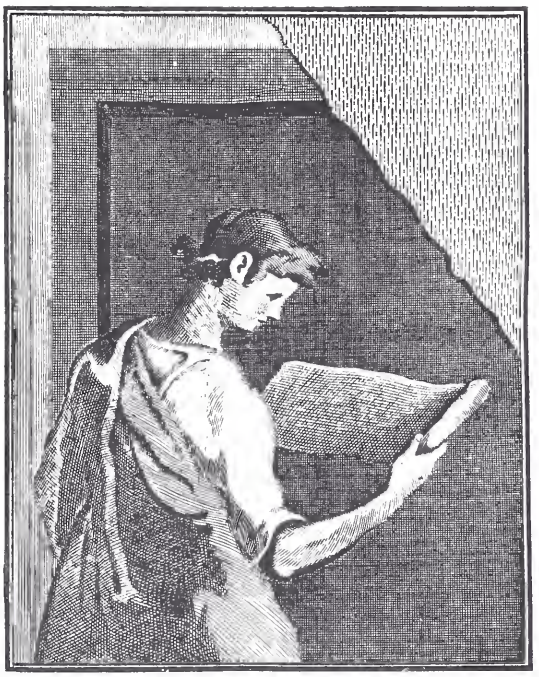

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AN IMPORTANT COPYRIGHT QUESTION.

In our issue of the 19th ult. will be found the report of a suit regarding copyright, the result of which will be looked forward to with interest by most photographers, inasmuch as a somewhat novel point has been raised. It is as to whether, when the piracy is committed abroad, penalties can be recovered for vending copies in this country. From the report supplied to us, briefly, the case, which was brought before the Carlisle County Court, appears to be as follows:—

A photographer sues a dealer for infringement of his copyright in some local views. The defendant, it is stated, desired to use some of the plaintiff's photographs for, we presume, micro-photography, but he would not agree to the terms offered. Eventually the photographer found that the defendant was selling pencils mounted with reduced copies of his pictures, which had been made in France. Hence the action. The main facts of the case were admitted. The point raised, however, by the defendant's advocate was that as the piracy was committed abroad, penalties for it could not be recovered here. The advocate relied upon a case tried in 1887, in which, he said, it was decided that when an article had been made abroad and imported into England the penalties imposed by Section 6 of the Act could not be recovered. In that case—Tuck & Son *versus* Priester—the advocate said, "The Master of the Rolls held that the penalty was upon the unlawful making. The Court held that the plaintiff was entitled to bring an action for damages sustained, and probably for forfeiture, and an injunction to restrain, but not for penalties. The plaintiff in the present case asked for penalties, forfeiture, and an injunction. The proper reading of the Act (it was contended), had been held, was that no penalty should be imposed when the copy sold was made in a foreign country. The copyright was in England, the making abroad."

This dictum will certainly take most of our readers by surprise. We cannot, however, help having some little doubt as to whether the case cited by the defendants' advocate was on all fours with the one now before the Carlisle County Court. It may possibly be that the report furnished to us does not fully represent the points raised, as in one or two matters it is a little vague. As at the time of writing the case is *sub judice*, we shall of course abstain from expressing any opinion on its merits. However, we here give Section 6 of the Act of 1862, the one relied upon, *in extenso*:—

6. If the author of any painting, drawing, or photograph, in which there shall be subsisting copyright, after having sold or disposed of such copyright, or if any other person, not being the proprietor for the time being of copyright in any painting, drawing, or photograph, shall, without the consent of such proprietor, repeat, copy, colourably imitate, or otherwise multiply for sale, hire, exhibition, or distribution, or cause or procure to be repeated, copied, colourably imitated, or otherwise multiplied for sale, hire, exhibition, or distribution, any such work or the design thereof, or, knowing that any such repetition, copy, or other imitation has been unlawfully made, shall import into any part of the United Kingdom, or sell, publish, let to hire, exhibit, or distribute, or offer for sale, hire, exhibition, or distribution, or cause or procure to be imported, sold, published, let to hire, distributed, or offered for sale, hire, exhibition, or distribution, any repetition, copy, or imitation of the said work, or of the design thereof, made without such consent as aforesaid, such person for every such offence shall forfeit to the proprietor of the copyright for the time being a sum not exceeding ten pounds; and all such repetitions, copies, and imitations made without such consent as aforesaid, and all negatives of photographs made for the purpose of obtaining such copies, shall be forfeited to the proprietor of the copyright.

A layman would not unnaturally imagine that there could be very little doubt as to the real meaning of this enactment. In framing the Act the Legislature clearly had in view the possibility of piracy committed in foreign countries, inasmuch as a provision is made for it by Section 10. This enacts that pirated copies may be arrested at the Customs House. As this Section, particularly when taken in connexion with the present case, may be of interest to many of our readers, we here give it in its entirety:—

10. All repetitions, copies, or imitations of paintings, drawings, or photographs, wherein or in the design whereof there shall be subsisting copyright under this Act, and all repetitions, copies, and imitations of the design of any such painting or drawing, or of the negative of any such photograph, which, contrary to the provisions of this Act, shall have been made in any foreign state, or in any part of the *British* dominions, are hereby absolutely prohibited to be imported into any part of the United Kingdom, except by or with the consent of the proprietor of the copyright thereof, or his agent authorised in writing; and if the proprietor of any such copyright, or his agent, shall declare that any goods imported are repetitions, copies, or imitations of any such painting, drawing, or photograph, or of the negative of any such photograph, and so prohibited as aforesaid, then such goods may be detained by the officers of Her Majesty's Customs.

By the above Section it is clear that the owner of a copyright is invested with the right of preventing the importation of infringements. Many photographers at pleasure resorts often complain bitterly of foreign piracies of their work in the shape of cheap collotypes, which are frequently sold at a tithe of the price of the originals. By this Section of the Act they will see that the importation can be prevented.

Reverting to the suit in question, it is a little unfortunate for the profession that the issue is being tried in a provincial county court instead of one of the superior courts, when the result—whichever way—would be the more decisive. Evidently the judge before whom the case has come is not quite clear on some of the points raised, inasmuch as he reserves judgment, and in the meantime suggests a compromise. If the latter be the end of the case, nothing will, of course, be decided by this action.

The foregoing case fully illustrates—what we have often said before—the necessity of an efficient and thoroughly substantial Trade Protection Society for Photographers. Such prosecutions as this one should be undertaken by a corporate body, representing the profession generally, for its mutual advantage, and not be left for a single individual to fight out in a country town. Any question of copyright is one that concerns the whole photographic community and, therefore, should be dealt with by its members in a corporate capacity, such as can only be obtained by a trade combination.

FROST IN THE STUDIO.

At the risk of telling a twice-told tale we propose making a few remarks upon some possible, but often neglected, precautions against the stoppage or retardation of studio work during winter weather, such as has, we regret to find, already occurred in the studios of many of our readers. The use of dry plates, with the power they give of making exposures for future development, enables portraits to be taken under conditions that render wet plate work impossible. Indeed, a photographer might be frozen up for a month yet not lose a single sitter, other things being equal. But his direst enemy is fog, and where the electric light or other artificial illuminant is not employed it is a matter of supreme difficulty, if even there be sufficient actinic light, to make a presentable negative. A very little fog in the atmosphere between sitter and lens utterly interferes with the production of a brilliant negative under ordinary conditions. That the absence of light that characterises so many of the days of this period of the year in the metropolis is not also experienced in the provinces many excellent portraits we have seen amply testify; hence the problem of taking pictures during the prevalence of a fog is by no means a theoretical puzzle only. It is well-known that where the electric light is installed pictures of almost, if not quite, equal excellence to those taken in the clearest weather can be made in a room not free from fog, if the precaution be taken to prevent the rays of light reaching any part of the room outside the sitter and his immediate environment. The same thing may be, and has been, done in daylight illumination by so putting up screens or long temporary tunnels in front of the lens that the atmosphere between sitter and lens is not illuminated. It is not the obstruction to light *per se* that causes foggy pictures, but the light reflected by the fog particles. They intervene between the darks of the picture and the camera, and are so relatively powerful as, when photographed, to predominate and give the familiar "foggy picture."

We have a letter from a correspondent informing us that this winter he has been unusually successful during the fog through having kept his heating apparatus at work night and day without intermission. He says, "In former years, when I have arrived at my studio through the foggy air, the same fog greeted me indoors, and was most disheartening; this year, thanks to keeping my hot-water pipes always hot, I find very little fog, and most of it is soon dissipated with a little extra firing." There is not any doubt that studio heating by hot water is preferable to open fireplaces as a general rule, although the latter have a far more comfortable appearance. There are very few chimneys that do not occasionally, in gusty weather, "smoke" a little; and, during the prevalence of a slight mist in the air, one puff of smoke spoils the atmosphere for a very considerable length of time.

There is another excellent mode of working in dull weather that is not adopted as frequently as it might be. We refer to the employment of shorter focus lenses than usual. There is then less distance between lens and sitter, and, so, less fog. Of course the usual objections to short distance obtains, but the professional photographer can often induce his sitter to have vignetted busts, or other kind of portrait where the use of short-focus lenses has few objections. For the rest, careful arrangement and a swing-back properly used will enable, in most cases, satisfactory pictures to be obtained. For groups it is almost essential so to work, unless the day be of an altogether exceptional character.

Snow on the glass roof is a fresh difficulty, but even here, quoting again from the gentleman we have referred to, he informs us that a five-inch fall of snow melted and disappeared in a day and a quarter this season, since he kept his studio warm all the night through. As to frozen and subsequently burst pipes, little that is new can be said, as most of the novel suggestions made have failed in practice. Some time ago a patent was taken out for making pipes of an oval instead of a circular section, on the theory that when expansion through freezing took place the pipe would be squeezed into a circular form, in which case, of course, the area would be increased and no rupture take place. We do not know whether these pipes have been put upon the market or not. Should any of our readers know, or have had practical experience with them we should be glad if they would communicate it to us.

Some years ago Mr. Apjohn ingeniously suggested that the expansion might be neutralised by soldering to the waterpipe, and of course communicating internally, another tube placed vertically and sealed at the outer end, in the expectation that, as the water expanded when it became ice, the unsolidified portion would be pressed into the blind tube, the air in which would be compressed by virtue of its elasticity, and not expose the untenacious metal to too severe a strain. We have seen this method tried; it failed. Possibly if such a safety pipe were to be placed at short intervals it might answer; the plan seems to us the most promising and feasible of any we have heard of.

Apart from such plans, we can only recommend the usual thing—hayband outside pipes; and where the waterpipe first enters the premises keep (as we know one photographer always does) a night-light constantly burning immediately underneath.

The autumn and winter meteorological conditions so inimical to photographic work, referred to in another portion of our columns as being so especially prevalent in the metropolis, can scarcely be understood except by those who have spent some time in London during the winter months; but, thanks to an article in *Nature* of the 18th ult., we can all estimate to a nicety the extent of the photograph-preventing pall that has been so frequently spread over the city.

This article, by Mr. Hargreaves Raffles, gives a series of charts representing the extent to which the sun's rays were excluded during the winter of 1889-90. One striking point at once noticed is the difference between the East and West End. Thus, in the months of December, January, and February, the number of hours that artificial light was used when with a clear atmosphere daylight would have sufficed was in Homerton, N.E., one hundred and fifteen and a half, while in Hammersmith, W., during only sixteen and a half hours was artificial light required. In other words, as the article states,

"Out of the ninety days concerned, nearly fourteen were practically turned into nights."

THE writer goes on to say, "The photographer is, perhaps, one of the greatest sufferers from this artificial state of darkness during the winter time. There are various methods in use by which photographs are produced, and most of these methods depend on good natural light." Tables are then given showing the various photographic results obtained with silver printing and ferro-prussiate. Taking half an hour as the time required to print a single copy in silver, or four minutes with ferro-prussiate, he finds that in November the average time for silver was on nineteen days increased to $3\frac{5}{19}$ hours; on fourteen days in December to $5\frac{3}{14}$ hours; and in twenty or twenty-one days in the next three months the time required was $3\frac{1}{3}$, $3\frac{1}{11}$, and $1\frac{3}{7}$ hours respectively. For ferro-prussiate the proportionate time was greatly increased. In November and four following months, and during about half their days, the four minutes required increasing to $2\frac{1}{5}$, 3, $1\frac{4}{5}$, $\frac{8}{15}$, $\frac{1}{4}$ hour respectively. The silver experiments were performed at Ealing, and the ferro-prussiate at New Cavendish-street, Portland-square. Hence the results are not comparable as to the relative rapidity of the two processes. But with regard to the latter it is stated that on one day only could a copy be printed in four minutes, the date being March 14, 1890; while on thirty-three days it was found impossible to print a single picture, even by this quick process!

THESE data exemplify the well-known fact that it is upon the rays found in the more refrangible end of the spectrum—just those which the fog particles filter out—that we must depend for great photographic activity. It would be wrong, however, to assume, as used generally to be done, that they alone act photographically; gelatino-bromide plates brought the action well towards the yellow and colour-sensitive plates, still nearer the red end; in fact, the relative action of the sun's rays is a function of the particular compound used rather than of the particular ray.

BEYOND a certain point at the violet end of the spectrum, rays exist which cannot be seen, but which, as is well-known, possess strong actinic power on ordinary sensitive silver salts. There are rays still further removed past the violet which had not been made photographically available up to a recent period. But Professor V. Schumann, in letters to Mr. Crookes, extracts from which the latter gentleman gives in the *Chemical News*, writes:—

"I have succeeded in photographing the ultra-violet spectrum beyond 1820 for a considerable extent. I thus obtain photograms which, if measured from Al No. 32, λ 1852 (Cornu), are two or three times as long as the entire spectral region between H (λ 4861) and Al No. 32. Hydrogen possesses the greatest photographic energy and the most refrangible rays; no other spectrum is so rich as this in lines in the extreme ultra-violet. These photograms can be taken only in a vacuum, and with plates sensitive for the ultra-violet. All known photographic plates, even the gelatine emulsion plates, are not sensitive for waves of very small wave lengths; hence they could, hitherto, not be photographed. I have invented a new sensitive plate, the photographic maximum of which lies in the most refrangible spectral region. I propose, subsequently, to publish my process of preparing these plates."

THIS is a discovery of singular interest, the work leading up to which has evidently been intricate and laborious. Professor Schumann's own words are:—

"The taking of the photograms of these new lines involved especial difficulties, as the vapours of thallium oxide arising from the passage of the spark between the metallic electrodes coated the window of the vacuum spectrograph and rendered it opaque, thus keeping back the effective rays. The air is so impervious to the most refrangible rays that I had to let the spark strike across quite close to the window. Hydrogen is very pervious, but the photographic energy of the spark striking in this gas is so faint that less can be done in this manner than in atmospheric air. Had the photographic action of the light been greater I should have allowed the spark to pass in hydrogen gas."

SCIENTIFIC photographers will await with great interest further investigations in this direction, which perhaps will not at first have the practical interest attaching to experimental work connected with he photographing of the rays in the region of the yellow, though it is at present full early to predict in what direction practical application may probably be found.

Obituary.

THE ARCHBISHOP OF YORK.

IT may not be generally known that Dr. Thomson, the Archbishop of York, was a practical amateur photographer who kept himself *au courant* with everything that transpired in connexion with the art-science.

On the occasion of his paying us a visit during last summer we conversed on the abuses arising from the indecorous use of the hand or detective camera, and on being assured by us that a few words on the abuse of the hand camera would doubtless have a great influence upon photographers, His Grace promised to write a brief article on this topic for our 1891 ALMANAC. His subsequent illness precluded the possibility of this promise being fulfilled.

The Archbishop of York has for many years been associated with photography. In 1872 a club of practical workers in dry plates was formed in London, known as the Dry Plate Club. Many of its members have now gone to their rest, among them being His Grace the Archbishop, who was president; Mr. John W. Gough, architect, the Honorary Secretary; Colonel Stuart-Wortley, P. Le Neve Foster, G. Wharton Simpson, and others. His Grace was also for many years one of the vice-presidents of the Amateur Photographic Association, of which H.R.H. the Prince of Wales is President. Although he had been ailing for a few months, he sank rapidly at the last, dying on the 24th ult.

WILLIAM ADCOCK.

IT seems only the other day since we had a pleasant genial letter from Mr. Adcock, explaining the circumstances under which he was compelled to make his article in the current ALMANAC so short. The next thing we heard of him was that he died on December 21st.

Mr. Adcock was an old and enthusiastic photographer, and for some years past devoted much of his work to figure studies. He chose more particularly subjects of every-day life largely of the humbler classes, in whose social interests he laboured assiduously, he being well recognised in Melton Mowbray (where he resided) as a large-hearted philanthropist. Mr. Adcock also took an active part in the Volunteer movement, holding rank as a Captain in the local corps. He was the beau-ideal of manly strength and vigour, and had almost reached the allotted span, dying at the age of sixty-nine years.

SEASONABLE EMULSION WORK.

IN spite of the heavy snowfalls of the past month, and the intense frost that has prevailed during a greater portion of the time, it cannot be said that the opportunities for outdoor work in the shape of snow or frost scenes have been very great, at least in the metropolitan districts, owing to the accompanying fogs, which, except at night, have been nearly constant. But in the laboratory the conditions have been eminently favourable for the preparation of emulsions for use in the coming season, for I believe there still remain, outside the ranks of professional plate makers, a few who find it worth while, at any rate for special purposes, to make an occasional emulsion.

During the best part of the photographic season it is perhaps scarcely worth the while of the amateur to attempt plate making, for, besides the fact that he has plenty of other calls on his time, the troubles attending the manipulation of gelatine and emulsion are too great for the merely occasional worker. However small or large the scale of operations may be, it is one thing to have every convenience at hand for making an emulsion at a few moments' notice, when possibly everything may run with tolerable smoothness; but it is an entirely different matter to take up the work at irregular

intervals, with no systematic means of regulating the temperature, and when every little detail has to be specially arranged to the entire upsetting of ordinary laboratory work. But at such a season as the present, while there is little else to engage the photographer, and when he finds the climatic conditions entirely in his favour, he may with advantage devote a portion of the long evenings to emulsion making, if it be only for the sake of practice and self-education.

I do not wish to imply that he can hope to compete against the professional plate maker in the production of his supply of plates for every purpose, whether from an economical point of view or in the matter of quality. The degree of perfection that has been attained in the arrangements of the principal makers of commercial dry plates, and the elaborate character of the machinery that has been imported into the work, have brought about such a combination of quality, rapidity, and uniformity, as no private operator on a small scale can hope to emulate. Still, for such purposes as lantern slides or slow andscape plates, or for any particular class of work that demands a plate of a special kind, it is not difficult now to secure results that will compare favourably with the majority of the plates obtainable commercially. Indeed, looking at the matter from one point of view, there is no reason why the careful worker on a small scale should not turn out films even superior to those prepared by machinery, and with all the attendant risks of a large and busy establishment, for in his case it would be possible to bestow especial care not only on the preparation of the emulsion, but also on each individual film coated.

It is mainly in the preparation of the emulsion itself that the cold season favours the operator, though to a certain extent the coating of the plates is also facilitated. Not only is the gelatine itself less liable to decomposition and other vagaries when the temperature is low, but it can be got to "set" more firmly, and consequently passes through the washing operation with infinitely less trouble than during the warmer periods of the year. Not one of my readers who has ever essayed the preparation of a gelatine emulsion but must have experienced the difficulty, even in comparatively cool weather, of bringing the emulsion to a sufficiently firm condition to enable it to withstand washing without partial volution or without absorbing too much water during the process, to say nothing of the chances of decomposition if the washing and draining be over-protracted. In the colder months this difficulty nearly disappears, and when snow lies on the ground it is perfectly easy to bring it to a state of toughness that enables it to bear almost any usage. And it may be asserted that when in this abnormally hard condition the soluble salts are as readily removed as when the temperature is higher, for the diffusion goes on with practically no diminution of rapidity at the freezing temperature as compared with 60° Fahr. When it is added that the gelatine absorbs far less water at the lower than the higher temperature, it is easy to see how greatly matters are simplified.

When we turn to the coating of the plates there is, of course, no difficulty in getting them to set rapidly, a serious difficulty with some gelatines in warm weather; but in this case there are perhaps counterbalancing circumstances to be taken into consideration. The setting may, in fact, be *too rapid*, causing irregularity in the thickness of the films, and absolutely necessitating the warming of the glass, which, of course, adds to the trouble involved. Then, again, the excessively low temperature is unfavourable to rapid drying, or, indeed, to drying at all; and this part of the procees may be so protracted as to extend over several days, with the result—especially if the temperature varies very much—that variations in sensitiveness and surface markings of the film occur. This difficulty, of course, need not exist where a properly fitted drying closet is available, but my intention is to show how the whole of the work may be performed with as little as possible of special apparatus. The emulsion may, however, be prepared and stored for use at a future time, when the conditions are more favourable for drying without too high a temperature for convenient coating.

It is not my purpose to deal with precise formulæ in my succeeding remarks, as so many of these adapted to different purposes are to be found in past volumes of the JOURNAL and the ALMANAC. My object is to give general directions for the treatment of the emulsion after sensitiveness is gained, whatever may be the formula and method adopted. Whether the "boiling" or the "ammonia" method be adopted, the conditions of temperature and other matters will be precisely similar, whether the preparation be conducted in summer or winter; and my task is confined solely to the after treatment. I will suppose, therefore, that the emulsification has been completed, and that the emulsion is ready for washing.

The first necessity is to bring it to the state of a firm jelly, and by far the most convenient way of effecting this is to pour it into a porcelain dish, which is placed in a larger one containing very cold water—or, better still, if it be available, snow, or a mixture of snow and salt. Under any circumstances, if the weather be at all cold, an hour or an hour and a half of this treatment will see the gelatine sufficiently firm for further treatment; but if snow be used, the jelly will be so tough as to be almost "leathery," and in splendid condition for manipulation.

The next operation is to reduce it into small fragments in order to allow the water to have free access to it. There are many ways of effecting this, a favourite one being, under ordinary circumstances, to squeeze the mass through coarse canvas; but under such conditions of temperature as I have described the jelly will be too hard for such treatment. It may, however, be easily cut up into fragments by means of an ivory or bone paper-knife, a strip of hard wood worked to a thin edge, or a silver fork. Whatever means be adopted it should be reduced to pieces not larger than a quarter of an inch cube, preferably smaller.

A very handy arrangement of a special nature consists of a piece of stout copper gauze of about eight or ten holes to the lineal inch stretched on a pretty strong frame of hard wood. Such gauze is obtainable at any of the dealers in chemical apparatus, and costs only about a couple of shillings the square foot; for our purpose a square of three or four inches will be large enough. Before fixing it in the wooden frame immerse it for a few minutes in an old hypo fixing bath, well charged with silver, which will cover the copper with a thin plating of pure silver, sufficient to prevent any action of the metal upon the emulsion. To use the contrivance, hold it with the left hand below the surface of a vessel of clean cold water, and having scooped up the solid emulsion from the dish in which it has set, rub it through the meshes of the gauze with the fingers of the right hand, when it will be reduced to the condition of hard granules, which are rapidly and thoroughly freed from their soluble matter without loss. If the water be quite cold, especially if a handful or two of clean snow be thrown in, there is not the slightest necessity to hurry the washing, and the emulsion may be left for some hours, with occasional changes, without fear of its absorbing too much moisture. When the washing water shows no milkiness on the addition of a drop or two of solution of nitrate of silver, or no more than water fresh from the tap that has not been in contact with the emulsion, the washing may be considered finished. After squeezing in a piece of linen or calico to remove as much as possible of the water clinging to it, the jelly may be remelted, and is ready for use for coating plates, or may be preserved for future use by pouring it into a bottle, about three parts full, and when it has set, covering it with good methylated alcohol containing one grain of salicylic acid to the ounce. Its keeping properties will be enhanced, and its fluent qualities when poured on the plate improved, by the addition before setting of about ten per cent. of its volume of the alcoholic solution of salicylic acid.

Another method of keeping the emulsion, and in some respects a preferable one, consists in covering the granules after washing, and without re-melting, with the same solution of salicylic acid in alcohol. Or, without washing at all, the shredded emulsion may be transferred to a bottle and covered with the same solution and left until required for use, the solution salts being gradually extracted by the alcohol. It may be observed that the alcohol, so far from penetrating the gelatine, has an opposite effect, causing it to shrink and become tougher, owing to the fact that it extracts the greater portion of the water contained; but it is this very process of extracting the water that also draws out the soluble matter. Before melting up an emulsion that has been preserved in alcohol it is always necessary to soak for some time in water after pouring off the spirit in order to restore it to its original swelled condition, and this washing or soaking effectually completes the removal not only of the excess of alcohol, but also the last traces of the decomposition salts. I am inclined to give the preference to this last plan where an emulsion is to be kept some time, as in addition to saving the trouble of the ordinary

washing, the presence of the soluble nitrates and haloids appear to have a beneficial action in preserving the clearness of the emulsion and preventing both fog and decomposition.

If preferred, the emulsion may of course be dried for preservation instead of being stored in the moist condition, though it seems an unnecessary trouble. If this plan be decided upon, the shredded jelly should be allowed to remain for a day or two under alcohol, and after a final rinse in a fresh quantity be pressed between folds of calico, and then spread on a sheet of glass or porcelain dish in a warm, dry place protected from light and dust until thoroughly desiccated.

There is one method of preparation I should like to describe, because it is not only well adapted to this style of preserving the emulsion, but it is also especially suited to the preparation of lantern plates, as it tends greatly to clearness of the lights by preventing the precipitation of the natural lime salts of the gelatine in an unsoluble form. I am not aware that it has ever been previously described in its entirety, though the general principle is not new.

The full quantity of gelatine to be used is soaked until thoroughly swelled and then dissolved by heat. Instead of now adding the bromides or other haloids, a sufficient quantity of pure crystallised carbonate of soda (not ordinary washing soda) to convert the nitrate into carbonate of silver is added, and when dissolved the silver itself is thrown in in crystals and stirred until complete solution has taken place. If the pure crystallised soda is not readily procurable, three-quarter the weight of bicarbonate may be substituted; but before adding to the gelatine it must be boiled vigorously in a glass flask with a small quantity of water to drive off the excess atom of carbonic acid, otherwise on the addition of the silver nitrate an inconvenient frothing will take place.

It will be observed that the emulsion now contains carbonate of silver and nitrate of soda, the latter serving more than one useful purpose. It aids the emulsification of the carbonate in a fine state, it helps to keep the lime salts in solution, and prevents fog; and if, as should be the case, distilled water is used, the conditions are all in favour of a bright and transparent emulsion. In this state the emulsion must remain for from half an hour to an hour at a temperature not exceeding 110° or the carbonate of silver may discolour.

At the end of the time mentioned sufficient bromide of ammonium is added to convert the carbonate into bromide of silver, and carbonate of ammonia is liberated, the temperature being strictly confined to that given above, or preferably it may be reduced to 100°. The carbonate of ammonia gives sensitiveness, while the nitrate of soda preserves the clearness of the preparation, and prevents fog as well as the formation of carbonate of lime. The emulsion is kept warm for half an hour, then allowed to set, and after breaking up, as already described, is covered with the alcholic solution of salicylic acid, in which condition it may be kept for a considerable time; though in view of the presence of the ammonia it is perhaps better to limit the time to at the outside a few days. The spirit may then be poured off and the emulsion well washed with *distilled* water and again covered with spirit if it is to be kept. If these directions are followed an emulsion will result in which the films are as clear as those of collodion.

In conclusion, while speaking of distilled water, the present is a very favourable time for preparing a stock that can be relied upon, which I am sorry to say is more than I have found with many of the samples one buys. With an ordinary flat-bottomed tin kettle and a few feet of tinned copper tubing bent roughly into a "worm," and one end soldered on to the kettle lid, and finally a bucketful of snow, a lot of distilled water may be drawn over in a comparatively short time.

W. B. Bolton.

A MEANS OF PRINTING FROM NEGATIVES HAVING EXCESSIVE CONTRASTS.

[A Communication to the Edinburgh Photographic Society.]

I come before you to-night to show a method of printing which, after a number of trials, I have found most successful with a certain class of negatives that would not give satisfactory prints by the ordinary method. There are some subjects from which, expose as you like, a good printing negative cannot be obtained. I allude to interiors, where the lights are in great contrast to the shadows. If a short exposure is given to such a subject, the lights are obtained all right, but usually there is very great density in such parts and very little detail in the shadows, consequently in printing to the requisite depth, either the detail in the lights is not obtained, or that in the shadows is over-printed and lost. If, on the other hand, a long exposure is given, halation or reversal is the result, and a negative is obtained from which it is impossible to get a print with the true values of the light and shade.

The method of overcoming the difficulty which I have to show you is so simple, and so self-evident, that I cannot but think that it has been tried before, but as I have never heard of its being previously tried, and as some of my amateur and professional friends thought it of great value, I submit the result of my experience to you in the hope that it may be useful.

The importance of being able to get satisfactory results from this class of negatives cannot be overstated, as such subjects are among the most difficult with which photographers have to contend, and an easy means of overcoming the difficulty is certainly a great *desideratum*.

Ordinary sensitised silver paper is made to print from negatives with a certain ratio between the shadows and high lights, consequently the negative has to be produced subordinate to that. It is different with bromide paper, where the result may be varied, both by the exposure and development.

A negative with very little contrast may be made to give a very satisfactory bromide print, and the same with one having very great contrasts. However, if halation is induced in a negative, no method of printing, so far as I am aware, will get rid of this fault. Reversal has begun, and no means can overcome the evil. It is with printing-out papers principally that I have to deal. I would suggest here that for the negatives a normal exposure be given to such subjects and the plate be not forced, so that the true relation between the lights and shadows be retained—that is, the contrasts produced in the negative as they appear in the subject, and then by subsequent treatment the result may be printed, so far as the whiteness of paper as high lights and the darkened silver as shadows will show.

I might have entitled this paper with great aptness "Compensation Printing," because the faults of the negative give its remedy. No matter how great the contrast may be, it is possible to print through the high lights of the negative and prevent the shadows at the same time from being overdone.

My first attempt to solve this difficulty was with a church interior, where there was only one window which caused trouble. I made a mask, from which I cut out a piece corresponding to this window, and in order to locate it, made the mask out of a lightly fixed print, from which I cut out the piece wanted.

This answered its purpose admirably, but trying the same procedure with another negative, where the strong lights were more erratic, I could not succeed in the same way. In this case the idea occurred to me to use simply a light print as a mask which itself would allow the light to be transmitted in a graduated manner most readily to those parts of the negative which were densest, and at the same time cover the thin portions. I found it was a complete remedy, and by varying the depth to which the mask was printed up, any desired result could be obtained.

The mask is prepared as follows:—A piece of ordinary sensitised silver paper is exposed under the negative and printed up to the required depth to suit the particular negative. I would say lightly for one in which there was not very excessive contrast, and pretty deeply for such as have the contrasts most marked. This is fixed, washed, and pasted on a piece of glass somewhat larger than the print. In order to use it, it is laid on the front of the frame so that it is about a quarter of an inch from the negative, and the subject allowed to print in the usual way, but it may, with advantage, be used in direct sunlight. If the mask causes the high lights to print up more than they should do, it can be removed when they are nearly right, and the shadows then allowed to print up to the required depth. It does not seem necessary that very great care need be exercised in placing the mask in exact register with the negative, it need only be approximately so.

Interiors, however, are not the only subjects which may be treated in this way, as any negative which has from under-exposure or other cause been rendered hard can be printed from satisfactorily by this means.

The only objection, and it is a small one, to be urged against the method is that it is comparatively slow, but the sun charges nothing for shining, and if a good print is desired one must just wait till it is done perfectly.

I need say no more on the subject, as you will have been able to

see at a glance of what value it is; and as I myself have received much useful information at these meetings, I hope my small quota will be found of service to the members. JAMES M'GLASHAN.

STEREOSCOPIC PHOTOGRAPHY.

[A Communication to the Greenock Camera Club.]

WHEN asked by our respected President to provide something for this evening's discussion, I at once chose the subject of stereoscopic photography, and this for two reasons: firstly, because my attention has mainly been devoted for the past year to this branch of photographic art; secondly, because I really think amateurs are not giving it the attention which its merits demand.

I cannot quite see why it is not more generally worked. I would not have it understood that I mean it to supplant the ordinary single picture which has its own merits, being often of large size, suitable for exhibitions, albums, &c.; but I would suggest that it should run alongside of it. All would find a charm and novelty in stereoscopic work that would be a pleasant change from ordinary single prints.

Stereoscopic photography is not new. I worked at it in the so-called good old collodion days, and that is not yesterday; but undoubtedly it fell into disrepute—why, it is difficult to say; possibly fashion had something to do with it, and, more possibly, bad pictures had conduced to its disuse; for the miserable work turned out by amateurs in those days had no chance of comparison with the work that now can be done, and only a tithe of the labour.

Now that the modern gelatine plates are used, the same difficulties do not surround it. It is as simple as any other photographic process, and, I venture to add, more enjoyable.

It may be urged that expense has deterred some from attempting it. No doubt two lenses are double the price of one, but they need not be costly lenses, and that is the whole additional expense. I think I explained last year how an ordinary quarter-plate camera could be drafted into the work with success for *still* subjects, but the great part of the charm of the work would be lost with only one lens. Two are, I think, a necessity, for all moving objects can be caught, just the same as with any ordinary hand camera. Then, again, to save expense, any one having a half-plate camera with square front can have a central division put in at a small cost, the lenses then being the only additional expense. Let me hope these few remarks, with others to follow, will stimulate more to take it up, and I know they will not regret it.

I do not pretend to give you a paper on stereoscopic vision, but I would like to help you to understand some of the principles that govern it. It is necessary to take two pictures. These two pictures must be taken from the same standpoint, but the point moved in a lateral direction, say $2\frac{5}{8}$ inches, so that they are dissimilar to that extent; or, say, two pictures taken by two lenses side by side $2\frac{5}{8}$ inches apart (the normal separation of the eyes), but on the same plane, will produce two dissimilar pictures to that extent. These two pictures properly mounted and viewed in the stereoscope will give you stereoscopic vision, they coalesce into one in the brain, and give you the feeling of solidity, distance, form, &c., a quality no single picture can give, no matter by what means it is viewed.

You will perceive by looking at a square box (placed at somewhat of an angle, showing two sides) that by looking at it with each eye alternately that you see more of the left side of the box with the left eye and less with the right, so that the views of the box are dissimilar, same as a lens or lenses would view it. And when you look at the box with both eyes, you see only one box, or one picture, unless under some peculiar state of hypnotism late in the evening. These two pictures then combine in the stereoscope and form one picture in the brain, having the same quality as looking at nature with two eyes. I presume nature did not give us two eyes if *one* were enough. It was evidently intended that binocular vision was to assist us in judging distance, form, &c., which one eye cannot do, as any one may convince himself by trying.

I would now direct your attention to the size of plate which may be best suited to this class of work. I do not see why the square conventional picture we have been used to should be right, any more than we should take our ordinary single pictures square, hence I have adopted the ordinary half-plate as my size. It is to be noted that the size of the picture is restricted in one direction, that is the width—$2\frac{7}{8}$ inches is my standard, but the other, or vertical portion, may be proportioned to this size. So it is found the half-plate will give a picture $2\frac{7}{8}$, say, by 4 inches, which is undoubtedly better than a square.

This leads us to the question of the width between the centres of the pictures, or rather the width best adapted to combine in the stereoscope without effort. This may be from $2\frac{5}{8}$ to $2\frac{7}{8}$ inches. The latter I have adopted, but no more than $2\frac{7}{8}$ inches can be used, or else there will be a strain, as some of you may have experienced in badly mounted pictures.

The distance apart the lenses are to be mounted on the camera will next require some consideration. Theory says $2\frac{5}{8}$ inches apart (the normal distance between the eyes), but practice finds $3\frac{1}{4}$ inches for distant objects, and even more, quite admissible. In taking portaits, $2\frac{5}{8}$ or $2\frac{3}{4}$ inches would be best, as near objects would be exaggerated to such an extent as to become painful; but for distant objects a good width is available. The reason for this is that for distance the lenses $2\frac{5}{8}$ inches apart would receive lines practically parallel or without relief, hence the power to give them relief. The half-plate which I have adopted as my standard gives me $3\frac{1}{8}$ inches between centres, the most I can get, as a $\frac{1}{4}$-inch is lost in the rebate of the camera, so that $6\frac{1}{2}$ inches is lessened to $6\frac{1}{4}$ inches, divided by two is $3\frac{1}{8}$ inches, that is the width between centres all my pictures are taken by.

Let us now consider the lenses themselves. Single lenses accurately paired can be had at very moderate prices, and answer the purpose well, in fact the best for landscape work, but for fast work a pair of rapid doublets are undoubtedly to be preferred. I use a pair of Wray's R.R., 5×4, $5\frac{1}{2}$ inches focus, which leave nothing to be desired. I have mentioned $5\frac{1}{2}$ inches focus, because I believe it to be the best medium focal length, but for confined situations and interiors no doubt 4 inches would be better. On the other hand, 6 to 7 inches can be used with effect for distant objects; but whatever lenses are chosen they must be accurately paired.

The camera suitable for this work can be a special stereoscopic camera, or an ordinary half-plate. I have before stated a quarter-plate can be used under some circumstances, but for general work it is best left out. The half-plate camera can have a division placed inside, which can be made to fold in the camera or taken out, and a front made to carry a pair of lenses $3\frac{1}{8}$ inches apart from centre to centre. A camera $7\frac{1}{2} \times 5$ can also be used same way, and utilize the full extent of plate, and the lenses in front could be made to move from 3 to $3\frac{1}{2}$ from centre to centre, and used according to the subject. A whole-plate camera can also be pressed into service in the same way; but, of course, using carriers as a whole-plate would be a piece of extravagance quite uncalled for.

But all these are, in my estimation, inferior to the hand camera, which I have now the pleasure of showing you. For the last three years I have made each year a hand camera, in which I have tried to carry out certain principles which I considered necessary for comfort, lightness, and for immediate use. I have here my latest development of a stereoscopic hand camera, which I am so satisfied with that I do not intend to make another this winter.

The camera mainly consists of a rectangular square box $7 \times 5\frac{1}{4} \times 9$. It is divided near the centre for focussing. The plates are held in a chamber behind, without slides, and changed by hand, in a light-proof bag. A double shutter in front is placed in a hinged lid, and can be regulated in speed at will. The lenses are a pair of Wray's 5×4, $5\frac{1}{2}$ inches focus, separated $3\frac{1}{8}$ inches from centre to centre. A circular level is placed in the top, and by its means *alone* (no finder being required) all the pictures are taken. To use the camera it is necessary (if no convenient rest is at hand) to place it against your chest. Stand firm, hold your breath, get the bubble of the level in the centre, let your eyes run along the sides of the box, centre your object, and fire by means of the small lever at the side.

I will now say something as to printing on glass for the stereoscope, but first I would impress upon you the importance of good, clean negatives, free from blemishes of any kind—not that you cannot get as good a picture on glass as you would on paper from the same negative, but in transparency work good clean pictures must rule. Your negative may be of fair average density, neither too thin nor too dense. If too thin, it can be improved by any good method of intensification; but note that your plate must be thoroughly freed from hypo, or stains will assuredly appear.

If you have any skies, do not block them out; they add a wonderful charm to the finished work. If pinholes appear—and they do appear—take a retouching desk, or some contrivance in place of it, and by the aid of a magnifying glass go carefully over the negative with a needle-pointed, very hard pencil. It is laborious work, but it will repay the trouble. If the pencil will not bite, use a little retouching medium, rubbed over the negative or part of it. The point of the pencil must be carefully carried to each spot, and repeatedly touched until it disappears. If there are large damages, such as scratches, &c., use a fine camel-hair pencil and some grey paint, water colour of course, to suit the colour of the negative, always remembering to make all rather darker than lighter, as in printing it will come out light, and you can again, by the pencil

on the transparency, remedy the defect. Having got the negative as perfect as possible, I will now show how a transparency can be put on glass without cutting the negative. The pictures have to be transposed on the transparency from what they are on the negative, for the reason that the pictures on the negative are taken upside down, and when they are looked at the right way the left-hand picture comes to right, and right goes to left, so that means have to be taken to reverse them before they are right for the stereoscope.

The printing frame made by myself (from some suggestions I saw in the journals) is similar to an ordinary printing frame but longer. The width is exactly the width of the plate. Instead of being open, it is closed, all but a central opening of $2\frac{7}{8}$ inches. A negative is placed in it, face up. It is run along to one end, bringing one of the pictures to coincide with the opening. It is adjusted at that, and a transparency plate is placed, face down, on it; but run to the opposite end from the negative, so that two ends overlap each other. The cover or back is put on and held down by a spring. The frame, with negative and plate, is then exposed. This, you will observe, is only one picture done. The frame is opened again, the negative run to the other end having the other picture against the opening, and the transparency plate also reversed. The frame is again closed, and the second exposure made, which must be the same as the first. The operation is now complete and ready for development. I have to say that the transparency plate is guided by two marks in the frame when placing down on the negative, which will result in the picture being properly placed on the plate, $2\frac{7}{8}$ inches apart. Regarding exposure and development, most of you work lantern slides, so that you will have methods of your own. Those who can produce a good lantern slide can easily produce a good transparency, the difference only being that development must be carried much further than for a slide—in fact, until you see the picture well through on the back. I have not here given you any formulæ for developer, as they are as numerous as stars in the heavens. Some use pyro, quinol, eikonogen, and ferrous oxalate. Then, again, the alkalies are as numerous—ammonia, soda carbonate, potash carbonate, soda hydrate, potash hydrate, ammonia carbonate, &c. &c., not leaving out lime water. Most of my pictures have been developed with a mixture of quinol and eikonogen, with carbonate of soda and potash as alkalies.

I have not found it necessary to intensify, reduce, or clear any of them, as I do not like these additional operations, and would rather take a picture over again than risk such a doubtful method. You will easily understand that when a plate requires clearing, reducing, or intensifying, there is something radically wrong, either light or development, perhaps both, and by no process can you get a plate wrongly exposed and developed right. The plan is to take another plate, and another, until you find it right, using brains in your developer. The best work can only be done in this way, and it is necessary to have the best work for transparencies.

Those of you accustomed to develop lantern slides will have observed the different phases of the process; first the faint image, which gradually strengthens, then the half tones, then the sky (if any), while the high lights preserve their creamy whiteness, and an image that is faint on the back, yet decided, can be seen. All this will satisfy the operator that he or she has got the best the negative is capable of giving.

But, on the other hand, if your picture comes up fast, having a grey, undecided-looking appearance, throw off your developer, throw the plate away, and start afresh, correcting the error you made, either in exposure or development. It may be accepted as a rule that for thin negatives the exposure must be with prolonged weak light and strong developer, and the reverse for dense negatives; this will reduce contrast or strengthen, as wanted.

It is not an easy thing to make good transparencies, especially for the lantern, and the plate has yet to be found which will give us the beautiful effects produced by collodion.

Here let me recommend to your notice a valuable addition to the pyro bath. If any of you use a dipping bath you will find it a great benefit. When the hypo bath is freshly made, add the following—say one to twenty of hypo—saturated solution of sodium sulphite, with one drachm of hydrochloric acid. This will keep your bath clear, an important item in transparencies. It acts as a clearer, and something also as a reducer. The bath lasts a long time, and can be renewed when discoloured.

Let me here state my reasons for preferring a transparency on glass to paper prints for the stereoscope. First, you will all I am sure agree with me that a stereoscopic transparency is a more beautiful picture than one on paper. The delicacy and sparkle of it cannot be equalled by any process.

Secondly, the operation can be carried on in your dark room any evening you care to work. The exposure can be made by the gas jet, and the few pictures any amateur wants from his negative can be done without the aid of daylight, toning baths, weather, &c., besides the troublesome mathematical problem of cutting and mounting paper prints, which are so difficult for the stereoscope.

I have nearly omitted to say that mounting a stereoscopic slide is the same exactly as mounting a lantern slide. The line down the centre is sufficient guide between the two pictures, the mask only being required round the edges. ALEXANDER ROBB.

THE SKELETON: A HANDY ENLARGING APPARATUS.

IN view of the then approaching short days and wintry weather, I lately assisted an amateur friend to design and fit up a daylight enlarging apparatus, and as it is somewhat new and has proved very successful, a description of its principle and arrangements as it has been fitted up may suit some of the numerous devotees who wish to try their skill in this department and enable them to utilise their summer's work without any great expense or very serious disturbance in an ordinary bedroom or parlour, the whole affair being comparatively portable.

The room selected (a small one, about fourteen feet by ten) looks north-west, with a fine clear outlook, unblocked in any way, to the horizon, which is closed in with a distant ridge of not very high hills; but to prevent any possible ill effect from this, and for other reasons, a window pane was filled in with a closely fitting frame filled with coarse ground glass, and for this purpose the coarser it is the better, as the light diffuses more equally through such a medium. This was simply fixed with a couple of pins and parbuckles for portability. This, the only window, had closely fitting shutters which required very little doctoring in the way of list being tacked round the seams to make it when they were closed a perfectly dark chamber—a camera obscura, in fact. One of the lower panels in the shutters opposite the obscured pane was carefully removed and refitted with fastenings, so that daylight or darkness was perfectly at command. The question as to the usual white sheet of paper at the 45° angle was discussed, tried, and found to be unnecessary.

The neat arrangement comprises what my friend has christened his skeleton camera, which consists of a couple of dressed boards with two such cross-ends to make them stronger and prevent warping. The one which is used undermost is fourteen inches broad by eighteen inches long, the other and upper one twelve inches broad and eighteen long. A slot runs through the centre of each, but not further than the cross-ends, to allow of them being clamped together with a couple of binding screws, just like the baseboard of the old wooden camera, which this is, with a difference.

Upon the lower board, a couple of inches from the end which is to be placed nearest the window, a frame is hinged at a right angle, and fixed there with suitable angle-fastening struts, so that it may fold down when not in use. The opening in this is made to carry the largest negative in use, and in the same rabbet is introduced fastening for holders to carry the various sizes of plates, down to the smallest of the hand-camera type. This we will call the plate holder. It will be seen that it is equally suitable for carrying transparencies.

Perhaps a better or, at least, as good a way to hold the negative glasses in any position, so as to use or exclude at will any portion of the negative, is that described at page 508 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1890, and that method might be adopted in making a similar thing, but in this case the copying lens is made to move so as to cover and centre any part of the plate holder before it, thus securing the choice of any part of the subject.

For convenience of access and handiness the inner frames are fastened by catches from the inside of the skeleton, and in order to allow the top slider to pass, a slot of sufficient size is cut in the lower edge, and of course rendered light-tight. This allows the lens to be brought as near as may be necessary; in fact, gives the fullest control over the size of the image, the lens being able to be moved as near to or as far away from the plate holder as may be necessary.

For fine adjustment, in case the lens in use is not provided with that arrangement, a focussing screw is attached to the lens holder and base, by which the greatest attainable sharpness can be secured. The upper sliding board carries the lens holder fastened with struts in the same way as the plate holder. This is a board with opening for the lens, moving freely and of the same external size. On the inner side of this is fixed, in the way usual with cameras, a holder for the lens or lenses which have free perpendicular and lateral motions. In the present case all the lenses in use, or to be used, fit into the same flange, so that each can be moved to cover the whole or any part of the negative in front of it; in fact, it is as if the front part of the camera

was reversed, and the lens screwed into its flange on the inside of the skeleton, and it having neither sides nor top makes the adjustments extremely easy, and not only so, but by using the negative or transparency with the film side out or reversed a print or negative may be got either the proper way or reversed at pleasure.

To the sides struts are attached by screws on either side, which reach to the floor and act as feet, and by the aid of the slots the skeleton can be placed either level or at any upward angle, the other end of the slotted strut resting on and catching the floor. The plate-holder end rests on a suitable fixture facing the only opening admitting the light, or the whole may be worked on a table of suitable height and size.

The space between the window and the lens holder is closed in with a suitable light-tight cloth, which is large enough to completely exclude the light, and a couple of umbrella or parasol ribs will be found very useful placed on the tops of the plate and lens holder in preventing this from sagging down and obstructing the image, or while arranging the negative transparency, or as this was principally designed for printing enlargements from small negatives on the bromide paper used for this purpose.

In getting the focus for the enlargement, whether that be on a plate wet or dry, a canvas, or paper, a piece of glass is used, covered with a sheet of white paper so as to be just the thickness of the prepared plate, and if paper be operated upon this must be so arranged as to fall in the proper space for perfect sharpness, but in order to make certainty sure a yellow glass cover or cap is used for the back or open end of the lens, and the enlarged image is focussed through this on to the sensitive surface itself; and, indeed, this is made use of in the same manner as a cap to expose and regulate the duration and shut off the sensitising light when the necessary amount of exposure has been given.

The second and supplementary portion of the skeleton is the support for the enlargement, and this not being in actual connexion or contact with it might be anything that would do for the purpose, but in the present instance, as well for convenience and price as for anything else, an artist's easel was taken with parallel sides and back rest stopped by a rack which was hinged, and the whole fitted with castors for easy movement. The shelf was increased to about double the width of that supplied with it, and in addition slotted quadrants with screws to fasten the support for the enlargement at any angle; this support was made of a large drawing board just the width of the easel, and which, when resting on the shelf and attached to the quadrants, in addition to their own proper motion, have also a limited up and down movement corresponding to and acting with the spring ratchet, so that the enlargement can be accurately centred, and the quadrants bringing the sensitive surface square to the lens and lens holder, and thus securing the correctness of the lines. No matter at what angle the skeleton may be, the quadrants on the easel will bring it to the square.

At the window shutter the necessary frame with deep groove was fixed permanently, and on the edge of the plate holder and lens holder a similar deep groove is run to enable the worker to fasten the cloth, which makes all light-tight, with a bit of cord, allowing at the same time access both to the negative and lens when necessary.

Another and not less necessary thing for comfort and easy replacement, when lost in the use of a portable enlarging apparatus like the skeleton, is to have all the screws throughout made interchangeable, and this is easily effected, as most ironmongers keep such screws of a cheap kind, and those are the only ones used, except that for the fine focussing arrangement, and they are found to be quite efficient.

W. H. Davies.

BLISTERS ON ALBUMEN PRINTS.

In a recent number I read in "Echoes from Europe" of the discovery or invention, whichever you may call it, of a sure preventive for that greatest of all pests, blisters on albumen prints, viz., the glycerine method, and your request for the opinions of your readers on the efficacy of the remedy in actual practice.

I have often read articles on the same subject written by men of extended experience and practice, and who could put their thoughts into good, readable shape, but I failed to see that any of them touched upon the real cause, hence their remedies (?) would have but a limited effect, and not a real permanent preventive.

I have given the subject considerable study, and experimented a great deal in this direction, and will here give the result, which does *effectually prevent*—not *cure*—them. An ounce of prevention, you know, is worth a pound of cure.

Now the remedy I shall propose is costless, and can be easily applied by every one, and as it can do no harm, it certainly is worthy a trial, and a thorough trial, before condemning it; and let no smart Aleck come forward and say, "Oh! I have tried that years ago, and it does not prevent." All I have to say is, "the proof of the pudding is in the eating;" try it, and convince yourself, as I have been convinced.

In the first place, what is the cause of blisters? I have proved to my own satisfaction at least what the cause is.

In the first place, if we take single albumenised paper and sensitise on a nitrate of silver bath forty-five or fifty grains strong we will have no trouble with blisters. Now take extra brilliant or heavy albumenised paper and sensitise on the same bath, and if we are not exceedingly careful—and many times with all our care—the blister pest will put in an appearance in some form or other.

Now here is the first step towards finding out the cause. In the first, the albumen being very thin, it was thoroughly coagulated by the silver solution, and in that condition the chemicals, during the remaining operations, had no deleterious effect. With the second or doubly albumenised the silver does not always thoroughly coagulate the albumen, hence in the operations of toning and fixing it becomes swollen and separates from the paper, and allows the air or gas which may be generated during the operations to collect, and in that way causes the blisters. This is my theory, acting upon which I proceeded to prevent the swelling of the albumen. First, I took two strips of albumen paper, one of which was placed into a dish of cold water; after remaining a short time it was taken out, and with my fingers I could wash off all the albumen. The second strip I placed into a dish of *boiling* water and let it remain a short time, and upon removing I could not disturb the albumen surface. Eureka! I have surely found the remedy, or preventive.

Having some untoned prints on hand, a portion of which I placed into boiling water (after toning and before fixing), and, as I had concluded, not a sign of blister. The next day I put the whole batch of prints through boiling water, and not a blister. Since then I have treated all my prints to the *boiling water* immersion, and have been entirely free from blisters, and no other remedy—salt included—is employed. I also found that the prints fixed more thoroughly, and looked more brilliant than before using the boiling water bath. I believe the prints fix better and are more permanent.

If a few prints are placed face down in boiling water, air in little bubbles will be seen to come through the paper at the back; try it.

Boiling water will not harm the prints in the least, and it is so much cleaner and expeditious than glycerine, and a thousand times more efficacious.

In conclusion, I would say, as I have not applied for a patent, I would request all who are in the least troubled with blisters, or softening of the albumen, to try the boiling water, convince yourselves and be happy, and see if there is not a small spark of science in it. I use the boiling water all the time, whether there be danger of blisters or not. My prints are better for it.

A. W. Clark.

—*St. Louis and Canadian Photographer.*

WOMAN AND THE CAMERA.

It is impossible to tell over-night who may be attacked by the photographic mania. You may go to sleep meditating peacefully on the prospect of a cool wave, and wake up with thoughts of film rolls and snapshots and developers, and the alleged ease of pressing the button while a beneficent Providence does all the rest, scurrying like so many microbes through your brain.

The virus works with unbelievable rapidity. In ten minutes you see an iceman who would make a capital character-study for a villain. In two hours you are listening eagerly to instructions about focus and exposure. In six hours you are training confidently on a Brighton Beach belle emerging from the water in a wet bathing suit. In twelve hours you are tilting the pan hopefully in an improvised dark room, most likely the bath room, with blankets pinned over the windows. In twelve hours and five minutes you are examining your first plate nervously by the light of your red lantern. In twelve hours and six minutes you are exclaiming "fogged!" in accents of wild despair. In twelve hours and ten minutes you are drinking lime juice and water, *à la* Beau Brummel, and explaining to your interested family that "it's curious what an amount of interest some people take in such things."

Such is the run of an ordinary attack of the disease, acute but brief. Some people have it harder. Mrs. Thomas C. Platt has had it very hard indeed. This lady was one of the first victims of the camera epidemic. It was four years ago, or thereabouts, that she began to use her husband as a model, and immortalised the ex-Senator in all sorts of dignified and undignified positions and occupations. When she got a fine series of views of him loading stones on a barrow, wheeling the barrow, and laying the walks, somebody suggested, "Labour vote, transparencies, use in campaign?"

"Loads are too small," said Tom Platt, astutely; "make the workingman grin."

The pictures of immigrants that Mrs. Platt took at the Barge Office and on the *Burgunda* a month ago, and other steamers more recently, have turned out very nicely. She has been down the bay with a labour inspector and interpreter half a dozen times, and has now a collection of turbanned Syrians and chunky little Italian girls in long earrings, and tall

and stalwart Irish girls, and weather-beaten old women from the Welsh mines, and picturesque Norwegians, Hungarians, and representatives of every nation that sends its surplus population to our shores, that is surpassed only by the photographic art gallery of Mrs. Bruce Ismay. The immigrants have shown themselves willing to pose for her, once satisfied she was not aiming at them a new sort of dynamite gun; but on her last visit a Russian Jew, in a long cloak of the hue of his long grey beard, insisted with so much dignity that "his face should not be stolen," that Mrs. Platt gave her word she would destroy the negative. The leonine old Russian may have been looking forward to the day when his descendants should be the Vanastorbills of the twentieth century, and objected to any record of their origin.

Mrs. Bruce Ismay photographs shipboard life, as a name connected with the Inman Line would suggest, and has perpetrated groups that would make the fortune of an artist if he could reproduce in colour the faces of some of these new citizens of our new land. I am told that the battery under the old *régime* at Castle Garden fascinated her, and that many of her most unique pictures were obtained by snapshots at the "lately-landed," issuing single file upon the asphalt pavement, looking about them curiously and in wonderment, seated on the park benches looking over the water, or volubly greeting half Americanised relatives.

The women who photograph do so with all sorts of cameras, from that which is sold for twenty-five cents, and takes a single picture before the exhaustion of its usefulness through a pinhole instead of a lens, up to outfits costing hundreds of dollars. There is one young woman, and a very graceful and dainty one, whose father has many shekels, and who when she goes off on a photographic excursion is followed by a negro servant, who carries her tripod, and adjusts it with great flourishing of elbows and conspicuousness of teeth when she has chosen her point of view. When the exposure has been made, with a "I tink we got 'er dat time, suah, missy," he packs up the *impedimenta* and journeys on. It may be well to add that the young woman, in spite of this pomp and circumstance of photography, takes artistically composed pictures.

Most women bitten with the craze use the handy little portable cameras, or detectives, but even without the services of a coloured porter there are a number who manage this tripod variety. Last summer, at one of the Seidl Society's meetings at Brighton Beach, there was a pretty scene when Mrs. Elizabeth Cady Stanton consented to be placed in position and was photographed by a daughter of Olive Thorne Miller. Mrs. Miller's family seem to be photographic, for she has two daughters who are given to shutting themselves up in dark rooms, but who cannot, with all their "snapshot" work, get very close views of the sky-feathered songsters that are their mother's especial study.

One of the most successful women photographers left America for Russia a month ago. Mrs. Sergius Schewitsch, who was the beautiful Helene von Racowitza, and whose career has been as romantic as that of any living woman, had the face of one to whom life had brought contentment, but showed a restless energy that did not disdain an outlet in half a dozen fads, photography being the most zealously followed. Her speciality was the portraiture of children, and I remember chatting with her one bright morning in the park, when a white-capped nurse came along with a Kate Greenaway urchin that could just toddle. "Will you lend me that baby?" The aristocratic nurse looked up at the tall, blue-eyed, blonde woman, and stared. "I only want to take its picture." The stare began to spell itself into a glare. "Come, little one;" and Mrs. Schewitsch conquered the baby's heart with a smile and an outstretched hand. The nurse had to follow willy-nilly, and for half an hour the woman who played so strange a part in the history of German socialism sat on a rock a little away from the track of the promenaders and studied the baby as it tumbled on the grass, catching it in all sorts of fat-armed and chubby-kneed attitudes.

A scientific photographer is the little dark-skinned Mme. Alice Le Plongeon, who spent so many years in Yucatan with her husband studying the relics of lost races. It is a common enough thing with amateurs to call themselves photographers, though they do nothing more than make the exposure, sending plates or film rolls to the studios of professionals to be developed and printed from. But Mme. Le Plongeon struggled with photography in the depths of tropical wilderness without the amateurs most ordinary conveniences, making pictures with wet plates which she herself prepared, often under the most unfavourable and disheartening conditions. Her work is wonderfully strong and even in its excellence, and to sit in her library—studio, den, by whatever name you choose to call her workshop—is to look round on ruins of temples, monuments, statues, inscriptions, until you anticipate the feelings of Macaulay's New Zealander, who may one day stand on the wreck of London Bridge and speculate on the forgotten civilisation of the British Isles. Mme. Le Plongeon makes her own lantern slides from her photographs, and when she lectures, her husband manages the stereopticon, she performing the same service for him at his lectures.

Miss Katherine Weed Barnes goes into amateur photography with whole-souled enthusiasm. Miss Barnes is a niece of Thurlow Weed, and having plenty of money, she does not stint herself in the number or the costly appliances of her cameras. If she wants to find out if she likes a thing, she buys it and tries it. Thus it comes about that she owns twenty-six different photographic cameras, and has fitted up a studio that wins exclamations of admiration and despairing envy from its visitors. Miss Barnes has paved the way for the admission of her sex to photographic societies. In photographic exhibitions she has stood consistently and logically against the absurd "ladies' prizes," maintaining that women exhibitors should not be set off in a class by themselves to compete only with one another, but that men and women should contend without sex distinctions, on the same footing, for the regular prizes. She has lately become one of the editors of the *American Amateur Photographer*.

There is no use mixing much in the company of amateur photographers unless you share their enthusiasm. Get half a dozen of them together and they will begin about "pyro" and "iron developer," and "bromide prints," and "colour values," and their language will depart so far from every-day English, that you speculate whether they are talking Sanskrit or Choctaw. This is how it happens with some of the women artists who use photography as an adjunct to sketching. Miss Agnes Abbott, for example, who has done many good things both as flower and landscape painter, makes considerable use of the camera to give her details in a minute, which it would take her an hour to bring out with pencil. At her country home in summer she sketches a scene in broad outline which strikes her as an attractive subject for a painting, and then photographs this fence corner, or the way that shrub leans over the brook, or a dozen and one other items, which are so many memoranda helps to her memory.

The wife of another artist is a good deal of a photographer. Mr. J. Wells Champney uses the camera, and Mrs. Lizzie Champney uses it quite as successfully. With its help she has preserved interesting records of the growth of her children, picturing them preferably while at play. Instantaneous pictures of children are fascinating photographic recreations. People with detectives take them pushing the lawn-mower, riding pick-a-back on papa's shoulders. A little boy was taken the other evening by a flash light at his mother's knee. "At prayers," she called it. "Wasn't praying," protested the honest urchin; "just having my picture taken." In photographic families, it may be noted, the children get well used to posing. One sweet-faced little girl is taken every Christmas morning surrounded by her toys. In after years she will have proof positive of the great number and variety of her childhood's playthings.

The photographic section of the Brooklyn Institute got up excursions last summer to different points in the suburbs, and these were attended by quite a number of women with their cameras. Miss Mary Newton, whose mother is Chairman of the Executive Committee of Sorosis, and who is in her tastes an artist, is one of the enthusiasts, and Mrs. Cornelia Hood, who is now part owner of Miss Mary F. Seymour's *Business Woman's Journal*, is another.

The detective is becoming quite a useful article of the newspaper woman's stock-in-trade. Miss Elizabeth Bisland is a clever photographer, and Miss Eta Thackeray, who is a relative of the novelist, has done considerable work with the camera. Miss Alice Stone Blackwell has photographic tastes, though she indulges in them for amusement, and not for the benefit of the *Woman's Journal*.

Photography seems to have an especial attraction for actresses. It is one of Clara Morris's hobbies, and her fine horses are her favourite subjects. Ada Rehan got a camera this spring, though how much she is doing with it I do not know. She ought to find plenty of picture material and plenty of people of congenial tastes in London.

A woman to be sympathised with is Mrs. Cleveland. She is rather given to hobbies, but is shy of indulging her tastes, because everything she does brings on her so many eyes. She is fond of the violin, but after her music mistress was interviewed her enthusiasm appreciably declined. She is fond of the camera, but does not like to be seen with one in her hand. Still she has made a fair number of snapshots during the past summer at Marion. A sense of the humorous crops out in her choice of subject.

A taste for the camera once fully developed, there is no telling where it will lead a person. It will take you to Alaska to picture Indians, as it did Mrs. Platt, or through the Vale of Cashmere, famed for many things, but more especially for shawls, as did a woman who has wandered twice around the globe in search of "material." It will take you up into the Catskills, where photography is a regular sport with the Onteora colony, or to Ashbury Park, where the confirmed photographer has no respect for the cloth, but takes an exhorter in full tide of admonition. It may even take you, as it did my nearest friend, to the penitentiary, where she photographed a poor fellow in the prison dentist's chair in the act of having a tooth extracted. Great is photography. Its charms are many, and its claims, when it has its grip on you, inexorable.

—*Brooklyn Times.* ELIZA PUTNAM HEATON.

DEVELOPMENT OF OVER-EXPOSED FILMS.

ON commencing to develop the films exposed this summer while abroad, using a Scovill 4 × 5 detective hand camera and Morrison six-inch focus wide-angle lens, working at *f*-12 and *f*-15 for snapshots, and *f*-30 for short-time exposures, I found I had in most cases over-exposed them, from speed of shutter not being fast enough.

When in Liverpool I was shown some very beautiful negatives on my Eclipse films, and on inquiry as to developer used, was told the development was started with eikonogen and finished with hydroquinone. The results were so fine I determined on trying it, but in my case the results

were too flat and lacking in density. I then tried soaking films in strong pyro solution, containing one-eighth part bromide of soda to the dry pyro then passed into a 5° Baume solution of carbonate of potash and soda till developed; also in a mixed pyro and soda potash developer, with bromide and citrate of soda. And while this latter gave me satisfactory results, there was the usual disagreeable feature of stained finger-nails from contact with the pyro solution. Next was tried hydroquinone, and with the most gratifying results; the negatives are clean, full of detail, and density all that can be desired. Following is the formula I am using, slightly modified from the formula to be found in my circular:—

CARBUTT'S HYDROQUINONE DEVELOPER.

A.

Warm distilled water	20 ounces.
Sulphite soda crystals	4 ,,
Citric acid	1 drachm.
Hydroquinone	1 ounce of 437½ grains.
Bromide potassium	60 grains.
Water, to make up to	32 ounces.

B.

Carbonate potash	1 ounce.
Caustic soda in stick	½ ,,
Water, to make	32 ounces.

C.—*Accelerator.*

Caustic soda	1 ounce.
Water, to make	10 ounces.

D.—*Restrainer.*

Bromide potassium	½ ounce.
Water	5 ounces.

Take of A two ounces, water two ounces, soak the exposed film or films in this for not less than one minute (I develop four 4 × 5 at a time in a 8 × 10 tray), using those made by the Celluloid Manufacturing Company. They are made with two sunk strips lengthwise of the tray, and are very convenient, enabling one to get the finger-nail under the film to raise it from the solution. While the films are soaking in the plain hydro solution I prepare the developer. It is of about the same strength as used for lantern slides—viz., A, one ounce; B, ½ ounce; water, four ounces for first time using. I remove the films to another tray, and pour over the developer. If the image shows up gradually, and the shadows do not come up too quick, I let development proceed to a finish, picking up and examining each film by transmitted light of the lantern, and if I think it needs more density I pass it into the strong plain hydro until the desired density is acquired. On the second set of four, I proceed as above, and if on applying the weak developer the image holds back, add one drachm of B solution or a few drops of C solution. For fixing bath I have had under trial for some time at my factory the following acid fixing bath, and can recommend the same. It keeps clear much longer when fixing pyro-developed negatives, besides hardening the film and clearing up the shadows of the negative at the same time.

CARBUTT'S NEW ACID FIXING AND CLEARING BATH.

Hyposulphite of soda	16 ounces.
Sulphite of soda	2 ,,
Sulphuric acid	1 drachm.
Chrome alum	½ ounce.
Warm water	64 ounces.

Dissolve the sulphite of soda in eight ounces of the water; mix the sulphuric acid with two ounces of the water, and add slowly to the solution of soda sulphite; dissolve the chrome alum in eight ounces of the water, the hyposulphite soda in the remainder, then add the sulphite solution, and last the chrome alum. This fixing bath will not discolour until after long usage, and both clears up the shadows of the negative and hardens the film at the same time.

After a good washing the films are soaked for a few minutes in a four per cent. solution of glycerine and water, the surface gone over with a tuft of absorbent cotton, passed rapidly through clean water, and hung up to dry.

Having derived much pleasure this past summer in exposing nearly 500 of the celluloid films I commercially produce, both Eclipse and Orthochromatic, I can testify to the greater convenience they possess over glass plates—no risk from breakage, their weight and bulk being a small factor compared with glass. I took with me one hundred dozen, but owing to meeting with so much wet weather while in Switzerland and Germany I did not expose all of them, and those brought back are in perfect condition for use. One great convenience I desire to note. It was my practice in loading the double film holders (I took with me twenty-four) to number consecutively the film at the corners on back. My holders were lettered on the edge from A to X, and numbered on the sides from one to forty-eight, reserving from letter A to R for Eclipse films, and from letter S to X for Ortho films. I used Anthony's exposure book, making the numbers consecutive. On taking out the exposed films and replacing them in the envelopes, I noted on the outer one the numbers on back of films, carrying this out systematically. I can now, by referring to my exposure book, take out of the respective envelope any one or more of the exposures I may want to develop, whether in the first, middle, or latter part of my journey, which I am now doing in order to produce a number of lantern slides to be shown at a meeting of the Philadelphia Photographic Society.

JOHN CARBUTT.

BLISTERS.

IN discoursing on *A Few Odds and Ends of Photographic Practice* at the Holborn Camera Club recently, Mr. E. Dunmore pointed out that a free immersion of the print in methylated spirit was a remedy for the annoyance of blisters. I think that photographers may accept this as a fact, as since I first mentioned this method at the Photographic Club I have never known it fail. I showed a print which had one half of it moistened by alcohol and the other half not so treated. The one half treated by alcohol was not blistered at all, while the other one showed a fine crop. Of course we all know that spirit had been recommended for removing blisters already formed, but that is very different to its employment as a preventive; and it is not likely that it acts in the same way in both instances.

There is a difficulty, perhaps, in determining the manner in which the spirit acts. It has been supposed that the alcohol may complete an already imperfect coagulation, but it is difficult to conceive that the nitrate of silver has not, during the sensitising of the paper, done this most effectually. Doubly albumenised paper is said to have its first coating simply coagulated by heat supplied by hot water, and then to receive a second coating, so that there is a possibility of the first one being insufficiently coagulated. At any rate, the double or thickly coated paper is more likely to blisters than single coated.

Again, it may be that the floating the paper on hot water may expound any air already in the texture, and cause an incipient, or perhaps a positive blister, which, drying out, does not show until an after operation.

This explanation, however, does not apply to the case of collodion and gelatine dry plates, both of which, especially gum-coated collodion, are liable to the defect. The late Thomas Sutton many years ago attributed the phenomena to exosmosis, which is probably very near the mark, as when the density of the fixing solution is gradually accommodated to that of the washing water, blisters are not likely to be developed. In this connexion the theory of alcoholic coagulation preventing blistering is scarcely tenable, because it may be considered that the paper and albumen are both of them septa, and that it is the least permeable of them that undergoes further hardening by the alcohol.

Most photographers must have noticed that in submitting some sheets of paper to the various solutions employed in the operations of printing there occur patches that are more transparent than the surrounding parts. Some will have experienced that there are some papers in the market that become thus transparent all over, and that these papers never seem to blister. No doubt this is a question of sizing, for it may occasionally be seen in the way of patches in most kinds of paper, and the lighter the sizing the more likely it is that the paper will be transparent all over. Now when the paper is in this condition it seems to me that the mutual diffusion of the lighter fluid —the washing water—into the paper and its contained fixing solution, and of the latter into the washing water, takes place so rapidly that there is no time for blisters to be formed.

Now, the application of spirit to the strongly sized paper will bring it into this semi-transparent condition. All that is necessary is to lay the print, face down, on any clear surface, such as glass, to dip a tuft of cotton wool into methylated spirit, and spread it over the back of the print, which it at once permeates and renders as transparent as tracing cloth. In consequence of the strong affinity of water for the spirit, the latter no doubt becomes diffused and carried away probably during the first washing of the print; but the transparency continues because the spirit is replaced by water, much in the same manner as oil will replace water, as shown by our Editor on p. 660, *ante*. In this condition of transparency the print remains until it begins to dry, but the process seems entirely mechanical because nothing is removed by the spirit, as is fairly proved by the fact that in any subsequent immersion in water the paper seems to behave the same as it would have done had no application of spirit been made.

There is one little drawback to this method of working, and that is the low-toned appearance of the lights of the print, making it a little more difficult than usual to see how the toning is proceeding. If the print be seen against the white bottom of a porcelain dish, little difficulty will be experienced, or the prints may be occasionally laid down on a piece of opal glass with a like result, and a very little practice will enable the printer to tone as easily as in the ordinary way. The method seems to be one that will entirely *prevent* the blisters from

appearing, and we all know that "prevention is better than cure.' In this connexion it is much cheaper also because it is a saving of time, no second weaker fixing bath being required. The best cure for blisters already formed is, most probably, immersion in spirits of wine; but what would be required to *cure* one print would *prevent* the blisters in more than a dozen.

Supposing the previous explanation to be correct relative to the more rapid passage of the solutions through the spirit-prepared paper, is it not likely that the washing would be facilitated in a similar way? I think it is, but have not made any experiments to determine the point. Perhaps some one will do so. W. D. RICHMOND.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—VI.

LECTURE BY MR. W. LAMOND HOWIE, ESQ., F.C.S., LOND.

THIS, the fourth lecture of the series arranged to be given during the currency of the exhibition, was delivered in the South Galleries on Friday evening, December 19. The subject was, *Ten Days on the Hardanger, Norway*, by W. Lamond Howie, Esq., F.C.S. It was illustrated by a series of pictures he had taken during the trip and a few others from friends who had also been in the district during the same period. The photographs embraced many examples of the grand scenery of the district, including the picturesque roadways, the great waterfalls, mountain, valley, and glacier views, together with much of the home life of Norwegians, their costumes, ceremonies, such as bridals and funerals, rejoicings, as well as interiors of the dwellings of the various classes of the district through which he passed; together with scenes on the way, illustrating the every-day life of the country, from clothes washing to fishing, bargaining at the market stalls, as well as at the greater industries of the timber and dried-fish trades, which are the staples of Norwegian industry.

The President, Mr. H. Blanc, occupied the chair, and in introducing the lecturer, stated that the fine series of views about to be exhibited were secured by Mr. Howie during his visit to the land of the midnight sun two years ago, and he was certain they would admire them as much as he himself had; but, in addition, he might mention that Mr. Howie had last summer succeeded in photographing many views of the Passion Play at Ober Ammergau, and that several of these had been used to illustrate descriptions of the famous play in the illustrated papers. He hoped to persuade Mr. Howie to make a set of lantern slides from those pictures, and that the Society would thereby reap a similar advantage from his last year's holiday to that which they would this evening.

Mr. Howie then proceeded by stating that, with several friends, including ladies, they had arranged to make this trip to the Hardanger, and they arranged to start from Newcastle-on-Tyne, which was about the least picturesque river that could be chosen to leave this country for a holiday; but even the most unpromising points must be taken advantage of, so the first of the series of about eighty views would be *Leaving the Tyne*, of which there were two, the sky in each instance making the picture, but each showed most truly the river with its familiar name the "coaly, smoky Tyne." Passing outwards, a fine snapshot was got at a yacht in full sail, with every rope, block, and gearing as sharp as if at anchor; but the split ripple at the bows showed that she was speeding along before a spanking breeze while being taken from the steamer conveying the party. The view at Tynemouth with the lighthouse, where the sea and sky make a fine picture, was the last before crossing the North Sea, with its usual accompaniment of rough water and sea sickness to the less travelled of the party.

Before entering upon a description of the route, Mr. Howie threw upon the screen a couple of maps of that portion of the Norwegian land within which his tour had been limited, on which he pointed out the harbour and town of Bergen, which was the first point at which the steamer touched, and other places.

The harbour and its scenes gave a number of fine pictures of the daily life of the port; the welled, rather coffin-shaped, boats in which the cod-fish are brought to market, for no true Norseman will eat stale fish—it must be all alive O!

The great stacks of dried stockfish were exhibited and explained while showing scenes on the Fish Quay with their characteristic figures.

At this point Mr. Howie remarked on the great change which had come over the habits of the Norse people in the matter of sobriety. At one time the consumption of ardent spirits amounted to seven gallons per head per annum, thus reaching in an average family thirty-five to forty gallons; and by way of comparison, he said that the consumption per head per annum in England was half a gallon, in Ireland one, and in Scotland one and a half gallons. But owing to a change in their licensing laws in the direction of prohibition, Norway now ranked as one of the soberest countries in the world. During the whole trip he had only seen two people under the influence of drink, and both spoke English. What to understand drink he saw used was principally beer.

In the course of the lecture, where the picturesque costumes of the people came in, he mentioned that the condition of the females, such as maid, wife, and widow, the costumes were quite distinct, the young women wearing no head covering (an old Scotch fashion), while the married wives had the most beautifully got up linen caps. It was difficult how they kept so well in shape from their size.

The most distinctive building exhibited was an old wooden church, dating back about the twelfth century, if not as far back as the Vikings, which had, being wood, as most of the buildings are, been removed bodily and put up here. Its principal characteristics were the superabundance of steep, many-sided roofs, with turned-up corners like a Chinese pagoda. Most of the churches, he stated, on showing the interior of one of them, were very plain, but externally they and the houses were miracles of cleanliness, to an extent that we had no idea of here, and as they would see from the photographs. A picture of a fishing boat which was a bad photograph he stated was upon an Alpha plate, and he had tried to get some colour in it in the developing, but it was a partial failure.

A number of views of the Fjords and the sailing thereon in a very Clyde built looking steamer, with the steep, sometimes precipitous, mountains, led us to the edge of the glacier ice, and after about twenty slides had been passed, comprising salmon fishing in a most peculiar way, a wedding and a funeral, and many others, the party was arranged at the edge of the glacier and a couple of groups taken. Mr. Howie's rather ingenious way of including himself may be related.

The camera is placed thirty to forty feet from the group, and so embracing a good background, in these cases the outer edge of the glacier and the party properly focussed. To the shutter of the lens is attached a piece of very thin indiarubber tubing, so thin that it is practically invisible, to this is attached a pneumatic ball, on pressing which, when all is ready, the shutter is opened and shut. The perfection of the slides was proof of the excellence of the contrivance.

Afterwards were shown those taken on a visit to the Voringfos, one of the grandest waterfalls in Norway, the road through the rugged valleys with well-made roads giving many fine views. The fall itself was a most difficult picture to get, from the drenching mist and spray at times covering everything, but with patience two views were secured, one of them showing a double rainbow, one at the base of the fall, the other high in the air, and this was greeted with loud applause. On an Alpha plate was shown a fine sunset about midnight which was very brilliant, and showed in tone almost the feeling of natural colour.

As showing the absence of night there were two pictures of the hotel and the railway station, one of which showed the clock pointing to eleven fifty-two, p.m. of course. For this he gave an exposure of two minutes.

The rooms were inconveniently crowded, and great interest was taken in the clear and racy manner which Mr. Howie accompanied by his remarks each picture as it was passed through the lantern with anecdote, jest, or information.

Mr. Blanc at the close proposed a hearty vote of thanks to the lecturer, who had provided them with a lecture at once educational and artistic. Mr. Howie returned thanks, and the meeting separated after a very lengthened *sederunt*.

MEDAL AWARDS.

The following is the list of awards by jurors on the pictures, &c.:—

Class 1. (*Landscape.*) Silver, Richard Keene, Derby; bronze, C. Digby Jones, Edinburgh; hon. mention, J. P. Gibson, Hexham.

Class 2. (*Landscape.*) Silver, F. Boissonnas, Geneva; H. P. Robinson, Tunbridge Wells; bronze, J. P. Gibson, Hexham; hon. mention, G. Bruce, Dunstable.

Class 3. (*Portraits.*) Silver, J. Moffatt, Edinburgh; bronze, Marshall Wane, Edinburgh; Alexander Ayton, jun., Edinburgh.

Class 4. (*Portraits.*) Silver, Window & Grove, London; bronze, J. G. Tunny & Co., Edinburgh.

Class 5. (*Portraits.*) Silver, William Crookes, Edinburgh; bronze, Marshall Wane, Edinburgh; Alexander Ayton, jun., Edinburgh.

Class 6. (*Figures.*) J. H. Hogg, Kendal; bronze, R. S. Webster, Edinburgh; Ralph W. Robinson, Redhill.

Class 7. (*Combination Printing.*) No awards.

Class 8. (*Genre.*) Silver, Lyd. Sawyer, Newcastle; bronze, J. Terras, Markinch; hon. mention, A. Diston, Leven.

Class 9. (*Instantaneous.*) Silver, Charles Reid, Wishaw; bronze, Lyd. Sawyer, Newcastle.

Class 10. (*Architecture, &c.*) Silver, William Mitchell, Dalkeith; bronze, Richard Keene, Derby.

Class 11. (*Scientific.*) Bronze, A. Pringle, Bexley Heath; C. Piazzi Smyth, LL.D., Clova; Gambier Bolton, F.Z.S., London.

Class 12. (*Landscape.*) Silver, J. Livingstone, jun., Edinburgh; bronze, Dr. Stewart, Edinburgh; J. D. Duncan, Glasgow.

Class 13. (*Landscape.*) Silver, J. H. Forbes, Edinburgh; bronze, J. K. Taylor, Buxton; hon. mention, J. E. Austin, Detling; R. Kidston, Stirling.

Class 14. (*Landscape.*) Silver, J. G. Patterson, Eskbank; bronze, W. Mitchell, Dalkeith; Major Redan, Glencarse.

Class 15. (*Prize Pictures.*) No Awards.

Class 16. (*Lantern Slides.*) Silver, Geo. W. Wilson & Co., Aberdeen; bronze, James Dore, Sandown.

Class 17. (*Reproductions.*) Silver, Autotype Co., London; bronze, James Patrick, Edinburgh; William Crookes, Edinburgh.

Class 18. (*Vitreous Enamels.*) Silver, H. P. Robinson, Tunbridge Wells; bronze, J. G. Tunny & Co., Edinburgh.

Class 19. (*Photo-Mechanical Prints.*) Silver, Autotype Co., London;

Walter L. Colls, London; James C. H. Balmain, Edinburgh; W. J. Annan & Son, Glasgow.

Class 20. (*Enlargements.*) No Awards.

Class 21. (*Apparatus.*) Silver, G. Mason & Co., Glasgow; W. Wray, London; J. M. Turnbull, Edinburgh; bronze, Wm. Hume, Edinburgh.

The jurors have not been able to select any one picture of such prominent merit as to justify them recommending it for the Society's Gold Medal.

MANCHESTER PHOTOGRAPHIC SOCIETY'S EXHIBITION.

On December 18, 19, and 20 was held one of the most interesting exhibitions of photography that has ever been brought together by this Society, and which must rank, in respect to the quality of work, with the best collections ever exhibited in the district. The rooms of the Literary and Philosophical Society, in which the exhibition was held, although well furnished and cheerful, do not lend themselves readily to the showing of photographs in large numbers, and great credit is due to the hanging committee for the efficient manner the exhibits were displayed, especially as the time for preparation was limited.

The exhibits, with the exception of a few autotype enlargements, were entirely the work of the amateur members. It was to be regretted that the professional members did not contribute, and so make the exhibition thoroughly representative. The pictures on the walls numbered close upon five hundred, of which more than half were sent in competition for prizes restricted to the last two years' work. The well-known processes were all represented, although platinotype and bromide not very strongly, the newer gelatino-chloride paper running albumenised prints a very close race for predominance, especially in the competing classes. In all classes but the instantaneous the results were of very exceptional merit, and the judges in making their awards must have had considerable difficulty in arriving at a decision.

A special feature of this exhibition was the very prominent place taken by stereoscopic photography, a large number of both transparent and opaque pictures occupying the centre tables in the principal room. The great interest and universal admiration expressed by visitors for this branch of the art showed that the stereoscope was in a fair way of regaining its old popularity. The enjoyment of many previously unacquainted with this instrument was greatly enhanced by the explanations of the gentlemen who took charge of these exhibits.

Amongst the other attractions of the tables, a number of albums well stocked with holiday tours, general views, portraits, &c., afforded a very convenient means of showing the smaller prints. The number of subjects shown in this manner and by the stereoscopes would be considerably over four hundred. On Friday evening a special set of exceptionally good lantern slides were shown of views taken in the Caucasus by Mr. Hermann Woolley, supplemented by some taken by the late Mr. Donkin. Mr. Woolley described his pictures at length, and gave, in addition to an account of his ascent and sojourn amid the snow-capped mountains, some particulars of the ill-fated Donkin party.

On each of the evenings a lantern show of members' work formed not the least interesting part of the exhibition.

It would be impossible, except at a greater demand for space than this notice can receive, to name any but the winning pictures in the competing classes. The landscapes, as a matter of course the largest class, showed very successful results, both from a technical point and pictorially, and though a local newspaper critic takes exception to the number of roadside cottages, this subject affords as good an opportunity for artistic treatment as any other, and contains a point of human interest often absent in more pretentious subjects. This was in a manner exemplified by the prize being awarded in the class over half-plate size to *Wardley Hall*, by Mr. J. Wood. This, though not quite a "cottage," is a picture perfect in the effect of calm and repose associated with the country dwelling.

For a very different subject Mr. Hutchinson received the commendation of the judges, viz., *A Ford on the Stour*.

In the small landscape, Mr. Thompstone received the prize for a *View on the Glaslynn*.

Interiors were not numerous, *Exeter Cathedral* gaining the prize in the large-size class. This was a beautiful platinotype by Mr. G. H. Rigby.

In the large instantaneous Mr. J. R. Colley was successful with one of a series taken at Llandudno. Mr. J. Wood winning in the smaller class with an agricultural scene.

"*In the Soft Evening when the Winds are Stilled*" (W. C. Bryant), was set for illustration by a suitable picture. This class, being a little out of the beaten track, called forth only three competitors. The prize was awarded to Mr Cooke for a view near Tilberthwaite, one of a number of river scenes sent in this class. Mr. Kenworthy's rendering of the lines was a very effective sunset on the sea, and Mr. Colley's a garden scene with figures.

All the work in the stereoscopic class was very good indeed, Mr. W. Blakeley's set of six transparencies (various subjects), gaining the prizes.

The remaining class to mention is the sets of six lantern slides, nine being sent in, which was rather a smaller number than was expected considering the many members working in this style of picture. Mr. Coote's set was placed first, but that gentleman having previously taken the prize in a recent competition of the Society, the prize passed to Mr. G. H. Rigby, the position of third in order of merit being given to Mr. J. Wood.

A special prize had been placed at the disposal of the Council by the President, Mr. Alan Garnett, and which, after a very careful inspection by the special judges (Messrs. Chilton, Whitefield, and Holden, non-competing members, assisted by Mr. Wade), was awarded to Mr. J. Wood for the best general exhibit.

The intensely foggy and cold weather no doubt deterred many from availing themselves of the invitations of members to view the exhibition, but with the exception of Saturday, when the streets were almost impassable, the attendance was fairly good.

The names of the judges in the general competition were given in last week's Journal, when by an error the exhibition was announced as taking place during Christmas week.

Our Editorial Table.

Wild Life on a Tidal Water.

By P. H. Emerson. (London: Sampson Low, Marston, Searle, & Rivington.)

The *Electra*, a house-boat replete with every comfort, was for the time the residence of the author of *Wild Life upon a Tidal Water*. The scene is off the Yarmouth coast. Dr. Emerson's companion, Dick, is evidently a jolly fellow, whom as a companion one likes, but whom as proprietor of the boat—the shipowner as it were—one envies. Their sole attendant, Joey, a six-footer and a genuine native, is at once boatman, caterer, and cook. He is a man not altogether unacquainted with the Yarmouth "pubs," but as a set-off against this Joey knows well where and under what circumstances to pick up the best fish procurable in that essentially fish-famed town. Here is a bit of interior view of the *Electra*:—"As you descend with bowed head and stooping shoulders the short staircase of the *Electra*, you find two small rooms on the one hand, and two small rooms on the other—the galley and saloon on the right, the cabin and painting room on the left. In the galley our sailor Joey, a massive, wild-looking East Anglian, with long, lank hair flowing over his rugged, sunburnt face, was frying fish, turning fresh plaice and soles clumsily, letting them fall with a splash into the boiling fat, then sheering off quickly and rubbing his flipper-like hand, as if his thick hide was scalded. . . . . Our saloon was just high enough for Joey—a six-foot man—to stand upright. On either side stretched low, cushioned seats, long enough to permit us to lie at full length; between us was the table, on which lay our tobacco pouches, the coffee-pot, and cups." Let us see what was stored in the bows of the *Electra*, which was a sixty-six-foot decker. Here we find "bacon, bread, tinned meats, coffee, tea, and groceries of all kinds, besides flagons of rum and whisky." Of course there were the appliances for shooting, fishing, painting, photographing, and writing. The result is a work of racy adventure, and one in which the interest is sustained throughout.

It is admirably written, and contains numerous excellent photogravures from negatives by Dr. Emerson, who, however, associates Mr. T. F. Goodall with him as an illustrator.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,438.—"Improvements in and relating to Flash Lights for Photographic and other Purposes." R. W. Thomas.—*Dated December* 15, 1890.

No. 20,452.—"Improvements in Photographic Cameras." A. Edington and A. Daniell.—*Dated December* 16, 1890.

No. 20,501.—"Improved Method of Holding and Exposing Sensitive Photographic Surfaces." S. H. Fry.—*Dated December* 16, 1890.

No. 20,601.—"Improvements in and relating to the Exhibition, upon a Screen, of Reflected Magnified Images of Opaque Objects, and to the Means for Causing such Images to Appear to Move." J. J. Melville.—*Dated December* 17, 1890.

No. 20,633.—"Improvements in Optical Lantern Stages, Slide Carriers, and Slides for Registration." D. L. Salomons.—*Dated December* 17, 1890.

No. 20,653.—"An Improved Magazine Detective Hand Photographic Camera." S. Tucker and W. J. Spurrier.—*Dated December* 18, 1890.

No. 20,690.—"Improvements in Protecting Sheets of Gelatine by Pyroxyline or Nitro-cellulose Varnishes." Complete specification. A. Van Winkle and E. N. Todd.—*Dated December* 18, 1890.

No. 20,774.—"An Improvement in Photographic Camera Dark Slides." J. Pitt and W. Hudson.—*Dated December* 20, 1890.

No. 20,836.—"An Improved and Simplified Form of Photographic Enlarging Apparatus." G. Calder.—*Dated December* 20, 1890.

PATENT COMPLETED.

A New or Improved Appliance to be used in Connexion with the Developing of Photographic Negatives and certain other Photographic Operations.

No. 151. John Boultbee Brooks, Great Charles-street, Birmingham.—*November* 29, 1890.

This invention has for its object the automatic distribution of photographic developing solutions, also in automatically applying, toning, and affixing solutions to photographic prints as aforesaid.

By my invention the developing is conducted by automatic means, through the intervention of clock or running-down mechanism, which gives to a table or support upon which the developing tray is placed a rocking motion, and, if necessary, a gyratory movement as well.

An automatic photographic developer, constructed according to one form of my invention, consists of a rocking table or tray with middle disposed under brackets, supported upon opposite pivot axes, carried by upright brackets, directed from the top of a case or enclosure, wherein the running-down mechanism for giving an isochronous or other equal time oscillation to the said table, frame, or support upon which the developing tray is placed, is situated.

The tray support has adjustable rests for the ends and sides of the tray to rest against, and which rests fix and keep the tray in a determinate position when the same is being rocked.

The adjustment means are operated and guided by longitudinal and transverse screws and rods passing through the said rests, so that by rotating the milled heads at the ends of the screws the rests are adjusted to the sides of the tray.

Directed vertically downwards from the axis or axes of the said rocking table and through a hole in the top of the mechanism-enclosing box or case is a pendulum with its bob heavily weighted, in order to impart to the said tray rest and table the necessary isochronous rocking movement.

The upper end of the pendulum, above the middle part of it, is connected crankwise to a face-plate, through the intervention of a curved and jointed link, which gives to the said pendulum, on the rotation of the face-plate, a swinging movement. This face-plate carries a toothed wheel and pinion upon its axis, the latter of which engages with a second toothed wheel, whose axis carries a second pinion which engages with a third toothed wheel upon a third axis, carrying a ratchet wheel, whose pawl is jointed to and carried by the third toothed wheel as aforesaid.

Surrounding this third toothed-wheel axis, which has a turn or spindle connected to it for the winding up of the mechanism, is an evolved or coiled spring, with its inner end connected to the said axis and its outer end to that of a fixed framing, so that by rotating the said axis, which is the main one, the spring is wound up, and its stored-up energy or force given out to the pendulum through the intervention of the multiplying train of wheels or gear as aforesaid.

To reduce the running down, the mechanism is provided with a fly, in the form of a thin plate, turning upon a pivot, with a pinion on it, gearing with a toothed wheel of an intermediate axis, which has a pinion that gears with the first-named toothed wheel.

To start the automatic developer, rotate the thumb-lever of the winding-up mechanism, which, when turned, closes up the coils of the spring, and thereby creates the necessary motive power for driving the pendulum.

The force given out from the spring on the thumb-lever being released communicates itself to the third toothed wheel, then to the second, and the first, rotates the face or crank plate, gives a reciprocating movement to the link, which, being connected with the pendulum, swings it to and fro through an arc, and by such swinging the tray carrying the plate with developing solution upon it is rocked isochronously.

In toning or fixing photographic prints, the liquid or solutions are placed in the tray or bath and then rocked by the mechanism, as aforesaid.

On the appliance requiring to be stopped, for the taking out or removal of a plate or print, I provide a turning or sliding stop, which comes under the table or tray rest, and which rests may be fixed, instead of being adjustable, as aforesaid.

To impart or give to the said tray a gyratory movement instead of a rocking one, I dispose the crank or face plate in a plane, directed obliquely to its axis, so that the crank pin shall describe an oblique elipse, which thus gives to the axis or pendulum, which has a universal joint at its upper end, a gyratory movement, and through it a like movement to the table or tray carrier.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 6.....	North London	Wellington Hall, Islington, N.
,, 6.....	Holmfirth	
,, 6.....	Sutton	Sutton Scientific Society's Rooms.
,, 6.....	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
,, 7.....	Coventry and Midland	The Dispensary, Coventry.
,, 7.....	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 7.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8.....	Birkenhead	Association Rooms, Price-street.
,, 8.....	Cheltenham	
,, 8.....	Manchester Photo. Society	36, George-street, Manchester.
,, 8	London and Provincial.....	Champion Hotel, 15, Aldersgate-st.
,, 9.....	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

December 23.—Technical Meeting.—Mr. T. Sebastian Davis in the chair.

The Chairman inquired whether any of the members had experience in making photographs of microscopic objects without the use of the eyepiece. With the eyepiece the size of the image was somewhat larger than without, but that could be managed without the eyepiece by placing the focussing screen farther from the objective. With the eyepiece he had found a certain amount of halation. In connexion with photographing microscopic objects, the members were aware that many of such objects were of a full ruby tint. Definition could be secured of the more transparent portions, but not of the more opaque portions. Then there was the question as to what kind of plate would be most suited for the purpose of giving the most definition in the interior portions of objects of a ruby character. In determining this question it was highly necessary to use very fine glass. He recommended that the finest ground glass be taken and rubbed with grease. This he had found of assistance in photographing objects of a minute character.

Mr. T. E. Freshwater said that he had been doing a great deal of photo-micrography, and he never used an eyepiece if he could help it; he had used the eyepiece, but not much. When he found that he could not get size of image sufficient without the eyepiece, he had to use it. He noticed that with the eyepiece there was more tendency to reversal of the image, so that the exposure must be more exactly timed. For moderate enlargement he would use the objective only, and only when he could not get sufficient enlargement in that way did he use the eyepiece.

Mr. W. E. Debenham inquired what were the limiting circumstances that Mr. Freshwater considered to necessitate the employment of the eyepiece.

Mr. Freshwater replied that when the camera would not extend sufficiently to get the size wanted he used the eyepiece.

Mr. Debenham inquired whether with a sufficiently long camera he would use the eyepiece for any degree of enlargement.

Mr. Freshwater thought not.

Mr. A. Mackie remarked that Mr. Pringle had said that no one now takes micro-photographs without the eyepiece.

The Chairman said that it was a subject open to further investigation, which he hoped would be brought to bear upon it.

Mr. Freshwater, speaking upon the time of exposure necessary, said that the preceding evening he had photographed the palate of a water-snail, merely opening and closing the objective.

Mr. H. Chapman Jones inquired whether Mr. Freshwater's condemnation of eyepieces referred to ordinary eyepieces or to those made especially for photographic work.

Mr. Freshwater replied that it was the latter kind that he had used.

The Chairman said that when the tube of the microscope was used without the eyepiece there was a central flare, which arose from the tube not being effectually blacked. Black velvet was the best lining.

Mr. Mackie thought that in a narrow tube even black velvet would not be sufficient to prevent reflection and flare.

Mr. Freshwater never used a tube when not using the eyepiece. There was then no necessity for it, and the objective was brought up to the opening in front of the camera.

Mr. Debenham would like to have the opinion of the members as to the comparative advantages of a microscopic objective and a photographic lens for enlargements of a moderate degree.

The Chairman preferred photographic lenses for enlargements of three or four diameters.

Mr. E. W. Foxlee had some years since made experiments with portrait lenses, and found them to answer better than microscopic objectives for enlargements up to twelve diameters.

Mr. H. A. Lawrance called attention to a developing formula recently quoted by Dr. Kiss, in which there were carbonate of magnesia and carbonate of ammonia as well as citric acid.

Mr. A. Cowan said that the formula was a very good one. Citric acid was more convenient than the citrates on account of the deliquescent character of the latter and the difficulty or uncertainty of obtaining them commercially.

THE LANTERN SOCIETY.

December 22.—Lieutenant C. E. Gladstone, R.N., read a paper on *Some Architectural Features of Normandy and Brittany*. The slides shown were made by the lecturer from his own 12×10 negatives on stripping films taken during the past summer. The paper was principally intended to illustrate the characteristic marks of the ecclesiastical and domestic architecture of the country, and the difference between the corresponding styles in England and France were pointed out.

WEST LONDON PHOTOGRAPHIC SOCIETY.

December 12.—Lantern night.—Mr. W. A. Brown (President) in the chair.

The Chairman referred to the forthcoming annual exhibition, to be held on January 9 and 10.

A discussion as to the best means of avoiding smoke from flash lamps then took place, the employment of a smoke trap constructed of hoops of cane over which calico could be strained being considered the best means of dealing with the difficulty.

Various slides were then exhibited.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

December 15.—General Meeting.—Mr. A. Mackie in the chair.

Mr. L. Medland showed some eikonogen powder which had been kept hermetically sealed in a tin, and yet upon being opened was found to have changed to a chocolate colour. Mr. Medland asked if it would still develop without stain.

Mr. Mackie thought it would not make any difference in the development.

Mr. W. T. Coventon said he thought when the sulphite was mixed with it, it would be all right. Mr. Coventon showed some negatives which had been developed with pyro, in which, by mistake, carbonate of soda had been added instead of sulphite. Upon mixing the ammonia and bromide with this, the

developer had turned coffee colour, and appeared fogged, but had cleared well in a saturated solution of alum and hydrochloric acid.

Mr. Medland and Mr. Parfitt showed a new frame for fixing lantern slides in contact with whole, half, and quarter-plate, so as to cover any piece desired, and to have the picture perfectly straight upon the slide.

Mr. B. J. GROVER then submitted a series of questions upon collodio-bromide emulsion, which were answered by the Chairman and Mr. Medland, the following information being elicited:—It is somewhat difficult to procure a good sample of pyroxyline for making the collodion, and the only way to test it is to make a *small* quantity of the emulsion first. The advantage of washed over unwashed emulsion is that the former dries quickly on the plate, whilst the latter has to be washed on the plate after coating. The emulsion will be washed sufficiently if the water is changed five or six times, and it is then soaked in alcohol.

Mr. MACKIE stated that he washed the emulsion five or six hours in a pickle jar with an inlet and an egress for the water, and that a good way to test the sufficiency of washing was to take a piece of the pellicle, break it, and taste it. If there is no taste of the methylated alcohol it is sufficiently washed. The proper colour for an emulsion when spread upon the plate is ruby: a bluish colour is no good, because the bromide in the emulsion is then in too large parcels.

The CHAIRMAN then showed some plates coated with emulsion, one of which had a number of opaque spots upon it. He had been trying to trace the cause, but had failed as yet. There must, however, be some foreign substance in the emulsion which ought not to be there. With respect to edging the plates, the best substance is a thick solution of macerated indiarubber in benzole. The edge must be lightly touched with this by means of a pledget of cotton wool, or a small paint brush with the hairs cut short and wedge-shaped. In coating a plate never pour the emulsion back into the same bottle because of particles of dust; if a substratum of albumen is used there is no need for the edging. A good way to dry the plates evenly is to warm two or three whole-plates in the kitchen oven, and then carry them into the dark room to receive the plates when coated. The plate is flooded with methylated alcohol before pouring on the developer in order to cause the emulsion to swell, and thus open the pores. Some plates will keep, some will not.

Mr. MEDLAND had kept them for eight months in a box, but he thought they got slower by keeping, and sometimes black spots showed. The emulsion itself does not deteriorate by keeping.

The CHAIRMAN had used some five years old. The colour of a slide can be altered in several ways. Use cyanide for fixing instead of hypo if intensification is needed. A red colour can be got with the uranium intensifier. Permanganate of potash will give a pinky colour. They can be intensified with silver or platinum. The Platinotype Company's intensifier is a good one, or they can be treated with Lyonel Clark's platinum bath.

Mr. J. HOWSON, of the Britannia Works Company, was present, and said that as the Company were bringing out a new chloride paper, he should like the opinion of the members as to whether there was not a more suitable size for the sheets than the present $17\frac{1}{2} \times 22$ of albumenised paper, so that it would cut to more advantage for whole-plates and cabinets. The Company thought that $16\frac{1}{2} \times 24$ was a better size.

After some discussion it was agreed that the alteration would be an advantage.

Mr. COVENTON having asked how to secure a good colour with bromide paper,

Mr. HOWSON said that hydroquinone gave heavy shadows, and the great secret for securing a good colour and clear shadows was to reduce the proportion of iron to oxalate—about one to eight being sufficient.

Mr. TANNER having asked how often could the developer for bromide paper be used,

Mr. HOWSON said that of course some change took place in the developer after each time of use. It was therefore a good plan to throw away half the developer each time and make it up with new.

The Travelling Studentship Prize Pictures, kindly lent by the Editor of the *Amateur Photographer*, were then passed round and admired.

An excellent programme has been arranged for the meetings of the Society up to July, 1891.

The next meeting will be on Tuesday evening, January 6, when the Secretary will read a paper on *Night Work, with demonstration on Lantern-slide Making and Copying, Enlarging, &c.*

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE Tuesday evening lantern lecture in connexion with this Society's exhibition, now being held in the Royal Scottish National Galleries, Edinburgh, was delivered by ALFRED A. MURRAY, M.A., L.L.B., at eight o'clock, and was composed of notes of a trip recently taken to Hamburg, Copenhagen, Christiana, &c. He stated that from this centre such a trip was now an easy matter, steamers leaving Leith several times a week, and the cost would be found comparatively inexpensive, his outlay for the twenty days occupied being within as many pounds (20*l.*) sterling. He took a hand camera with him, and was only once bothered by any of the Customs officers, and in that instance he supposed the man took the innocent-looking, brown-paper parcel, which he carried under his arm, to be some infernal machine or other. He was a little put about from knowing nothing of German, but he managed nevertheless. The slides illustrated the voyage from Leith, and introduced several of the coast villages on the Fife side of the Firth of Forth, thence across the North Sea, touching at Heligoland, to Hamburg. The slides showed examples of the architecture (including some bits saved from the great fire) of the old portions of the town—its ports, docks, and harbour scenes; as also at Altona, Copenhagen, and Christiana, where, in addition, some of the habits of the people, their costumes and customs at the markets, and coast portions of those places—all being snapshots. The lantern used was a sciopticon, and the audience was numerous.

RECENTLY ELECTED OFFICERS OF SOCIETIES.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—*President:* J. B. Stone, J.P., F.L.S., F.G.S., F.R.G.S.—*Vice-Presidents:* W. Jerome Harrison, F.G.S., E. H. Jaques, B. Karleese.—*Hon. Librarian:* W. S. Horton.—*Hon. Treasurer:* T. Taylor.—*Hon. Secretaries:* J. H. Pickard and A. J. Leeson.

BROOKLYN (N. Y.) ACADEMY OF PHOTOGRAPHY.—Established 1877. Social and dark rooms, 517, Fulton-street. Exhibition rooms and hall at the Hoagland Laboratory, Henry-street. *President:* Frank La Manna, LL.D.—*Vice-Presidents:* W. T. Wintringham, William Arnold, John Merritt.—*Treasurer:* Edward H. Quantin.—*Secretary:* Hermance Tremper, 54, Park-place, Brooklyn, New York State.

BOLTON CAMERA CLUB.—Meetings held at the Studio, 21, Bury New-road, on the second and fourth Wednesday in each month during winter months, and monthly during summer. *President:* J. Johnston, M.D.—*Vice-President:* C. A. Mackechnie, M.B.—*Council:* Messrs. Turner, Russell, Harper, Royle, Berry, T. Parkinson, jun.—*Treasurer:* W. Bromley.—*Secretary:* Thomas Parkinson, 117, Westbrook-street, Bolton.

CAMERA CLUB OF ROCHESTER (N.Y.).—Established 1884. Ordinary meetings every alternate Friday in each month. Annual meeting, first Friday in January. *President:* G. Hanmer Croughton.—*Vice-President:* S. Turner.—*Second Vice-President:* S. Lowe.—*Board of Management:* G. H. Croughton (President), Messrs. Willard, Mitchell, Page, Gove, Haskins, Horne.—*Treasurer:* W. G. Mitchell.—*Secretary:* J. L. Willard, 62, State-street, Rochester.

CORNISH CAMERA CLUB.—Meetings, every first Tuesday in the month at the Science Schools, Penzance. *President;* W. E. Baily, F.L.S.—*Vice-President:* Dr. B. Vivian.—*Council:* Barnes Richards, John Branwell, jun., N. H. Symons.—*Treasurer:* W. H. Percy.—*Hon. Secretaries:* A. K. Barnett and H. Tonkin, Science Schools, Penzance.

DEVON AND CORNWALL CAMERA CLUB.—Lecture hall, library, dark room, and studio, the Athenæum, Plymouth. Excursions are held frequently during the summer, and in winter meetings are held at half-past Seven p.m. on every alternate Monday for lantern evenings, demonstrations, reading of papers, &c. *President:* J. D. Pode, J.P.—*Vice-Presidents:* Robert Murray, C.E., and W. Gage Tweedy, B.A.—*Council:* Major R. Barrington Baker, David Roy, E. H. Micklewood, Charles Aldridge, M.D., J. S. Hawker, J.P., S. Weekes, Mus. Bac., Cantab., &c., R. Hansford Worth, C.E., A. R. Norrington.—*Hon. Treasurer:* Arthur A. Carnell.—*Hon. Secretary:* Robert Burnard, 3, Hillsborough, Mannamead, Plymouth.

DEVON AND CORNWALL CAMERA CLUB (POSTAL BRANCH).—Two photographs are contributed four times per annum, making eight in all. Medals and the album itself are given as prizes on each occasion. *Hon. Critic and Judge:* Andrew Pringle, F.R.M.S.—*Hon. Secretary:* J. D. Pode, Slade, Ivybridge South Devon.

GLASGOW PHOTOGRAPHIC ASSOCIATION.—*President:* William Lang, jun.—*Vice-Presidents:* J. Craig Annan and Archdeacon Watson.—*Council:* John Annan, Robert Gardner, William J. McIlwrick, Andrew Mactear, George Mason, John Morrison.—*Treasurer:* George Bell.—*Secretary:* Fred. Mackenzie, 122, Wellington-street, Glasgow.

HEREFORDSHIRE PHOTOGRAPHIC SOCIETY.—Meetings on the first Tuesday in each month during the winter at the Mansion House. Field days on the first Thursday in each month. *President:* Alderman Blake.—*Vice-Presidents:* Rev. W. Bowell, M.A., Alfred Watkins, Thomas Salway.—*Council:* W. Parker, A. H. Smith, R. Clarke, E. G. Davies, H. J. Wilson, P. Levason, E. Pilley, E. W. H. Chare.—*Hon. Treasurer:* B. Cullwick.—*Hon. Secretary:* J. Parker, Mansion House, Hereford.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—*President:* Paul Lange.—*Vice-President:* William Tomkinson and Joseph Earp.—*Trustees:* Paul Lange, Joseph Earp, A. W. Beer.—*Auditor:* Arthur Bradbury.—*Librarian:* J. Macdonald Bell.—*Hon. Treasurer:* P. H. Phillips.—*Hon. Secretary:* L. M. Tunstall. The following to fill the places of retiring members of the Council:—A. F. Stanistreet, Henry Lupton, F. B. J. Illingworth, B. Boothroyd.

MANCHESTER PHOTOGRAPHIC SOCIETY.—Ordinary meetings are held at 26, George-street on the second Tuesday in each month. Lantern meetings on the fourth Wednesday from October to March inclusive. An exhibition of members' work (optional) is held during the year. Annual meeting in October. Outdoor meetings, fortnightly during the summer months. *President:* Alan Garnett.—*Vice-Presidents:* A. Coventry, John Schofield, Abel Heywood, jun., T. R. Cobley, H. M. Whitefield.—*Council:* D. E. Benson, W. Blakeley, W. Broughton, F. W. Burt, T. Chilton, F. Edwards, H. Smith, F. Spencer, M. W. Thompstone, J. Whitham. *Lantern Committee:* D. E. Benson, W. Broughton, M. W. Thompstone, H. M. Whitefield.—*Hon. Librarian;* John Schofield.—*Hon. Curator:* F. Edwards.—*Hon. Treasurer:* W. G. Coote.—*Hon. Secretary:* W. H. Farrow, 58, Greenheys-lane.

TORONTO AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1887. Weekly meetings on Monday evenings in the College of Physicians and Surgeons, corner of Bay and Richmond-streets. *President:* Frank D. Mauchee. *Vice-President:* Dr. Ellis. *Committee:* W. B. McMurrich, R. Muntz, George S. C. Bethune, A. W. Croil, Hugh Neilson, T. Langton.—*Treasurer:* R. S. Clark.—*Secretary;* E. Havelock Walsh, 219, Beverley-street.

VICTORIA CAMERA CLUB.—Established 1887. *President:* Hon. F. S. Dobson, LL.D.—*Vice-President:* A. M. Henderson.—*Committee:* James Pettigrew, A. Harper, H. B. Clutten.—*Secretary and Treasurer;* Alfred Henry Farmer, 54, Elizabeth-street, Melbourne.

SOCIETY OF ARTS.—Among the forthcoming papers to be read at the meetings of the Society of Arts after the Christmas recess are:—A. G. Green, C. F. Cross, and E. J. Bevan, *Photography in Aniline Colours;* Carmichael Thomas, *Illustrated Journalism;* T. Emerson Dowson, *Decimal Coinage, Weights, and Measures;* Colonel Sir Charles Wilson, K.C.B., K.C.M.G., F.R.S., *Methods and Processes of the Ordnance Survey.*

Correspondence.

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

WARM TONES ON BROMIDE PAPER.

To the EDITOR.

SIR,—Public taste, or at least that of some of those whose work considerably influences it, seems to be coming back once more to a feeling for warmer tones in our photographic prints. Whether the fancy—I was almost calling it craze—for the cold grey which has pervaded our exhibitions for a year or two has been a real love—or only a spurious—thrust upon us by the fashion of the time, I am content to leave to each individual to decide for himself. Certain it is, however, that any modification of our processes introduced with a view to giving warmth to the blacks, or even of substituting for them sepias, or an honest brown, on a suitable surface, meets with a ready welcome. For the production of contact prints, either direct or by development, there are abundant methods giving tones to suit every taste. It is with enlargements that the difficulty comes in. Unless the amateur be prepared to make enlarged negatives he is practically confined to bromide paper.

So many amateurs—many who have worked, and who still work, larger sizes as well—so many amateurs of no mean ability have taken to the modest quarter-plate when on the tramp, depending—for their more imposing pictures—on enlargements from such of their negatives as are suitable, that the consideration of how warmer tones may be obtained on gelatino-bromide papers may interest some of your readers. The regret which I have felt myself, and which is frequently experienced by others, that we are confined in our enlargements to the cold greys, however beautiful they may be made by skilful workers, has led me to make a few experiments.

I am aware that warmer tones can be obtained on this paper by modification of exposure and development; but these are not always as agreeable as the blacks. That they can also be produced, I believe, by other methods, such, for instance, as bleaching the unfixed image and after-restoring, toning and fixing in a suitable combined toning and fixing bath. But these methods are generally troublesome, and withal very uncertain as to the final result, besides having mostly to be carried out in the dark room. My aim has been to hit upon a process of toning which could be worked with comfort and ease, as well as with some degree of control over the resulting tone.

After some other experiments which it is not necessary to describe, my attention was attracted by a ferridcyanide and uranium intensifier mentioned in the pages of the recently issued ALMANAC. With this, as I had anticipated, I was enabled to convert the image to a red brown, although at first it was not of an agreeable tone. Further trials convinced me that an image resulting from ferrous-oxalate development was not suited to my purpose, and that I must obtain a groundwork of greater warmth upon which to deposit the toning agent. Quinol with a caustic alkali gave too blue an image, with sodium carbonate I got a dirty one, and it was at last with potash and a liberal dose of sulphite that I produced by development a print somewhat resembling a sepia platinotype. What was wanting in clearness and richness I found could now be easily added by the ferridcyanide uranium toning solution, and I obtained the results which I had the pleasure of submitting to you, Mr. Editor, yesterday—results which will, I think, leave little to be desired by lovers of every tone from warm black through sepia and the browns to a rich Bartalozzi red.

The developer I have used in my trials is as follows:—

No. 1.

Potassium carbonate	50	grains.
Sodium sulphite	60	,,
Water, to	1	ounce.

No. 2.

Quinol	8	grains.
Citric acid	3	,,
Potassium bromide	1½	,,
Sodium sulphite	40	,,
Water, to	1	ounce.

Use equal parts of Nos. 1 and 2.

The development is slow. Exposure should be full, as the best results cannot be obtained from prints that are in any degree hard. Hard prints may, nevertheless, be improved by toning, as the blackest shadows seem to be toned down by the warm deposit and the lighter details of the high lights, and the half tones seem to gain in prominence by the added colour. After washing and fixing in the usual manner, the prints are again very thoroughly washed, as the slightest trace of hypo seems to intensify into a stain with great readiness.

The prints are now ready for toning in the following bath:—

Nitrate of uranium	20	grains.
Ferridcyanide of potassium	20	,,
Acetic acid	440	minims.
Water, to	20	ounces.

This should be made up as required and used at once. At first I used a stronger bath, but I found it convenient to dilute it to this strength, as greater control was obtained by more gradual working. The first change which appears is the clearing of such degree of muddiness as there is in the developed sepia print. This is followed by a gradual warming of the tone, and the action can be arrested at any desired point by a vigorous washing in water, as the resulting print, when dry, is very little different from what it now appears. And here comes the weak point in the whole process. You must not wash your prints too long—only enough to clear the whites, which may take ten minutes—for the tone which we have taken so much trouble to produce will slowly but surely go down the waste pipe if you do. This, no doubt, will have been foreseen by old workers who are acquainted with ferridcyanide-uranium intensification, which was known to them more than twenty years ago.

That the tone will not stand prolonged washing is certain, unless some means can be devised to fix it. Whether it will be stable under the influence of light I have been unable (*in the absence of much of it lately*) to determine. I, however, put forward my experiment in the hope that some of our chemists more able to grapple with the difficulties to be overcome may have their attention directed to the subject, and may be induced to follow it further.—I am, yours, &c., JNO. WEIR BROWN.

Croydon, December 30, 1890.

GAS PRESSURE GAUGES.

To the EDITOR.

SIR,—Referring to the explosion of a gas pressure gauge, recently reported in the JOURNAL, there is a general belief that gauges are safe from these disasters. This, however, is not so. It is surprising that so few gauges come to grief, used as they so frequently are with the *full pressure* of gas *suddenly* admitted into the gauge, the strain thereby being very severe!

To use safely, turn on gas slowly; and, as a precaution to personal safety, do not stand directly over the gauge. Accidents can, however, be prevented, or reduced to a minimum, by plugging up the end of gas passage in gauge and drilling a hole of the *smallest possible* dimensions through the plug. The plug must be *screwed* into the orifice in nozzle of gauge; if this precaution is not adopted, the probability is that the plug will be driven through the gas passage by the force of the compressed gas to inside the gauge. There is also a "patent check valve" adaptable to all gauges, which, it is stated, is a preventative of accidents of this nature.—I am, yours, &c., SILVESTER PARRY.

Chester, December 29, 1890.

THE JURY OF THE NEXT INTERNATIONAL EXHIBITION AT VIENNA.

To the EDITOR.

SIR,—Under the same heading as this note, in No. 1597 of your JOURNAL, appeared some remarks about the jury of the next international exhibition at Vienna, to a few points of which I wish to draw attention. No doubt the whole of the note emanates from the pen of the promoters of this exhibition—the Committee of the Amateur Club at Vienna—as nearly the same appeared in *Photography's* issue of November 27, therefore giving the views of these gentlemen. Now the whole contents of the introduction to the list of names of the jurors is so full of self-confidence and pride, and makes statements which others and not the promoters of this exhibition should express, if thought of, and contains such an offence to photographers in general, that no English photographer should leave it without, at least, some remarks.

Already the first words contain an assertion which, we repeat, others and not the interested party should make: "Hitherto no exhibition has been able to show a jury like this." As it is not meant in any other than a distinguishing sense, all exhibitions in England and elsewhere, and all men who acted as jurors on such occasions, are depreciated. We shall protest against such an assertion which reflects so little of credit to our exertions in the matter of photographic exhibitions, and in reverence to the many excellent men who acted as jurors on our exhibitions.

They say, further, that "artists of the first rank, free from every prejudice," have declared to act as jurors; and they continue, "by these means the exhibition acquires an importance unsuspected before." It will be seen that the stress is laid upon this communication, which no doubt culminates in the personality of the gentlemen who consented to act as jurors—"artists" they are named, and we therefore look at once upon the list. No doubt there are six gentlemen—four painters, one sculptor, and one photographer—who all, or perhaps in the spirit of the Viennese arrangers only five, very well deserve the title of artists. But very far we are to see in this selection of jurors—no doubt in their quality as painters and sculptors—such an *evénement* through which the exhibition "acquires an importance unsuspected before." On the contrary. As to the artistic capacities of those gentlemen we have naturally nothing to say. They may be, and they are, artists of first rank. But we have to protest on two points of view against this "unsuspected importance." Notwithstanding the great movement which now is going on in England as to the artistic side of photography, it will, we think, never be voted in our country, neither by the Parent Society nor by the Camera Club, that in a jury composed of six members only one shall be acquainted with photographic art. On the contrary, it means depreciating photography as an art, or at least depreciating photographic artists. Artists—painters, art critics—have very often acted together with photographers as

jurors in our exhibitions, and had any of our *leading* societies—and, of course, only their decisions can be looked for in this instance—thought it desirable to compose a jury exclusively of men working in the other branches of art than photography, they would have easily done it. But they have not done it, and they will not do it we presume.

The meaning of the epithet, "free from every prejudice," we can likewise not understand. It is a *conditio sine quâ non* that gentlemen acting as jurors shall be, as far as human nature shall allow, free from every prejudice; and we also had such jurors. In this condition of things we can, therefore, again see no "unsuspected importance." Only let us remark that the Viennese promoters of the exhibition, in inviting England's best men to help to carry out "the ideal thought (?) on which the exhibition is founded," pay us a compliment in saying that "this is all the more to be hoped, because, probably, she (England) is destined to take the highest place there." Now it is possible that the Viennese promoters are interested to have our best men to adorn their walls; but it is certainly not a sign of freedom from every prejudice, as it may be unjust against our neighbours, when they already *now* say that probably "she (England) is destined to take the highest place." We accept this as a decision of a competent jury; but we decline it as a persuasion, a bird-call, and so more amongst statements of "ideal thoughts" and "freedom from prejudices."

We exceedingly regret that we cannot better return the bow. We have not the intention nor the right to investigate the claims which the Committee of the Vienna Amateur Club acquired to send such a declaration to the photographic world, to stamp their decisions, and in consequence all concerning their projected exhibition, together with their nomination of a jury, as "an importance unsuspected before." On the contrary, we found all reason to contradict them, and we hope that British photographers, thinking a little over the matter, will not help to carry out their "ideal thought." AN ENGLISH PHOTOGRAPHER.

THE WORKS OF THE LATE O. G. REJLANDER.

To the EDITOR.

SIR,—We have pleasure in informing you that we have acquired from the widow of this celebrated artist the whole collection of original negatives, numbering nearly 400 of the finest examples of photography.

It is our intention to shortly hold an exhibition of these works at our showrooms, and to publish them in the form of prints, enlargements, and lantern slides. The photographic public will thus have an opportunity of obtaining at popular prices high-class reproductions of the works of this photographer, who was, as you are aware, one of the finest exponents (if not the finest) of the art side of photography the world has yet seen.—We are, yours, &c., THE FRY MANUFACTURING CO.

(A. E. Hayman).

5, Chandos-street, Charing Cross, London, W.C., December 24, 1890.

Exchange Column.

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

Will exchange dissolving view apparatus, pair of lanterns side by side, dissolver-lamps, slides, &c., complete in case, almost new, for McKellan's detective camera, half-plate apparatus, wide-angle lens, books on photography, and accessories.—Address, J. DADLEY, Pailton, Rugby.

Will exchange Houghton's changing tent, Newman's shutter, Eastman's roll holder, Shew's detective case, and THE BRITISH JOURNAL OF PHOTOGRAPHY, 1888; wanted, first-class landscape negatives, quarter-plate or larger size, half-plate landscape lens, and enlarging apparatus.—Address, W. PRATT, 27, Regent-street, Nottingham.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

C. PALMER.—In purchasing copyright negatives a legal assignment of the copyright is necessary; that is, each copyright must be separately assigned or it will be of no value.

WM. FERRIER.—If you have reason to imagine that the mounts are the cause of fading, your best way will be to send them to a chemical expert for analysis, who, after examination, will render a report as to their quality.

NITRANI.—Aurine or any of the yellow dyes will answer for a colour screen in orthochromatic photography. The strength of the solution must depend upon the thickness of the medium. A thick film is, of course, equivalent to a thin one more strongly coloured.

P. MAHON.—The best method when printing on bromide paper is to make the exposure to artificial light. Daylight is so variable and the exposure so short that a good deal of waste will accrue when it is employed. Most commercial bromide direct printing is done by artificial light.

WM. DAVIS.—Pyrogallic developer is liable to produce a yellowness when ordinary plates are used for lantern slides. Hydroquinone would certainly yield slides with purer lights. But why not use plates specially sold for lantern purposes? These will yield far better results than the plates you have been employing.

S. O. says he recently obtained a burnisher, though not one of the most expensive ones, and all the prints put through it have lines running through them, and they always come in the same place. On writing to the maker he says the burnishing bar has become scratched, and this is the cause of the marks. He asks if this is likely to be the case.—Yes, certainly. If the bar is scratched laterally the prints are sure to show them when burnished. The remedy is to grind the scratches out of the bar.

A. HOWARD BENHAM writes: "I am rather anxious to have the loan of several half-plate negatives of frost scenes, trees, &c., in order to make an enlargement therefrom, not having such a one in my portfolio, and being unable to make the negatives myself. If you could put me in the way of obtaining such a loan for a few days I should be greatly obliged, and could in exchange offer loan of negatives of Corsican views (unique, I believe), and others of Italian cathedrals, Milan, Pisa, &c., of my own."

F. T. QUICK writes: "Would it not be possible to stop halation by interposing a substratum between the sensitive film and the glass? For example, an emulsion of iodide of lead would be of a good non-actinic colour, soluble in hypo, and very cheap. I believe there might be some difficulty in coating gelatine on gelatine, but this could hardly be insuperable. Plates so made would be highly sensitive, but wanting the methylated spirit bath if to be dried quickly. It may be that collodion for the first coat would answer better than gelatine."

W. A. VARLEY writes that he recently saw an apparatus advertised for sale to take vignetted portraits direct in the camera, and asks if the thing is possible, so as to avoid vignetting in the printing in the ordinary manner.—There are several ways by which vignetted negatives can be obtained. The simplest, perhaps, is to have a white screen with a serrated opening, through which the sitter is seen, arranged between the lens and the sitter, and out of the focus of the lens. Of course, when the negative is vignetted it cannot be used for "full-out" portraits, which is a disadvantage.

ENAMEL asks: "Will you kindly state the cause for the enclosed enamel being so dull after stripping from the glass? Also, whose is the best collodion for enamelling? Also, as to the reason that you can strip the collodion from the enamels done by professional enamellers and not those done by yourself? The enclosed is as it is stripped from the glass."—The reason the print looks less glossy than most "enamelled" prints is that too much of the gelatine has been expelled in the operation. Any of the collodions sold for the purpose will do quite well. We were not aware that the collodion could be stripped off as stated.

R. C. A. says: "A few months ago I purchased a photographic business said to make a return of so many hundreds a year; I now find that the returns, even in the best part of the year, are not half that amount, and I have since learnt that my predecessor was hardly able to pay his way, while he represented to me that he was deriving a good income from the business. Therefore I consider I have been taken in or next to swindled out of my purchase money. Can you tell me if I have any remedy?"—If our correspondent can prove fraud or misrepresentation he has a remedy at law. The best way will be to consult a respectable solicitor, putting all the facts before him.

SCANDERBEG writes: "Would you kindly give details of any process (development or otherwise) by which I can procure in a dry plate negative the creamy white which characterises the wet collodion process? I believe such a process has been published, but cannot discover the formulæ. Can the film be bleached by converting the reduced silver remaining in the film into iodide of silver; if so, will you please to give formulæ?"—We advise our correspondent to carefully study an article by Lord Rosse which appeared in our issue of June 10, 1887, in which his lordship described how, at a bazaar for a charity purpose, he took positives on gelatino-bromide plates and bleached them into good presentable pictures ready for framing and delivery.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, January 7, *Photomicrography*; January 14, *Dark Room Illuminants.*

The following, from the Vienna correspondent of a London daily paper, must be taken for what it is worth:—"An interesting discovery in photography is said to have been made by a Herr Dombrzynski, of the Lemberg Polytechnic Academy, who claims to have succeeded in photographing by electro-magnetism. In a report on his discovery, addressed to the Vienna Academy of Science, Herr Dombrzyuski explains the means by which he succeeded in obtaining photographic effects by electro-magnetic undulations."

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INTENSIFICATION WITH HYDROQUINONE AND SILVER.

There is far less call at the present day for methods of intensification of gelatine plates than was the case a few years back, when the films were perhaps less perfect and their proper treatment less thoroughly understood. Besides, it was scarcely recognised at that time that development and intensification may and do proceed simultaneously when the alkaline method is employed in a far more regular and satisfactory manner than was possible, except under the most favourable conditions, with acid development. With collodion plates and iron development it was rarely, except in cases where the exposure happened to be most accurately timed, that printing density and due gradation were secured in a single operation, the almost invariable custom being to "redevelop" or intensify by means of a second solution either of iron or more commonly of pyrogallic acid containing a larger proportion of restraining acid.

One of the initial difficulties in connexion with gelatine plates was that of getting density, a difficulty in no small measure due to the employment of less silver than is now usual in the film, and also to the presence of more or less tendency to fog in the emulsion, which restricted the extent to which development could be pushed. In attempting to remedy the defect thus arising, very little attention was given to the first stage, or development proper, the natural course being deemed to be reinforcement by means of a separate solution. It is true that increasing the strength of the pyro solution was commonly supposed to lead to greater vigour of image, but this in most cases proved insufficient to meet the difficulty, so that separate methods of intensification became the fashion.

Of these, perhaps, the one that found least favour with gelatine workers was that which had been almost universally employed previously, namely, the "acid-silver" method. The first workers with and writers on gelatine plates used and published formulæ similar to those already in use—in some pyro, in others ferrous sulphate, being the reducing agent, with citric or acetic acid as the restrainer. But little satisfaction, however, was derived from these, owing to the laborious washing it was necessary to apply to the swollen and absorbent gelatine film before it could be considered safe to apply the silver solution, and the persistent and inexplicable manner in which stains made their appearance, even when all ordinary precautions had been observed.

The intensification of gelatine negatives, it should be noted, has been invariably performed after fixing, whereas in the collodion process it usually preceded the fixing operation, though not necessarily so. The reason for this, there can be little room for doubt, is that the comparative thickness and opacity of the unfixed gelatine film renders it impossible to judge with any accuracy of the intensity of the image, so that it came to be considered an essential to fix before intensifying. All collodion workers know how extremely hazardous an operation it was to intensify with silver after fixing with hypo, despite the comparative ease and rapidity with which a collodion film is washed. No wonder then that the extra care rendered necessary with gelatine threw silver intensification into disrepute.

But, as we have frequently endeavoured to impress on our readers, this form of intensification, when carefully and successfully conducted, gives results not only unsurpassed but unequalled by any other method, and, contrary to opinions expressed by others, we hold that such images are more permanent than any others. Who ever heard of a silver-developed and intensified collodion negative fading? Who, on the other hand, can look back on the practice of ten years ago but must remember with sorrow the loss of valuable negatives that had been submitted to mercurial intensification? Collodion negatives, it has been said, have stood for years after precisely similar treatment with salts of mercury, whence it was argued that it was the gelatine itself that was at fault, and that if the mercurially developed images faded, so also would the silver; that it was equally impossible to avert the inevitable decay. Here we have always considered that a fallacy was involved. In order to successfully carry through the intensification of a gelatine negative with silver, a proper amount of washing is an absolute necessity, otherwise the damage is palpable at once; in the case of mercurial methods of treatment the washing may be to some extent shirked without producing any immediate signs of injury, though the seeds of future decay may remain. Hence the mere fact of a negative having been intensified with silver without staining is in itself a guarantee that it has been fairly and properly treated, and its chances of permanency are greater than can be claimed for the mercury image.

But, setting aside the question of permanency, there is one feature of silver intensification that recommends it above others, namely, the wonderful capacity it has of modifying the gradations of a negative, and, it may be added, the extent to which the reinforcement may be carried. In the case of mercurial methods which depend mainly on substitution or an alteration of the colour of the deposit, the increase in density is proportionate throughout the whole image, which is equally *thickened* throughout. This is all that is required if the gradations are correct to commence with, but how often in practice is this the case? More frequently, whether from under-development or over-exposure, the image is flat and wanting in contrast, and

intensification with mercury is only a sort of palliation. With the silver method, on the contrary, which piles on additional material to the already existing image, the contrasts may be increased to almost any extent by varying the proportions of restraining acid of silver and the strength of the reducing agent; and, moreover, the metal may be so added until absolute opacity is obtained in the lights without—assuming proper precautions to have been taken—filling up the shadows. This renders silver intensification especially valuable to those whose work lies in the direction of line reproductions.

Of the two intensifiers—iron and pyro—the former possesses, with gelatine, the advantage of not being so liable to stain the film, but it suffers from the defect of being very slow in action and incapable of exercising as great an effect as pyro. The latter, from the strong discolouration that takes place in its solution, not only by the reduction of the silver, but also by the oxidation of the reducing agent itself, is almost certain in cases of prolonged application to stain the film more or less deeply; and though there are means of removing such stains—supposing them to be due solely to the action of the pyro and not to the presence of unremoved hypo—it is usually at the cost of some of the density.

Arguing on the "difference in the behaviour of pyro and hydroquinone in conjunction with alkali on the gelatine film," we some two years or more ago roughly tried the latter as the reducing agent with acid-silver, and quite recently the subject has been revived on the Continent, and hydroquinone as an intensifier has been favourably spoken of. We have not our notes of these experiments at hand, and have no definite recollection of the behaviour with gelatine; but applied as a developer to collodion plates, hydroquinone and acetic acid with silver proved a very slow agent. The difference between development and intensification is, of course, a very wide one, and a solution may prove an efficient intensifier although incapable of *originating* an image—as witness the relative behaviour of pyro and silver in developing and intensifying a dry collodion plate.

We have not had an opportunity of repeating the trials with gelatine films, but hope to do so very shortly; meanwhile, we may describe the comparative action of pyro and hydroquinone in conjunction with silver in solution. Unrestrained pyro, if a few drops of a ten-grain solution of silver nitrate be dropped into it, instantly blackens and throws down a dense deposit. If the mixture be boiled in a glass flask, allowed to settle, and the liquid poured off from the deposit, the former will be found to consist of a filthy black mess, while the latter, if washed in two or three changes of water, consists of metallic silver in granular powder of a light greyish colour. If a small quantity of citric acid be added to the pyro, on the addition of the silver no change occurs for a while beyond the production of a slight opalescence. Gradually, however, the solution changes colour, passing through various shades of yellow "sherry" to deep red brown, still, however, remaining clear until the colour becomes too deep. Later on it becomes opaque and muddy, and eventually as bad as if no acid had been employed. The precipitated silver is in this case finer and lighter in colour.

If silver be added in the same manner to a plain solution of hydroquinone, the first change is a slight opalescence, which gradually deepens until the liquid assumes a greyish-white, muddy appearance, and this colour changes gradually to greyish black. If this be boiled, as in the previous case, the silver is all precipitated, and the liquid in this instance becomes perfectly clear and bright, and of a more or less deep yellow, brown, or red colour, according to the strength of solution and the quantity of silver added. The precipitated silver is much finer and lighter in colour than under similar circumstances with pyro. If a little acid be added to another portion of hydroquinone, the addition of silver produces similar changes, though more slowly, to those that occur with pyro; but the colour of the mixture does not darken as in the case of pyro until it is heated, when it passes from a greyish drab or cream colour to brown, and eventually clears completely, presenting a rich sherry colour. The precipitated silver after washing is almost white by reflected light, and in a very fine state of division, and shows a grey tint when spread in a thin layer on glass.

These appearances seem to promise that so far as freedom from staining and similar troubles are concerned, hydroquinone will have the same advantages over pyro as an intensifier as it has as a developer. It remains now to be seen whether its action is sufficiently energetic to render it practically useful, and to determine the best proportions in which to employ it and its restrainer.

PHOTOGRAPHING MANUSCRIPTS.

In another portion of our columns will be found an article which appeared in last week's *Athenæum*, and will in all probability give rise to considerable remark. It contains comments upon a notice issued by the Controller of the Clarendon Press on Christmas Eve, to the effect that he will undertake the photographing of MSS., printed books, &c., belonging to the Bodleian Library, or deposited there, at certain specified rates. These rates are so extremely low that surprise will be felt, and possibly incredulity, at the possibility of the work being done without loss. A 10×8 negative will be taken for three shillings, a silver print for fourpence, a platinotype or carbon for tenpence, collotype prints—all 10×8 size—for less than a penny farthing each. If the work is to be confined to the precious tomes in this particular library, none but local photographers will be interested; but if this be the beginning of a plan whereby it is intended to embrace the whole of the country in the scheme, and the photographing of any MS. or printed matter sent from architect's plans to rare books, printed and written, it cannot be doubted that considerable feeling will be aroused. As a matter of fact, the copying of printed or written matter is very very simple work, and, on the scale proposed, a five-pound note would cover all capital that need be put down in order to be able to take the required negatives. A young boy might be taught it, and very good results obtained with dry plates, which we assume will be used, and which hitherto have usually given inferior results to those obtained by the wet plate process.

It will be observed that printed and written matter only is named, and thus an arrangement could be set up which would reduce the time and labour needed to a very insignificant amount. The photographer would not be troubled by sitters, by an anxious press of work, or by any of the thousand worries that beset the average photographer; he would erect a simple frame that would enable him to bring the surface of the print to be photographed mathematically to one regular and uniform spot; a simple calculation would give the scale of reduction, if any, and the position of the ground glass duly registered for each point of the scale. A print brought could be placed in position and focussed in less than a minute, and there would be nothing further than photographing, reduced to a purely mechanical operation; and almost any number of plates could

be developed and fixed in the same time that would be required for one only.

The Editor of the *Athenæum* appears to think that the half a guinea which he assumes to be the average minimum charge of the professional photographer for such work is a high price, and this of course it is, compared with these new rates; but the parallel is quite unfair. If a photographer were asked to do several hundreds, or even dozens, of negatives of such subjects, the half guinea would be very quickly reduced to a much smaller sum, and such a comparison is the only just one. The bulk of the photographic establishments in this country are mainly concerned in producing photographs of living objects and scenery, and the disarrangement and rearrangement involved in the photographing of objects such as those we are discussing is so considerable that the loss of time must be taken account of, not to speak of the fact that they would in all probability be undertaken in a costly studio by a clever, artistic operator, whose skilled labour is so much more costly than that which would be required by the Clarendon Press MS. photographic establishment when once erected. We feel it incumbent upon us to express ourselves strongly and at length on this matter, for we do not doubt that when once these Oxford prices become well-known to the public they will be quoted by many of that class who consider professional photographers to be banded together to make illicit and unheard-of profits as a reason for reducing prices. There is also to be considered the fact that these subjects are all black and white, no half tones, no light and shade, being required. This should be borne in mind also by photographers themselves when they compare these prices with what they would have to pay to the firms who undertake this class of work for those devoid of convenience or appliances for producing it. To copy an occasional MS. or plan again, though a very simple matter when there is a complete installation always ready, may yet be a matter of considerable difficulty when only occasionally called for, and from one whose training has been mainly artistic. The production of collotypes belongs more to processes trade than to the art or science of photography; yet collotypes at penny farthing a-piece if a hundred are taken, or twenty prints, including proof, for five shillings and sixpence, are prices so far below anything yet in the collotypers' price lists that we feel to some extent curious to know whether they will make any public comments upon this novel and startling "cutting" price list.

We have had a good old-fashioned winter this time, even if we have no more of it. In the opinion of many photographers, we imagine, a so-called "old-fashioned winter" is better in the imagination than in the reality. A green Christmas is said to make a fat churchyard. But a Christmas such as the one just experienced—with the weather that preceded and followed it—has not increased the exchequers of the majority of photographers, neither has it added to the comfort of working, or to the quality of the work produced.

The old adage, "make hay while the sun shines," might appear almost a mockery to professional photographers just now. But there is no reason why they should not take advantage of the continued severe weather to add to their returns. In Canada, America, Russia, and other countries where long winters are the rule, winter portraiture is a special feature. Backgrounds of winter scenery, with accessories in keeping, are to be found in most studios, and sitters go in their latest winter attire to have seasonable portraits taken. Why should this not be the case here? We venture to say that if many of the photographers in some of the fashionable thoroughfares had early last month made a good display of specimen portraits in winter costumes of the present fashion, with wintry accessories, they might have done a really good business in this class of picture. It has been stated that some ladies are photographed in every new dress they have—artists wish it were true—and there are few costumes that flatter ladies more than those in which masses of rich furs predominate. It may be said that these winter portraits would only be pictures of a season. True; and that is the greater reason why the business in them should be cultivated by the profession.

Suitable backgrounds and accessories can, with a little ingenuity, easily be extemporised. With a small sash tool and a little whitewash any old or damaged sunny landscape background can quickly be converted into a snow-clad scene. If the background be a good one that is utilised, provided it be in flatted oil, it can at any time be restored to its original condition with a sponge and water. With regard to the accessories, two or three pounds of cotton wool judiciously distributed on the horizontal parts of the ordinary outdoor ones will be all that is necessary, while a few sheets of common wadding for the floor will complete a very effective winter scene for the studio.

If the wintry aspect is carried out to the extent that it is in some countries, where winter portraits are a special feature, that is, by splashing the negative over with opaque matter so as to imitate falling snow, it should be distributed evenly all over the picture. We mention this because, a few years back, a photographer of some repute made the great mistake of showing at one of the Society's exhibitions a large portrait of a lady taken in what was intended to represent a snowstorm. But the snow was falling everywhere except in front of the model's face. For this reason the picture, otherwise effective, was ludicrous in the extreme. In taking portraits with wintry aspects incongruities must be avoided.

It appears, according to the correspondent of a daily contemporary, that the advocates of the American Copyright Bill are becoming somewhat discouraged, it being asserted that some Senators intend to propose certain amendments when the Bill comes before them. The result, if successful, will be that the Bill must be returned to the Lower House, and then it will have but little chance of passing there again. The amendments threatened are said to be the restrictive clauses extending their provisions to photo-lithography and similar industries. In the opinion of British publishers and printers *many* more amendments are desirable.

Not a few of those who have taken insufficient precautions with regard to their water supply have experienced the inconvenience of burst pipes. It often happens when the burst first becomes manifest that the source of supply, whether from a cistern or the main, cannot be readily reached and so stopped. The best plan under these circumstances is to close the pipe by flattening it with a hammer a few inches from the fracture. This procedure sometimes causes a little more work for the plumber, but the slightly extra cost incurred is generally well compensated for by the damage avoided. Even a few minutes flow from a fractured pipe, particularly in the upper part of a building, will often cause immense injury to property, to say nothing of the annoyance of damp walls and ceilings, perhaps, for weeks.

The total number of patents applied for during the year just ended was 21,303, as against 20,993 the year previous, not a very great difference. It will be interesting to see what proportion of last year's applications will be completed. The number of applications for patents in connexion with photography appears to be about the average.

What, writes a correspondent, about the Automatic Photographic Company's machines and the pictures they have produced during the past month of fogs and inclement weather, when even in the best appointed studios, and with the greatest skill, moderately good results

have only been obtained under difficulties? We cannot answer the query, inasmuch as we are unaware that any of the machines are in use, though they were promised months ago. We have a penny ready wherewith to increase the returns of the Company for the first machine we see. It was stated that a machine was, a short time ago, installed at Brighton, perhaps some of our Brightonian friends will enlighten our correspondent as to how it is working just now.

How has business been during the last year is a question very general just now. So far as we can ascertain from London and provincial photographers it has, on the whole, been neither better nor worse than the average of the two or three previous years. It would almost seem, however, that the most flourishing businesses are the highest and the most expensive, and those with the lowest prices. The medium class, as in previous years, are those that complain the most of bad trade and the effect of amateur photography. We are told there is a growing tendency amongst some high-priced artists to depart from their price lists and to take less rather than lose custom. If this be true the system is much to be deprecated.

AMATEUR photographers, nowadays, seem to be everywhere. At a recent great fire in the city, one gentleman, evidently a city clerk, was heard to remark to a friend that he wished he had his camera with him, as he would have had a few shots at it. We doubt, however, if any of them would have been successful from where he was standing, as it was to the leeward of the blazing buildings. To the windward, as there was a strong wind blowing at the time, some very interesting photographs might have been obtained. On the day after the fire, we are given to understand, several cameras were on the scene, and some interesting pictures may have been secured. A church in the city of London covered with ice from tower to base is certainly a novelty. This was literally the case with St. Benet's—one of Sir Christopher Wren's churches—while the adjacent ruins had every opening draped, as it were, with a deep fringe of icicles, and the ladders and escapes of the firemen were ice from top to bottom. Such a sight has seldom been witnessed in London. It is to be hoped that all the negatives have turned out successful, as the scene was well worth recording.

WARMING THE DARK ROOM.

THAT a "spell of cold weather," as it is commonly termed, is not without its advantages in connexion with some of the operations of photography I attempted to show last week, but it is equally true that it is felt in a contrary sense in other manipulations even closely allied. For instance, while the making of emulsion and coating plates or paper are greatly facilitated by the absence of the heat of summer, the drying of the films is correspondingly retarded during the low temperature of winter, when we have the choice either of an atmosphere fully laden with moisture or else of actual frost, either of which is fatal to the production of the most perfect result.

In the former instance, the atmosphere being charged with almost the full quantity of moisture it is capable of carrying, even if passed over the films in a constantly changing current, leaves them but little benefited by its action, with the result that they may occupy several days in drying; and though the injurious effect of this prolonged exposure of the gelatine to the decomposing action of moisture may not be so great as when the temperature is higher, it must at least produce some slight deterioration of the emulsion itself in a physical sense. But, in addition, we may also expect that if there lurk in the preparation any inherent tendency to fog or even to increase of sensitiveness, it must clearly have a better chance of asserting itself in the damp condition of the films than when they are perfectly dry. Such tendencies may exist without developing any pernicious result when the emulsion is stored under alcohol as I have described, but the circumstances are altogether altered when the films are freely exposed to the atmosphere.

In the case of frost, not only do the same atmospheric dangers exist—though perhaps in a slightly less degree—but there is the additional chance of the films themselves becoming congealed and covered with indelible crystalline markings, which, though beautiful enough in themselves, are out of place on a photographic film. Frozen films may, moreover, become apparently dry without showing markings, owing to the quantity of moisture present being very small; but if packed away in this condition the effect of a rise of temperature is to restore the condition of dampness, and closely stored as the plates will naturally be, this is maintained for an indefinite period, or until they are opened for use, with the only possible result of ruin to the sensitive surfaces.

The abnormally low temperature makes itself felt also, though of course not to the same extent in the drying of negatives after development. Here the atmospheric conditions, so far at least as the presence of noxious gases is concerned, do not so much matter; but with negatives that take a day or two to dry, there is far greater risk of injury from dust and other causes than when the drying takes place in an hour or two. Where only a few negatives have to be dealt with occasionally, it is not difficult to adopt special measures for their rapid drying; but this is not so easy in a large establishment in constant work unless systematic means are taken.

Then, again, the effect of low temperature upon development has been more than once alluded to recently, and the importance of preserving the solutions, as well as the atmosphere of the developing room, at a reasonable point has been insisted on; but, unfortunately, when the necessity arises for any special precautions against cold, the photographer, especially if he be an amateur, usually finds himself at a loss how to proceed. In the case of professional establishments, if properly appointed, the means will, of course, be ready for use when called for, but this is not always the case, and amateurs are seldom so fortunately situated as to have it in their power to cope with a sudden and lengthened visitation of cold. Even if the dark room be provided with a fireplace, it is of little use in its normal condition, as a fire in the dark room, especially if it is to be used for the preparation of plates, is a nuisance, both on account of the light and the dust it gives out. Some other means must therefore be sought.

A very simple expedient that proved useful to me some years ago for warming the interior of a drying cupboard has within the last week or two again done good service under circumstances that found me otherwise unprovided, and it occurred to me that it might be worth while disinterring it for the benefit of those who have never heard of or forgotten it. The principle formed the subject of a patent some years ago under a name something like "Anselin's patent portable foot-warmer." The apparatus consists of a metallic vessel filled with a hot super-saturated solution of one of the numerous salts that are capable of rendering latent a large amount of heat in act of solution, which on cooling they give off far more slowly than ordinary solutions. In other words, an equal volume of such a solution would remain warm far longer under the same conditions than a similar quantity of pure water. Such salts are remarkable for the intense cold produced in dissolving, and for the high boiling point of their saturated solutions, and amongst them may be named acetate of soda, "hypo," nitrate of soda, nitrate of potash, and sal ammoniac, with many others of a kindred character.

The best is undoubtedly the first-named, which is extremely soluble, dissolving in about two-thirds its weight of water, and forming a saturated solution that does not boil until it reaches 256° Fahr., or 44 degrees above the temperature of boiling water. Such a solution, possessing as it does an initial temperature so much higher than plain water, might naturally be expected to prove more efficient in heating power; but when, by virtue of its "latent" heat, it gives it off more gradually, it will be seen that for maintaining a gentle and equable temperature it possesses manifest advantages. It resembles in its behaviour, though in a reverse manner, a block of Wenham Lake ice when compared with a similar block of ice frozen in this country. The former, probably formed at a temperature below the zero of Fahrenheit, although it is no colder than English ice to the touch or to the thermometer, carries a vast quantity of "latent" cold stored up in it, and if too equal-sized blocks be exposed under similar conditions to a "thawing" temperature, the "Wenham" would far outlast the other.

Hypo is the only other of the salts named that I have tried myself for this purpose, and it does not fall far, if any, short of acetate of soda in efficiency; but it is a nasty chemical to have about unnecessarily in the dark room, and especially in a dark room where plates

are *prepared*. Still, it is the cheapest of all those mentioned, and if care be exercised in its employment there is no reason why it should not be chosen, especially in the case of large quantities of solution. Every photographer knows the price of hypo—from 8*s*. to 12*s*. per cwt. Acetate of soda, nitrate of potash, nitrate of ammonia, and sal-ammoniac can be purchased at 6*d*. per pound cheaper in quantity, and nitrate of soda lower still. But for all practical purposes acetate of soda and hypo will answer our purpose.

The first points to be settled are the shape and size of the containing vessel. In the apparatus sold under Anselin's patent the shape was, in all that I have seen, very similar to the ordinary railway foot-warmer, or on a smaller scale for ladies' muff-warmers a neck was added, converting the thing into a flat flask. This shape is calculated to give off the greatest amount of heat rapidly, which for our purpose is not precisely what we require. Rather, we want a "warmer" that will retain its heat as long as possible, and give it off gradually, so as to raise the temperature and keep it in a confined space at a moderate height for some hours without attention. For this nothing answers better than a cylindrical can, such as is used for oils, varnishes, paraffin oil, and the like, and if strongly and stoutly made so much the better. Such a tin of one quart capacity is filled with acetate of soda solution and placed, *boiling*, in a drying cupboard of about eight feet cubic capacity to keep the temperature above 40° for over twenty-four hours, the outside temperature of the room varying during that time from a little below to a little above freezing, while the maximum, as shown by a self-registering thermometer, was 66°.

Whatever salt be selected, the easiest and most certain plan for getting the saturated solution is to place a quantity of water in an iron or enamelled pan on a good fire, and to throw in the salt until no more will dissolve when the solution has been boiling some time. While this is dissolving have the can ready with a handful of crystals in it, and a tin funnel placed in the neck, and when the solution in the pan is judged to be saturated, transfer it to the can as quickly as possible and cork it up. A can with a screw top, however, is superior to a corked one, for the reason that, in cooling, the cork will be so firmly drawn in that it will be difficult to get it out again when the "warmer" has to be reheated, which is not the case with the screw The extra crystals placed in the can are not absolutely necessary, but they do no harm, and are there in case more water should have to be added to replace waste.

When it becomes cold the can will be found to contain a very large quantity of crystals thrown out in cooling; most probably it will appear a solid mass. To prepare it for use again it is only necessary to loosen the cork or screw-cap and place the vessel on the fire or, better, on a gas stove, until it reaches the point of ebullition, or until crystals appear, on shaking, to have redissolved; it is then ready for use once more, and may be employed without further trouble for a very long time if the slight loss of water in heating be made up from time to time. It must be borne in mind that as the boiling point of water is passed long before the solution itself enters into the condition of ebullition, the loss of water is far greater than might be imagined. It is necessary to allow for this, or unexpectedly the can may fall to pieces on the fire from melting of the solder.

In actual use in the dark room the can may be placed in any convenient corner on the bench or sink, where its warmth will influence not too vigorously the various bottles, and then expend itself on the atmosphere. If for use in a confined space, as in a drying-box, it will be well to enwrap it in flannel to still further shut in the heat and moderate the intensity at first. By this means the danger of melting the films will be removed without wasting the effective heat given off.

The whole arrangement for "tempering" a small developing room need not cost a couple of shillings. W. B. Bolton.

SEA GULL PICTURES, INLAND.

Many of your older readers will remember the excitement caused some years ago—nearly five-and-twenty—by a certain "gull picture," which not only puzzled the experts to determine how it had been produced, but caused a lively discussion among the critics as to whether the gulls were true to nature or not—whether they had been taken from life or from stuffed "dummies," whether they were gulls at all or "kittiwakes," and a variety of other equally important points. I believe until the present day the truth has never been publicly declared.

During the past few days the materials have been ready for the production of another gull picture to mystify the critics of the present and future generations, and perhaps to prove that it is possible to be too clever by half. Imagine a picture of, say, Richmond Bridge or Isleworth Ferry with a flock of sea-gulls speeding athwart the sky. What would captious critics of the Pall Mall Exhibition next October say to the anomaly of sea-gulls in a picture of inland landscape? As photography can't lie, the artist would no doubt be charged with having "faked" the picture in a very clumsy way, and the controversies over Robinson's "gulls" and Gale's "swallow" would be repeated.

Yet such a picture has been quite possible, or would have been if the light had been a little bit better and the atmosphere a trifle clearer. The severe weather has driven sea-gulls within the last week to a point further inland than I ever heard of before. I have heard of them at Richmond, and how much further they may have reached it is impossible to say; and I was told of one being actually shot above Mortlake.

Another incident of the frost that I myself witnessed in the same neighbourhood would have made an interesting hand-camera shot: Two poor swans travelling rapidly up-river with the flood tide, surrounded by floe-ice, and vainly endeavouring to have some little control over where they were going, and yet exhibiting a sort of intinct for steering themselves into the broadest and most comfortable channels.

Speaking of the want of clearness of the atmosphere, there is an impression abroad that for foggy weather isochromatic plates are the correct thing. While there is a certain amount of truth in this, I think it would be well to remember that this is not invariably the case, as there are "fogs and fogs." I have stood at Charing Cross at noon and seen the gas lamps shining brightly the length of the Strand, while up above a sienna pall made noon into midnight. There an isochromatic plate might have a better chance than an ordinary one, though not much; under less extreme circumstances the advantage would be greater. But take a white riverside fog that the eye cannot penetrate five yards, or one of the frost fogs of the past fortnight, where the air is loaded with innumerable particles of frozen mist, will the isochromatic plate pierce that veil? I trow not. Rather, by virtue of its greater sensitiveness to the yellow winter rays, it will find more active light reflected from the fog particles, and, if anything, penetrate less deeply than the ordinary plate. So at least I have found.

"Stained" collodion plates are the proper thing for making transparencies just now, for, working by artificial light, they can be made very nearly as rapid as gelatine plates, and of course give better results with the same amount of trouble. Let any one who doubts try. Observer.

COPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY ARTIFICIAL LIGHT.—II.

In a previous article I described a simple arrangement whereby bound or unbound photographs, cartoons, or other similar subjects, might be held *in situ* for the purpose of being photographed. Doubtless there are other methods, such as a copying board carrying vertical and horizontal lines which permit of the objects being bound by studs or elastic cords so as to be held in the position that is desired; but after all, where the objects are not very large in size, the simple adoption of an ordinary printing frame is just as good if not better than any other plan. Whatever method, however, be employed, one essential point which must not be overlooked is the placing of the object being copied exactly parallel to the sensitive plate. When a copying board is used which has lines drawn across its surface from side to side at equal distances, but little difficulty will be found in registering with ease any objects in an ordinary printing frame when the same is stood up on end or on its side true to the lines on the copying board.

Having described a few adjuncts which are necessary for undertaking this work in a comfortable manner, I shall now proceed to write about a simple arrangement which any one can rig up for him-

self with very little cost and trouble. Where any one has at command a supply of ordinary house gas there is no more simple or effective way of illuminating the objects than by the use of a couple of good-sized Argand burners. I do not profess to know much about the candle power of this or that particular gas burner, but I am told that the ones I use when burning Glasgow gas give somewhere about sixteen candle power each. With two of such burners, coupled together by means of an ordinary indiarubber tube and a metal T-piece fed from any ordinary gas pipe or jet, a beginner becomes possessed of all that is necessary to so light up his objects as will yield perfect negatives when a fairly liberal exposure be given. Of this, however, I will have something to say later on. The fitting up of the Argand gas burners is quite easily accomplished without the aid of any expensive gas fittings, or even without the necessity of calling in the services of a gas-fitter.

The following is how I went about rigging up an arrangement that has given me unbounded satisfaction. The first thing is to get a piece of board about half an inch thick, and cut this into two pieces, each four inches square. These pieces of wood are for the purpose of acting as a pedestal for carrying an upright bar. This upright bar is nailed or secured in the centre of the pedestal at one end, and when firmly screwed or nailed on to the bottom or pedestal, bore a hole sufficiently large through the upright bar as will permit of the gas-pipe end of the Argand burner being slipped through. This hole may be conveniently bored about two inches from the bottom. The brass flange of the burner is then screwed on to the upright bar, which done, you have an Argand gas-burner that will stand steady and in no way liable to be upset when working. A tin reflector is then added to the back of the burner—mine was made out of an old lime tin. There are many simple ways of attaching a tin reflector so as to throw the light nicely forward. I fastened mine on by means of a tin collar ran round the upright bar; this permits of the catch of the reflector slipping in between the collar and hood of the upright bar. These arrangements concluded, it simply remains that the Argand burners be attached to the indiarubber tubing at each end of the T-piece, when they may be lit up.

It is best not to bore the holes too high up the upright bar, otherwise the flame or light would be too high, for when working on small-sized objects (say such as are conveniently held in a whole-plate printing frame) the flames will be found to be just about the centre of the object when the frame carrying same is stood up on its side or end at the extremity of the copying board.

In my practice I invariably use a Ross rapid symmetrical lens of about five inches focus, and stop the same down to *f*-11. The most of my work is done with a square whole-plate camera; and when producing negatives for lantern slides to be eventually produced from same, I employ a carrier holding a plate $3\frac{1}{4} \times 3\frac{1}{4}$, from which the resulting transparency is made by contact—very frequently more so, in fact, than any other way—by means of wet collodion for the lantern slides, and find no trouble in printing same in contact. Later on I hope to refer more in detail to the *modus operandi* of doing such work, but, of course, the simplest way for amateurs is the using of a suitable lantern plate; they cannot, however, at all compare with collodion for the work we are considering.

So much for the necessary apparatus. Now let me proceed to describe how I should go about making a negative with the aid of same, and as I write I call to remembrance a typical case which has just been done by me. In this case a large cartoon, such as we often see handed round with newspapers, was brought to me to make a slide from, and but very little time was allowed for the accomplishment of the work. This cartoon, it must be observed, represented a large group of heads and busts of leading characters in a public entertainment that had just been very popular in Glasgow, and was in a sense rather a good production of its kind, or perhaps I should say somewhat removed above the common order of the penny dreadful stamp of publication; the likenesses were exceedingly good in a rough kind of way, and, taken altogether, was just a first-rate subject to work upon. So before I proceeded to make a negative from it I saw at once that much could be done in the way of improving the cartoon by working up the faces with a hard lead pencil. In all similar pictures there is always more or less flaws that are quite easily filled in and shaded off. This done, the eyebrows and dark portions of the cartoon were more or less deepened by a slight application of india ink, and many other little touches given here and there, till the cartoon commenced to assume the appearance of a really creditable production. After as much work in this direction had been done as time permitted, the cartoon was placed in a 15×12 printing frame carrying a sheet of glass, the back inserted and spring up and placed in position on the end of the copying board. The whole-plate camera was then adjusted on a wooden stool on the copying board, so as to bring the lens almost on a line with the centre of the picture. The two Argand burners were then lighted up and removed backward and forward till it was seen, when looking from the back of the camera, that the glass of the printing frame did not show any reflections of the flame over the portion of the picture that would be included in the negative. In this case a large 15×12 white mount was placed on the copying board between the picture in the frame and the camera. This acted as a most efficient reflector, and proved to be of very great service in throwing up the light so as to ensure an evenly lit surface; in fact, in the negative not a trace of inequality in illumination could be noticed. So much for the manner of lighting.

When working on large objects, such as 15×12 pictures, the lights require to be placed farther apart, and the reflector between the camera and the printing frame is almost a necessity, but when only small objects are being copied, of course the lights and camera are all working at closer quarters. The one main thing to observe is, that there is no appearance of the flame spots on the glass in the printing frame, and the lights should be adjusted near enough so as just to clear the same; of course, bearing in mind that at all times they are kept outside the field of view of the lens. When working with a lens of the description named, they will seldom intrude; but should workers use wide-angle objectives, some little thought must be given to see they are kept sufficiently apart.

Before, however, that any one proceeds to make a negative from such a subject as I have mentioned, the picture should be carefully scrutinised for defects, and the same removed with a hard lead pencil. Any one could hardly believe till they see it what an amount of improvement can be made on such pictures by a little judicious working up here and there and spotting out defects. It does not need any experience to overcome, and is just one of those nice little occupations paterfamilias can set about with his slippers on of an evening and his little ones looking over his shoulder all the time, if, indeed, the little ones cannot do it for him.

In my next I hope to refer to exposure and development.

T. N. Armstrong.

NOTES ON "REVERSING" METHODS.

In the summer of last year I described in your pages a few experiments dealing with the reversal of negative and positive images on gelatine plates, or, to be more precise in my language, the production of negatives and positives from negatives and positives, and I am glad to observe that the subject has since secured the attention of several other workers, and that many interesting remarks and experiences in connexion therewith have been published. In reference to some of these I will venture to submit a few comments. The matter, particularly in the aspect it has assumed through Colonel Waterhouse's classical experiments, is of such importance as to easily justify exhaustive treatment.

Writing on the subject of direct positives in the camera in the current Almanac, Mr. Francis T. Beeson mentions a process of Obernetter which he thus describes:—"Gelatine dry plates in which there was a small proportion of gelatine to the amount of silver salt present in the emulsion were preferred. The exposure was double the normal one given to produce a negative on the same emulsion. The image was then developed with iron till the plate was black through to the back, the developer washed away, and the plate immersed in a two per cent. solution of chromic acid, or a mixture of one part of potassium bichromate and five parts of nitric acid in a hundred parts of water. After this has acted on the whole thickness of the film the plate is exposed to daylight, washed with a very dilute solution of ammonia, and the developer again applied. The original image is removed, and the unreduced silver salt is left to form the secondary one."

I was not aware that the late Herr Obernetter had ever published such a process, or when treating of the subject last year I should not have ignored it, and even now, although Mr. Beeson indicates the date of its publication as about seven years ago, I am unable to trace mention of it, either in The British Journal of Photography or in the Almanac, there or thereabouts. However, that is of no consequence. As one interested in the subject I am thankful to Mr. Beeston for having exhumed the process which I hasten to admit bears, on the face of it, possibilities from a practical point of view as great as either of those which I myself suggested. Perhaps it will be convenient if I state that these were respectively:—(1) The soaking of a developed, unfixed positive in a solution of tannin, dissolution of the image in nitric acid, and exposure and redevelopment of the unaltered salt; and (2) conversion of a developed, unfixed positive (or negative, as the case might be) into silver chloride, dissolution of same in ammonia, followed by exposure and redevelopment as before. From

this outline my readers will be able to see in what respects Obernetter had cut the ground from under my feet.

I should have been glad to read that Mr. Beeson had been able to carry his experiments to a successful issue, as a process of this sort is not of much use if it is not reliable and expeditious. Before resolving to give it a trial myself two or three of the directions almost induced me to save my time and trouble. Where could I get gelatine dry plates (at one shilling per dozen, of course) in which the proportion of gelatine to the amount of silver salt present in the emulsion was "small?" that is to say, with not too much gelatine, but just gelatine enough to hold the haloids in suspension. Mr. Beeson—or, rather, Herr Obernetter—had set me a puzzle here. Probably, seven years ago, before dry plate making had drifted into the hands of the small-profit-come-quick-return school, such a plate might have been had, but to-day, I fear, it is not common. If one wanted a plate on which the proportion of silver salt to the amount of gelatine present in the emulsion was small, then how easily one might satisfy one's self! I have heard it said that so-called "richly coated plates" and "extra thickly coated" ditto are undoubtedly what they profess to be, but that the extra thickness does not arise from any increase of silver salt.

Why double the normal exposure? This is surely wrong. I always thought that in these processes the exposure should be neither under nor over, but "full," so as to yield a plucky image without forcing or, on the other hand, the use of too much restraining bromide and a weak developer and the consequent jeopardy of density. Double the normal strikes me as being—well, just about double as much as is necessary. Development with iron is out of date, at any rate in this country. For, "the *plate* . . . . black through to the back" it would be safer to write "high lights." Gradation in the reversed result has to be borne in mind, I imagine.

The few trials that I made with this process led me to regard it with a fair degree of favour. After having washed the developed positive (I was aiming at reversed negatives) I applied the second solution above mentioned, compounded exactly in those proportions, allowing it to act for a quarter of an hour. The film at once took a deep yellow stain, which subsequently defied removal. Ammonia 1 : 20 removed the image rapidly enough, but badly frilled the plates, a result which I could not obviate when using it at half that strength. The redeveloped images had a fatally stained and muddy appearance; but inasmuch as I was only testing the practical application of the process, and not working for pretty-looking pictures, this caused me no concern. If means could be devised for preventing or getting rid of the stain set up by the bichromate-nitric acid solution, I should think the process would be simple and satisfactory enough to work. Bichromate-hydrochloric acid does not impart that stain.

It is always difficult in these particular processes to get rid entirely of the impression of light in the gelatine. This I found interfered with the character of the resulting images in a marked degree. On a former occasion the Editor mentioned the fact of the free chromic acid of the solution acting as a destroyer of these impressions, but of this I failed to adduce confirmation, and the proof of the matter, it seemed to me, was easy enough. Take an ordinary negative, convert it into chloride of silver by means of a mixture of potassium bichromate and hydrochloric acid, and remove the converted image in the fixing bath. A faint but far from inappreciable impression of the picture will remain in the gelatine. I have tried many times to destroy that impression, but unavailingly. In my opinion it is the one weak point of these processes of reversing the picture. I trust the Obernetter method will be tried by others.

Mr. E. J. Humphery, in a paper read before the Camera Club describes, at page 742 of your last volume, some attempts he made in this direction by taking advantage of the reversing effects induced by extreme over-exposure. He placed sensitive plates in contact with negatives and positives in an ordinary printing frame, exposed in diffused daylight, and developed with a weak developer. I remember about a year and a half ago experimenting on similar lines to these, but the measure of success I obtained roused very little enthusiasm in me concerning the practical value of the process. I used both slow and quick plates, gave all degrees of exposure in strong and weak lights, and applied developers of varying strengths and composition; in fact, spent a deal of time over the process, and finally left off unconvinced that, as a reversing method, there was anything in it to recommend it to the attention of practical men which would pay for further experiment. The process, in the words of our author, is undeniably "simple," and may be fascinating, but my own experiences force me to doubt whether any "experiments can be carried out which will give one a perfect mastery over the methods of development necessary to obtain the best possible results." I look upon it as incapable of giving the "best possible results," which I assume is intended to mean results equalling at least in technical excellence negatives or transparencies such as you may obtain by the common double operation method.

I have at different times seen a good many specimens of "solarised" images, and, moreover, have deliberately produced not a few, but I have never yet set eyes upon one, either accidental or designed, which possessed anything like the scale of density which should distinguish a positive or negative image. There has always been an abundance of detail, but for the rest a weakness and flatness of image, and a lack of gradation and vigour which put the results entirely out of court for practical purposes. I do not see what else we are to expect from the mere nature of the phenomenon upon which the process is based. In all my attempts, again, I never succeeded in producing a picture that was not fatally veiled, although to a certain extent I could vary the density and detail of the impression. We have all met with reversals; they may be obtained by leaving exposed plates for a long time in the red light of the dark room. You can also get them by vastly over-exposing in the camera. Does the light fail to reach those parts of the surface which should be "unaltered?" Are the reduced parts of ordinary negatives and positives ever strong enough to cut off the solar rays from the sensitive film? Again, of what use would "thin" negatives be for reversing purposes in the printing frame? Measured by the "sunlight" standard, most negatives are thin—very thin I'm afraid, especially where we are dealing with plates as sensitive as even the slowest now made, and in any kind of daylight.

For reversing purposes in the printing frame I found both slow and rapid dry plates just about what Messrs. Eastman & Company's bromide paper is for daylight exposure—far, far too rapid when, to quote Mr. Humphery, I did not want "the high lights in the negative to partake of both the positive and negative image." But, "other men, other methods." Possibly Mr. Humphery's method is superior to mine, and so he succeeds where I fail. I gathered from his paper that he was satisfied with the results of his efforts. I hope, if he undertakes further experiments, he will have every reason to be gratified with the issue of them.

THOMAS BEDDING.

EXPLOSIONS OF HIGH-PRESSURE GAS GAUGES.

As the use of high-pressure gas cylinders extends, it is disquieting to find that explosions of gauges used for determining the pressure in them are becoming more frequent. Several of these explosions, notably the one which led to the recent action against the Brin's Oxygen Company, have caused serious injury to person and property. Now it seems to me that there should be no more difficulty in making a gauge for absolutely safe use with high-pressure gas than there is in making the cylinders for storing the gas; all that is necessary is a knowledge of the conditions which have to be met. I believe that most, if not all, of the explosions referred to may be accounted for by the fact that any cheap high-pressure hydraulic gauge has been considered suitable for gauging high-pressure gas. This is not by any means the case. The properties and behaviour of liquids and gases under high pressure are far too dissimilar.

A gauge for registering high pressure is made of a steel or brass tube bent round like a crook and closed at the bent end. The pressure, being admitted at the open end, tends to straighten the tube. The motion of the tube in straightening is conveyed by means of a system of levers and cogged wheels to a pointer, which moves round a graduated dial, and in this way is made to indicate the pressure in the tube. The whole mechanism is enclosed in a strong metal case, and the dial is covered by stout glass.

When a high-pressure gas gauge bursts, the first explanation which suggests itself is that the gauge tube was too weak to withstand the pressure of the gas and collapsed under it. Several explosions may doubtless be explained in this way, among them being the one referred to above. I do not propose to discuss the general question which opens here concerning the selection and testing of the tubes used in gauge construction—this is for the manufacturer to deal with. It is enough for the public to know that there are a few firms whose name on a gauge is sufficient guarantee that the soundness and strength of its various parts are all that can be desired. I will only make two remarks in this connexion. When a gauge bursts it is not usually the tube which flies in pieces. The tube, as a rule, only tears or splits. The damage which may result is caused by pieces of the case or dial which are blown off by the violent inrush of high-pressure gas from the cylinder through the broken tube. This fact suggests the advisability of providing means for the rapid escape of any gas which may accumulate in the gauge case through leakage or the bursting of the gauge tube. This requirement would perhaps be met by perforating the case with a number of small holes or slits, protecting

it if necessary from the admission of dust by means of a cloth lining. Hydraulic gauges do not require any provision of this kind, as the expansive force of water is not sufficient to make the bursting of a gauge at all dangerous. My second remark is that a gauge used for testing high-pressure gas cylinders is liable to more sudden strains than a hydraulic gauge, owing to the much greater fluidity of gas. When the valve of a gas cylinder to which a gauge is attached is suddenly opened, the full pressure of the gas from the cylinder enters the gauge tube with great force. A tube which will withstand gradually applied strains for an indefinite time may be soon fractured by a succession of similar strains suddenly applied. Some means should be adopted, therefore, for protecting gauges from these sudden strains.

The object of this paper is to discuss quite another and much more numerous class of gauge explosions, what may be termed explosions proper, in which, namely, there is direct evidence that the bursting of the gauge has been caused by ignition of explosive or combustible matter in the gauge tube. Last February I made some experiments to determine the cause and means of preventing these explosions. The description of them will be perhaps more intelligible if I first state one or two elementary physical truths. When a gas is heated it expands if it is free to do so. Now suppose we measure the quantity of heat which is required to raise the temperature of a given volume of gas or air by a given number of degrees while allowing it to expand freely. Then let us measure the quantity of heat which is required to raise the same volume of the same gas to the same temperature in a confined space in which the gas cannot expand. We shall find on comparing the two quantities that more heat is absorbed when the gas is allowed to expand than when it is forcibly prevented from doing so. This proves that when a gas expands a certain amount of sensible heat disappears or becomes latent. We say it has been converted into work, viz., the work of expanding the gas. If we compress the gas again to its original volume, all the heat which was absorbed during expansion reappears, becomes sensible, and raises the temperature of the gas, so that whenever a gas is compressed, its temperature is raised. The temperature to which it is possible to raise a quantity of gas by sudden compression is very high. In Box's "Table of Heat produced by Compression of Air," it is stated that compression under twenty-five atmospheres produces heat sufficient to raise the temperature of the air more than 800° Fahr. This fact may be strikingly illustrated by means of the pneumatic syringe. The pneumatic syringe consists of a strong glass or metal tube provided with a piston which fits it accurately. At the bottom of the tube is a small chamber in which is placed a piece of guncotton or other easily inflammable material. The tube being full of air, let the piston be introduced and quickly plunged to the bottom of the tube; the compression of the air liberates heat, and if the compression is so rapid as not to give time for the sides of the tube to absorb and conduct this heat away, the temperature of the air is raised so high that the cotton is ignited. A form of this syringe may occasionally be seen in old country houses, where it was used for procuring fire before the invention of matches. Another modification of this syringe was the American gunpowder pile driver, in which a charge of gunpowder was ignited by the same means. When a gas is compressed at high pressure into the familiar steel cylinders, it is necessary to cool it several times during compression to prevent overheating of the pump. I have seen a leather washer charred black by the heat liberated during this compression when there has been insufficient water supplied to the pump for cooling purposes.

The above facts suggest an explanation of the gauge explosions. What happens when we connect a gauge with a cylinder of high-pressure gas and then open the cylinder valve? Gas rushes from the cylinder into the gauge tube and compresses the column of air already in the tube with a pressure of perhaps 120 atmospheres. Here we have our pneumatic syringe again with a current of highly compressed gas taking the place of the piston. The compression of the air in the tube must liberate heat, and if the compression is rapid enough, the heat liberated will be so intense that any combustible matter which the tube may contain will be ignited. Should the gauge tube contain a residue of oil with which it was perhaps tested, or a mixture of air with some combustible gas from a cylinder gauged previously, and should the cylinder being gauged contain oxygen, the combustion would be so rapid and intense as to become an explosion, which would probably shatter the tube and gauge.

Assuming that the above is a correct explanation of gauge explosions, it would follow that they would never occur if the high-pressure gas were always admitted so slowly as to allow the heat liberated by the compression of the contents of the gauge tube to be absorbed by the walls of the tube. Unfortunately, valves of high-pressure gas cylinders are often so stiff that it is impossible to avoid opening them with a jerk and allowing pressure to enter the tube violently. To ensure this slow admission of gas, it would be necessary to introduce a check or obstruction at the entrance to the gauge tube which would only allow gas to pass slowly even against the full pressure in the cylinder. Of course, if it were possible to keep the gauge tube free from oil or combustible matter when used for oxygen, and to use it for oxygen alone, there would be no fear of the explosion described above. But it is so difficult to ensure absence of oily matter, and so convenient to be able to use the same gauge for different gases, that I thought it would be worth while to follow out the idea of introducing a check. I first fitted a gauge with one of the little valves used for checking the pressure of water in hydraulic gauges, but could not perceive that it opposed the slightest check as indicated by the pointer of the gauge when high-pressure gas was suddenly admitted to the gauge tube. Then I plugged the entrance to the gauge tube with a plug bored with a very fine hole, but I found that in order to perceptibly check the inrush of high-pressure gas it was necessary to have so fine a hole that it would have been always difficult and generally a matter of chance to make one fine enough. I finally effected my purpose by introducing sections of porous material tightly packed into the connecting tube of the gauge. I first screwed a finely drilled screw well into the inlet of the connecting tube; on this I placed the sections of porous material, and pressed these tightly together by means of a second finely drilled plug which was screwed in after them. By increasing or decreasing the number of these sections, and by tightening or slackening the plug, I found I could increase or decrease the amount of resistance to the entrance of high-pressure gas at will without affecting the accuracy of the gauge's indications.

Having now got a satisfactory "check," the next thing was to ascertain whether the theory of explosion and its prevention, which I have already sketched, had any foundation in fact. Mr. F. Budenberg, of Messrs. Schäffer and Budenberg, the well-known gauge makers, kindly furnished me with a couple of gauge tubes, such as are used for their high-pressure gauges. One of these tubes had been tested to two tons, and the other to a pressure of three tons (6720 pounds) on the square inch, and both contained traces of the oil which had been used in testing them. I first fitted a loose brass connecting tube with the check, and ascertained, by attaching it to a gauge, that it would only allow high-pressure gas to pass, so that the pointer of the gauge moved quite slowly round to indicate the pressure of the gas. Then I coupled the same connexion and check to the two-ton gauge tube, and screwed it on to a cylinder containing coal gas at 1800 pounds pressure per square inch. I admitted the gas to the tube and emptied it again twice over, so as to ensure filling the gauge tube and connexion with the gas. Then I screwed it immediately on to a cylinder containing oxygen at 1800 pounds pressure, and suddenly opened the cylinder valve, repeating this also twice so that I should ensure having a mixture of oxygen and coal gas in the gauge tube at one stage or other of the experiment. Each time I admitted gas or oxygen to the gauge tube I could feel it become warm at the end, owing to the compression of the gas inside it. I repeated this experiment about a dozen times, but observed nothing more than this warming of the tube. I now withdrew the check plug from the connecting tube and repeated the alternate sudden admissions of coal gas and oxygen exactly as before. In the very first experiment, on the second admission of oxygen, I felt a "kick" in the part of the cylinder which I held in my hand while turning on the gas, just as if the cylinder had been struck a blow with a piece of wood. On touching the gauge tube I found it so hot that I had to withdraw my hand. I unscrewed the tube and immediately perceived in it a strong smell of burnt oil or animal matter. I found, too, that a leather washer used for packing the joints between the gauge tube and connexion had been quite deeply charred wherever it had been exposed to the gas.

All trace of oil had disappeared, and it was quite evident that there had been an explosion in the tube, which, however, had not been powerful enough to shatter it. This explosion gave me an interesting demonstration of the fact that an explosion in a confined space is noiseless. I further repeated the alternate sudden admissions of the two gases, and several times noticed very slight explosions, doubtless due to the ignition of mixtures of the gases in the gauge tube. These explosions were, however, so feeble that had the gauge tube been enclosed in a case I could not have perceived them. It was plain that the explosion of gas without oil was not likely to shatter a strong tube. I may note here, however, that a gauge which is used for gauging cylinders of coal gas is not likely to remain long without traces of oily matter, which are condensed in the cylinders during compression of the gas, and may at any time be blown from the cylinder valve into the tube of a gauge when in use.

In order to verify the results obtained with the two-ton gauge tube I repeated the experiments with the three-ton tube. I attached to it the same connexion by means of a heavy brass hexagon nut, and fitted the connexion with the same check plug. The same number of alternate sudden admissions of coal gas and oxygen were made, but no explosion or sign of combustion of any kind ensued. I then removed the check plug, and, as before, the second sudden admission of oxygen after filling with coal gas caused an explosion; but this time it was so violent that the three-ton gauge tube was completely shattered with a deafening noise, several pieces of it flying off and embedding themselves quite half an inch into the side of a wooden cupboard which stood near, while the heavy brass nut which coupled the gauge tube to the cylinder connexion was broken into two pieces. As before, all trace of oil had been burnt out of the tube and the cause of the explosion was evident.

I considered that these experiments pretty conclusively verified the explanation of gauge explosions proper which has been given, and it seemed to me that the check plug was a very satisfactory safeguard against them. Moreover, this same plug served to protect the gauge tube from the great strains put upon it by the sudden admission of high-pressure gas, and further would, in case of the bursting of the gauge tube, prevent gas rushing violently into the case of the gauge, and give time for the vent holes to pass off the gas as fast as it entered. During the last nine months I have used the check regularly, and fitted over a hundred gauges with it. So far as I can learn it has acted very satisfactorily, and my Company is fitting it to all the gauges it supplies.

W. Morton Jackson,
Manchester Oxygen Company.

NATURAL COLOURS ON THE LANTERN SCREEN.

The problem of photographing colours direct by the camera, in the same easy way in which light and shade is now secured, is one that has attracted many minds, but, so far as published hitherto, without much practical result. There have been two systems in use by experimentalists: one may be called the chemical method, in which the colours are produced by the various tints assumed by silver compounds under certain conditions; while the other may be styled the physical system, in which the component parts of light are separated, and, while separated, made to produce various negatives, coloured positive prints or transparencies being afterwards made from these negatives and combined together, so as to imitate the colours of the original object.

The chemical method referred to is obviously one that can only be pursued with any hope of success by those proficient in advanced chemistry; those who are not so gifted must perforce study the physical system.

During the past summer and autumn I have been experimenting in the physical line of colour-reproduction, the method of combining the coloured positives being that of projecting their images on a lantern screen by a multiple lantern. My early attempts were highly interesting to the experimenter, but not very successful, owing to the colours not coming out right; reds would appear as yellow, greens as blue, and so on, until I began to have a strong suspicion that the theory of light which I was working upon was not correct. This theory was that of Sir David Brewster, commonly accepted by artists, it being that white light was a compound of red, blue, and yellow.

The spectroscope came to the rescue and removed most of the difficulties in the way. The instrument used was of the roughest home-made description, but it soon proved that yellow was a double colour, composed of green and red. It showed that nearly every transparent dye, glass, or pigment was a compound colour, admitting several kinds of colour to pass through it; and it eventually proved to my complete satisfaction that white light is a compound of four primary colours, which are as distinct in their individuality as four of the chemical elements or four different persons.

These four primary colours are, practically, never seen singly in nature, and the colours we see are compounds of the primaries, bearing no more resemblance to their component parts than water bears to its elements, oxygen and hydrogen.

Further, it was found that certain pigments are transparent to some primary colours, but stop out the others as effectually as an iron plate. For example, Prussian blue in a moderate thickness is perfectly opaque to the red, but more or less transparent to the other three primaries. Another blue is opaque to the green rays, but partly transparent to the red.

About fifty transparent colours were tested in this way, and an analytical table was drawn up, giving the exact composition of each colour in terms of the primaries; and after this was finished it was easy to select combinations that would be opaque to three primaries, and transparent, more or less, to the fourth. Four such compound screens were made up and used for the multiple camera with four lenses, with which the experiments were made.

In order to simplify the work, the four lenses were fitted with stops, having such apertures as were required to give an equal exposure to each quarter of the sensitive plate employed, and one large cap covered the four lenses. Isochromatic plates were necessarily used for the negatives, ordinary plates being quite unaffected in two of the sections. Using a colour-sensitive plate, it was necessary to have the lens of the red section used full aperture, *f*-4; the other three admitted only a small fraction of light—about one-fiftieth—as compared with the stop for red.

The exposure of the plate under these conditions was comparatively long, two seconds being the shortest exposure yet given with success; this secured the colours of a bay horse and trap in full sunshine. In the shade, for portraits from life taken out of doors, thirty to a hundred seconds were given. The plates were Edwards' Medium Isochromatic; no other plates were tried, as it would have involved a re-arrangement of stops; but it is probable that other plates could be obtained more sensitive to the red rays, and the use of such would enable the exposure to be lessened.

These compound negatives were taken on $3\frac{1}{4} \times 3\frac{1}{4}$ plates, each picture being only one and a half inches square. Positives were made by contact on ordinary lantern plates from the negatives, and being provided with paper mats having four apertures, one for each picture; they were mounted with a plain cover glass in the usual way.

There was thus a set of lantern slides of the usual size, each slide presenting four little pictures in black and white, all alike, except in the shading. The slight and almost imperceptible differences of density in the four pictures was the latent form in which the colours of the original object had been secured. With very gaudy colours the differences were conspicuous; for instance, a deep red rose would appear snow white in the red section, and nearly coal black in the other three divisions of the slide.

The latent colours of these slides can only be made manifest by the aid of a special optical lantern having one limelight and a four-inch condenser, in front of which is a glass painted with gaudy colours, imitations of the primary colours, one colour for each quarter. In front of this glass is placed the compound slide; thus red light goes through one section, and our snow-white rose would allow the red light to pass through it, while the coal-black roses in the other sections would effectually stop the other coloured lights from passing. The four images all combine together into one on the screen, and our rose appears with its natural red colour, while its surrounding objects for similar reasons also display their true colours. This is the outline of the patent-applied-for process called the Verak process.

About forty Verak slides have been made in the course of the experiments; these slides are not considered perfect, but they prove that all the main colours of any object photographed can be reproduced with some degree of accuracy, and with almost any degree of vividness.

The chief difficulty lay in the adjustment of the coloured screens, both of the camera and of the lantern. The camera screens have not been altered for three months past, and seem to be practically perfect in colour; but the lantern screens have only recently become satisfactory, and possibly further improvements will be made which will increase the brilliance of the Verak image on the screen.

As a memorandum of colouring, I find the Verak photograph more reliable than my memory. I sometimes found errors in the tints shown on the screen, but on further examination of the original, the error was on my side, and the Verak was right.

Mr. Andrew Pringle, feeling an interest in the invention, has kindly promised to demonstrate the machine if it proves workable in his hands, and comes anywhere near up to his expectations.

Albert W. Scott.

PHOTOGRAPHY AT THE BODLEIAN LIBRARY.

In the future work of libraries photography will play an important part. Dr. Richard Garnett has repeatedly called attention to the great help it affords for cataloguing printed books, and schemes have even been devised for inserting photographs of title-pages, instead of printed transcripts from them, in the general catalogues of the larger libraries. Some manuscripts have already been published in photographic form throughout, and the student of palæography has already many books of autotype or other facsimiles to choose from.

But the chief difficulty has hitherto been the price. The most direct attempt to grapple with this problem in the interests of the manuscript departments of libraries was made by Professor Chandler at Oxford in 1888, the results of which were printed early in 1889, only a few weeks before his death. Of this pamphlet, which contains elaborate estimates

of the actual cost of the materials, time, and skill required, only twenty-five copies were printed; but owing to the energy of the delegates of the Clarendon Press and the co-operation of the curators of the Bodleian Library, a result has been obtained on the lines of, and in general accordance with, the Professor's suggestions. It is difficult to resist the conclusion that the prices hitherto paid for photographs of MSS. have been based on those charged for photographs of persons, who, it need hardly be said, are seldom satisfied with less than two positions and a good deal of discussion with the photographer. The latter naturally charges in one way or another for the two negatives, for the extra time, and possibly for the trial of his temper. Ordinarily speaking, if a photographer be engaged to take a fair-sized negative from a manuscript he will charge not less than half a guinea for the negative and the print.

The notice which follows, and which was issued on Christmas Eve, will show that we have changed all that. The standard size has been taken as ten inches by eight inches, and a negative and print can be obtained for 3*s.* 4*d.* or 3*s.* 10*d.*, according to the process preferred. For twenty collotype prints and a negative the charge is 8*s.* 6*d.*, or a fraction over 5*d.* a print. It is obvious that if (say) six persons of similar tastes will join to form a syndicate they can obtain most satisfactory results. They can have a dissertation in some foreign periodical, perhaps illustrated with elaborate diagrams or engravings, or a page of a codex in which they are interested, transferred to their own note-books in a convenient size, and with two extra copies each for other uses, at a price of 1*s.* 5*d.* a page. This is far below the price at which anything of the kind has been hitherto obtainable in Oxford, and literary students, both in England and abroad, will not be slow to avail themselves of the opportunity afforded them.

The following is the notice issued:—

The Controller of the University Press, Oxford, is prepared to take photographic negatives from MSS., printed books, &c., belonging to the Library or deposited there, and to supply prints, at the following rates (permission having been first obtained from the Librarian):—

	s.	d.
For a 10 × 8 negative taken at the Library	3	0
For a silver print (unmounted) from a 10 × 8 negative	0	4
For a platinotype print from a 10 × 8 negative	0	10
[With regard to platinotype prints, the price must vary with the cost of the special paper. It will probably increase from time to time.]		
For a carbon print from a 10 × 8 negative	0	10
For 20 collotype prints with clean margins from one 10 × 8 negative	5	6
For 50 collotype prints ditto ditto	9	0
For 100 collotype prints ditto ditto	12	0

Estimates for larger sizes or greater numbers may be had on application.

The sums quoted above are given on the assumption that only ordinary trouble will be involved in making the negatives and prints.

—*Athenæum.*

THE SELECTION OF SUBJECT.

Every careful observer must have noticed again and again the very small area of subject *usually* chosen by the every-day photographer. From year to year we visit the exhibition rooms and find the same portrait lady in bridal dress, portrait of gentleman in boating costume, ruins of what's-his-name abbey, the yacht lightening, &c.—the same old story, *ad nauseam*; in fact we, "on this side," have gradually and unconsciously grown up in the faith that no photographic exhibition is complete unless it includes a view of Conway Castle and a portrait of Mr. Gladstone.

Having absolutely no personal knowledge of the state of affairs on "the other side," I yet make a bold venture, and say no photographic exhibition is considered complete which does not contain at least some one view of Niagara. If this is so, one needs ask the question, "Why this thusness?"

The answer, I think, may in part at least be easily found upon consideration (1) that man is, among other things, an imitative animal, and (2) he loves the praise of men.

Firstly, we may observe that it is *easier* to let "the other fellow" do the thinking, and you just follow in his footsteps; and when to this convenience you may add the additional luxury of feeling you are being quite original with the least possible trouble, then indeed you feel the path to fame lies at your feet.

The average history is somewhat as follows:—Having become possessed of apparatus and enough technical skill to enable you to produce "prints," the next step is to visit some exhibition. Looking around you find a very ordinary view of "Rum Jum Falls." "Aha! I can produce something equal to that," you say. Like a giant refreshed with wine you seek the spot, and at the last moment, fired with a desire to outstep your rival, you will not take his point of view, but move further down stream a few feet, and so *get more into your picture* (quantity is your leading motion). Happy thought—a figure or two; spread them out so that all may be seen right down to their patent spring-side boots. Having got thus far, you feel one or two more views should be taken, "there is such a lot in it that it is quite worth a few extra plates."

Presently and anon, as you are departing (reluctantly) from this favourite spot, you meet Brown and Jones "actually going to take your view." Curiously enough, Brown and Jones on their return meet Smith and Robinson, and so on.

Next year comes round, and you have at your local show two or three dozen views of Rum Jum Falls. Each somewhat worse than the other, and every one of them bursting its very frame with the notion of quantity, each exhibitor silently despising "the other fellow" for "taking his view."

The above diagnosis being sufficiently general to include most cases, perhaps a hint or two may be acceptable as regards remedies. First, then, let me remind you that you probably selected in the exhibition one of the worst pictures there, because its very badness made you feel that you could do something better. Now, in place of this course, let me suggest that you should seek the opinions of several of those who have had more experience than yourself, who have had more training and culture than may perhaps have fallen to your lot. They will probably be old enough to have outgrown any temporal crank or fad, and also have outgrown the "jealousy with circumspection" stage. Let the opinions of these wiser heads guide you as regards what is good and worthy of study (N.B.—Imitation may be flattery, but is not intelligent study); and, above all, do not set yourself the ignoble task of striving to beat that which is bad, but rather to gather powers which will enable you to equal that which is good, and in time to outstrip what you may with commendable modesty now regard as unattainable.

Furthermore, remember that *all* great artists have studied nature at first hand as the direct source of sound knowledge, using the works of others as help in study—never as substitutes for nature.

Secondly, as regards the love of praise. Where the attention is divided one or other parts of the work must suffer. If there is before the mind any calculation as to how much honour and glory such a work will bring, to that amount must there be deduction from the concentration of attention given to its production.

Also to this thirst for praise is in a part due some of the tendency of imitation. Mrs. Brown (age fifty-five, and not quite so good-looking as she was in former time) sees Mrs. Jones (age twenty-five, who "looks well in anything") in a new bonnet. Result: Mrs. Brown argues, "If I have a bonnet like Mrs. Jones, I shall look like Mrs. Jones." The interpretation of the parable is this, viz., Smith cultivates a little original thought, strikes out in a new line, treats it simply and well. Brown proceeds to copy Smith without in the least seeing Smith's aim or the steps by which the result meets the required condition of the case. Thus once again are we brought to see that imitation is a weak—a very weak—feature of the present times. The selection of subject manifestly lies at the very root of the matter; for where the subject is in itself bad no skill of treatment can make the result good. The utmost that can be hoped for in such a case is that the offensive parts may be rendered less offensive. By selection of subject I would mean much more than simply the selecting of a view or group of figures. The space at present disposal does not admit of more than the mere suggestion of one of the factors; others must be reserved for detailed consideration hereinafter. What now I would earnestly commend to the notice of thoughtful workers, who have all the world before them to select from, is that in their selection they will do well to consider the relative merits of the parts of the picture in contemplation; remembering that several equally feeble features do but divide among them the focus of interest, which by preference should be concentrated on one (or, at most, two) strong features. Furthermore, that selection implies rejection of those parts which are not really required, or at least of giving preference to some parts rather than others.

In short, the universal temptation to the young photographer is to "take" anything or everything, and not only that, but to have as much of it as possible; whereas the painter-artist will with much deliberation select the general outline of his point of view or subject, and then one by one remove or eliminate those parts or factors whose presence tends to carry off any of that interest which he would prefer to be concentrated on the leading theme of his work. Those parts retained are the argument for this particular selection, viz., that it was for their sakes the selection was made.

Now, while admitting that the painter-artist has powers of omission and addition which are denied the photographer, yet abundant examples by our more thoughtful workers prove that the photographer has powers of selection and suppression which are apparently unknown to the great majority, and it is the further cultivation of these means, applied with observation and discretion, that we may hopefully look forward to seeing presently a much greater proof of thought and individuality in the selection of the subject.

F. C. Lambert.

—*St. Louis and Canadian Photographer.*

EDINBURGH PHOTOGRAPHIC EXHIBITION.—VII.

December 31, 1890.—A miscellaneous lantern display by Mr. G. G. Mitchell. This included the second moiety of the transparencies which are on exhibition and competition. As these were unaccompanied by any description of the views beyond the mere titles, and that only in about two-thirds of the whole, very little was given to the speaker beyond

naming each view as it was projected; but he took the opportunity to make it as entertaining as possible by supplementing the meagre information available from the catalogue by remarks upon the quality of the pictures as they passed upon the screen. He pointed out how much the element of size or dimensions had to do with the impression which a picture conveyed to the spectator. Lantern slides were susceptible of being looked at in two aspects: As transparencies of 3¼ inches square, and at that size no subject whatever could be described as grand or imposing; the term pretty might be aptly used, but the importance and due merit of a composition of that size could not be fully realised till it was projected on the screen and enlarged to ten or fifteen feet, as the case might be; then it assumed a totally different aspect, and demanded a different kind of criticism. When the subject was good in all respects the enlargement added immensely to the charm of it; but when bad and awkward, or defective, either in technical quality or composition, the opposite took place, and what was of little interest or none in the small size might become simply abominable when enlarged.

The value and absolute necessity for some detail in skies was pointed out, and this was the more necessary in cases where great expanses occupied by sky existed, and this was exemplified by reference to views possessing the desirable charm of cloud detail suitable to the landscape, and also to those which were defective in this respect. In the one case the sky was shown to give completeness and picturesque value to the subject, and to turn the composition more into a perfect picture. While in the other the absence of this necessity in landscape left it bald and unfurnished, an effect which even the least informed on art matters could feel, though unable perhaps to tell what was wrong.

The value of a knowledge of what created or assisted picturesque effect was then commented on, and the affirmation made that the same subject could be made to have it or entirely want it, according to the standpoint chosen and the artistic aptitudes of the photographer.

The speaker next enlarged upon the immense importance of securing texture in material objects and the importance of avoiding that chalkiness which was too often observed in slides, and he indicated the remedies for this, and commented on such evils as over and under-exposure, indicated the beauty conferred upon a picture by the careful use of water reflections, and insisted on the desirableness of striking and truthful renderings of the relative distance of objects, together with the intelligent use of masses as foils to the lighter parts of the subject.

The speaker went on to explain that he had purposely avoided particular criticism of the slides except in a favourable way, and where adverse remarks had to be made that the works might come from Timbuctoo, or anywhere else, so that the author of them should be well out of earshot. Anything said about buttermilk rivers, cotton wool water, and summer snow, was therefore to be understood in a general sense.

Some of the slides were of a high, indeed of the highest, order of merit, and elicited much applause. The display was fitly concluded by showing those of G. W. Wilson & Company which have obtained the silver medal. They are principally cloud and landscapes with breaking waves, and the award sufficiently attests their quality. They were much appreciated by a very critical audience.

NOTES FROM NEWCASTLE.

Mr. J. P. Gibson, of Hexham, delivered his lecture on *Northumberland: its Antiquities and River Scenery*, in the Lecture Hall of the Jesmond Wesleyan Church, on Wednesday evening, the 3rd inst. Mr. Gibson illustrated his subject with 150 lantern slides.

Mr. Arthur Brown, F.G.S., another of our oldest photographers, gave a lecture on the *Yellowstone Park*, the *Hawaiian Islands*, *&c.*, at the Y.M.C.A. the other evening, and had a very large audience.

I hear very good reports of the local Society's new lantern, used for the first time on the 9th ult. at the ordinary meeting. There was a good muster, as usual, and about 200 slides were shown.

Mr. J. Pike gave a lecture on *Practical Photography*, with lantern illustrations, before the local Chemists' Association, of which he is Vice-President, Mr. Fred. Park, another local chemist and amateur photographer, in the chair. An attempt was made to photograph the members present by a flash-light apparatus, and was fairly successful.

Mr. Parry, of South Shields, has very near completion a new and commodious studio, which I hope to inspect and describe shortly.

The universal opinion of all the photographers and laymen I know shows The British Journal Photographic Almanac to be a "marvellous shillingsworth." I am afraid the amateurs and professionals hereabouts read this instead of their Bibles on Sundays; I don't suppose they are any the worse for it.

D. D.

London and Provincial Photographic Association.—New quarters, the "Champion Hotel," Aldersgate-street. Thursday, January 15, adjourned discussion on *Developers.*

Photographic Society of Great Britain.—An ordinary meeting will be held at 50, Great Russell-street, Bloomsbury, W.C., on Tuesday, the 13th inst., at eight p.m. A paper will be read by Mr. E. W. Maunder, F.R.A.S., on *Photography applied to Astronomy.*

Our Editorial Table.

The Optical Lantern.

By Andrew Pringle.

Lantern Slides by Photographic Methods.

By Andrew Pringle.

These two volumes form those of Scovill's photographic series most recently issued by the Scovill & Adams Company, Broome-street, New York.

In the former mentioned, Mr. Pringle treats of the lantern in a thorough manner and by successive steps, explaining the nature and use of the condenser, the object glass, the body, the jets, and the light. He describes how oxygen and hydrogen are prepared; gives ample directions, the result of his own experience, how the lantern should be managed during a lecture; and concludes with a chapter on its application to photographic enlarging.

When treating of gas (oxygen) in rubber bags, nothing can be sounder than Mr. Pringle warning that it must not be kept long in such a receptacle, it being, as he says, "bad for the bags and bad for the light. The sooner the gas is used after it is made the better. Oxygen kept twenty-four hours in the best bag will give a very poor light, as we have repeatedly found. Even four hours has, in our experience, made a marked difference on the light. Presumably hydrogen also deteriorates in the same way, presumably to a greater extent. Even such a septum as indiarubber cannot prevent diffusion by osmosis, and, moreover, the bags themselves suffer by having gas kept in them." Mr. Pringle speaks in high terms of the value of Beard's gas regulator in connexion with the employment of compressed gas in cylinders, and we can endorse to the full every favourable word he writes on this excellent adjunct.

Taken as a whole, this is a seasonable and excellent work on the lantern, which, as stated in the preface, is written less for the popular public lecturer than the photographer and the teacher. In the introductory chapter he says a prime object of the book is "to remove dangers and difficulties from the imagination (for there alone they exist) of many who are prepared to admit the advantages, but who question the practicability, of using the optical lantern as an educational and recreative instrument." Seeing it is written mainly for an American public, we have nothing to say as to this questioning, but we are happy in thinking that the practicability of employing the lantern for educational and illustrative purposes seems in *this* country to be fairly conceded.

Concerning the second book on the list, *Lantern Slides by Photographic Methods*, we have in it an account of the processes employed at the present day in the production of slides, both by contact and camera. There are the wet and dry collodion and the gelatino-bromide processes. There seems no doubt that of these the author prefers the latter as the best all-round process. In his description of the characteristics of a good lantern slide, Mr. Pringle says:—

"A slide must have a high scale of light and full gradation from its highest light to its deepest shadow. A large mass of highest light is just as mischievous in a slide as in a print, absolute opacity is just as much out of place in a slide image as on a paper print image, and on account of the substantial nature of the slide image there is greater danger of dense opacity in a slide than in a print, for the print is always illuminated to our eyes by more or less reflected light. If high lights preponderate in our slide, the image will be of the brilliant type; if shadows preponderate, we shall have a subdued slide; but the gradation must be in both. A very common fault indeed in slide making is to produce a slide of an interior on a scale of light precisely coincident with the scale of an open landscape; this must be wrong, yet many slide makers congratulate themselves on such achievements, which are not only abominable, but easy. Probably photographers are encouraged in this vandalism by the approbation of an unthinking and uneducated public which applauds a 'clear' slide, whatever its other qualities may be; but it is time that we photographers should correct this.

"When half-tone is in abnormal preponderance we have either a 'washed-out' image, or, in aggravated cases, a scale of light so low as to amount to 'fog.' This is the converse fault to 'summer snow,' and equally baneful; it is perhaps the commonest fault with beginners, and arises in nearly all cases from faulty technique or a bad negative.

"The next attribute of a slide is that of colour or 'tone,' or, as it is sometimes called, 'medium.' The colour of image most frequently seen is a sort of cold, slaty blue; it is the tone most easily produced, and most objectionable, if we except the dirty 'bottle-green,' which, luckily, is not so common as it used to be, when plate makers and plate users were less skilful. This slate colour is seen in many amateurs' iron-developed slides, and in numbers of commercial slides where the platinum toning process has been underdone, or done on unsuitable positives. Far preferable to this is a good warm blue-black, such as is produced by the

wet process, used properly, or by gelatine processes under the best conditions of exposure and iron development, or quinol development. But we yearn after warm tones, such as can be produced easily with dry collodion, with gelatine chloride, and with 'Argentic Stain' (see p. 57), and less easily with gelatine bromide. We believe not only that the warm tones are required for perfect slides, but that the photographic world is entirely of our opinion; the public will soon follow. The albumen slides so much admired are of warm tone, the mechanical slides are still warmer, and some of our most applauded slide makers affect warmth and eschew blues. We are referring wholly to pictorial subjects at present; slides purely scientific, as astronomical, microscopic, and the like, are probably better rendered in cold—but not blue—tones. We shall lay down, then, a warm tone as essential to a perfect slide; failing tints tending to red, we must content ourselves with a thorough good engraving black, such as one illustrious amateur knows how to produce, but very few other workers in this field.

"To sum up. A slide to be perfect must have: (1) A high scale of lighting. (2) A continuous scale of gradation. (3) A pleasing tone. To put it otherwise. A slide must have: (1) Clear highest lights. (2) Secondary lights well furnished with detail. (3) Middle tones. (4) Transparent shadow details. (5) A good general colour of image.

"So much for the photographic qualities of a slide; we have others to consider. The size of a slide plate is three and one-quarter inches square; there is no reason for changing this size or for adopting any other. But the *frame* of our picture—the 'mask,' technically—requires consideration. Why we should adopt for slides shapes and proportions practically unknown in any other branch of graphic art is a mystery, and the sooner we alter this practice of circular and 'square cushion' masks the better."

Both books are well illustrated by cuts.

Dry Plates for Lantern Slides.

By B. J. Edwards & Co.

Three packets of lantern plates received from Messrs. B. J. Edwards & Co. have yielded us slides of an agreeable rich tone, with perfect clearness in the high lights. One sample is intended for use with a pyro developer, a second with hydroquinone, and the third (a gelatino-chloride) with ferrous oxalate modified by citric acid, chloride of ammonium, and alum. While we find it well to adhere in the case of that last mentioned to its own special developer, we also find that the others are amenable to the action of any other good developer that comes to hand. No toning is needed, as by the developer alone the image comes up in an excellent colour that leaves nothing to be desired.

For the benefit of those who prefer to buy their developer ready mixed, the firm send out with each packet of plates sufficient to develop the accompanying dozen.

Messrs. Marion & Co. have sent us an opaline palette, one side of which is coated with Thomas Tomlinson's A1 spotting medium. This is not only an excellent preparation for spotting prints, for it adheres well, but the form in which it is put up is highly convenient. To employ it, all that is necessary is to use a good sable pencil and a little clean water in a steady vessel not easily spilled. Moisten the palette with the sable pencil and apply to the print.

Platt's Simplex Flash Lamp.

Mr. E. G. Platt, of Birkbeck-road, Kingsland, has brought out a

lamp of which we give a cut. It answers its purpose quite well, as we have proved by actual experience, and is sold at a very low price.

Chloro-platinite of Potassium.

A sample of this most useful salt has been received from Mr. C. A. Rudousky, 3, Guildhall-chambers, E.C., the importer and agent for the same. Although prepared for the purpose of toning silver prints in platinum, which it does with ease, certainty, and great beauty, this salt can also be usefully employed in toning collodion transparencies for vitrification. Mr. Rudousky has also submitted samples of rough grained paper for silver printing, which, when toned with platinum produces charming effects for many purposes.

New Lantern Plates.

By the Britannia Works Company, Ilford.

The peculiar characteristics of the Ilford "Alpha" lantern plates are well known. A special quality of that brand is a warm tone which, according to duration of exposure, permits various shades of tone to be obtained. These plates give results which very nearly approximate those obtained on albumen, and owing to this they are eminently adapted for stereoscopic transparencies; indeed, we have applied them to this purpose with such a degree of success as to render it difficult to distinguish between them and the well-known ferrier albumen slides. But it is an entirely new departure in the Britannia branch of transparency plate manufacture that we started to notice. We have said that the Alpha plates give warm tones. The Company have now introduced a special lantern plate for black tones, and we have had samples sent us for examination. We find them very much more sensitive than the Alpha brand, the exposure varying, according to density of negative, from twenty seconds upwards to a gas burner, and giving, especially with hydroquinone developer, an agreeable black tone. We give this new plate a glad welcome. The developer recommended is as follows:—

No. 1.

Hydroquinone	160 grains.
Bromide of potassium	30 „
Sulphite of soda	2 ounces.
Water to make	20 „

No. 2.

Soda, hydrate	100 grains.
Water	20 ounces.

For use, take equal parts of each. A ferrous-oxalate developer may also be used.

The American Annual of Photography and Photographic Times Almanac for 1891.

New York: The Scovill & Adams Company. London: Hampton, Judd, & Co., 14 Duke-street, Adelphi.

Mr. Canfield, the editor, has this year given us an annual in no respect inferior to any of its predecessors, being full of contributions from quite a number of well-known writers. Among the illustrations, which are numerous, are no fewer than nine portraits of Daguerre reproduced from various sources, no two being alike, although a general degree of similitude runs through all of them. Among those writers who treat on technical subjects, A. Miethe recommends the improvement of faulty negatives by painting on the back, followed by coating with ground glass varnish. Dr. Clarence E. Woodman treats on the mounting of stereographs, recommending a system similar to what is now adopted in this country by many, as explained a few years ago in our Almanac for 1887. Mr. F. C. Beach gives a detailed account, with plans, of the dark rooms of the New York Society of Amateur Photographers which will prove useful as a guide to clubs and societies who purpose having dark rooms erected or fitted up. In short, the variety of topics treated is very great, and the volume will prove most useful reading for the photographer. It is, as usual, beautifully got up. Price in paper covers, fifty cents; bound, one dollar.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,852.—"Improvements in Photographic Camera Shutters." J. T. Clarke.—*Dated December* 22, 1890.

No. 20,864.—"Developing Tents." W. R. Baker.—*Dated December* 22, 1890.

No. 20,869.—"A Slide Rule for Cutting Lantern Slides to Register Correctly." D. L. Salomons.—*Dated December* 22, 1890.

No. 20,876.—"An Improved Photographic Camera." Complete specification. R. Stirn.—*Dated December* 22, 1890.

No. 20,931.—"Improvements in Photographic Cameras." K. F. Jekeli and J. Horner.—*Dated December* 23, 1890.

No. 20,972.—"Improvements in Carriers for Lantern Slides." R. W. James and M. Stodart.—*Dated December* 23, 1890.

No. 21,012.—"Improvements in Panoramic Cameras." Complete specification. G. G. Rockwood.—*Dated December* 24, 1890.

No. 21,059.—"Improvements in or connected with the Production of Photographic Negatives." Communicated by J. M. Jordan. G. F. Redfern.—*Dated December* 24, 1890.

No. 21,285.—"Improvements in Photographic Cameras." A. R. F. Evershed and B. W. Wild.—*Dated December* 31, 1890.

No. 78.—"Improvements in Dark Slides for Holding Photographic Sensitive Plates." W. W. J. Nicol.—*Dated January* 2, 1891.

PATENTS COMPLETED.

Improvements in Camera Stands.

No. 1155. William Ritchie Baker, 9, Belmont-villas, Wallington, Surrey. —*December* 6, 1890.

The top of my stand is usually formed of a hollow triangle, which differs from the usual kind in having the sides loose, and so hinged that they will fold together.

On the upper surface of each of these sides I hinge or screw a piece of wood of suitable thickness, and of the same length as the sides, so that it will stand upright upon it, but not go further back than a right angle, and to the inner side of this I fix by a pivot another piece of sufficient length that it will reach across to the corresponding piece on the opposite side of the triangle, to which it is attached by some suitable fastening, and is itself fixed to the piece from the blind side, thus forming an upper triangle separated from the lower one by the length of the uprights first mentioned.

There might be more than one upright at each corner, which could be either fixed on one another or made to slip into or between each other, so as to give greater height; but all parts would be so arranged that they would fold up and lie side by side when not in use, and so occupy but little room.

All the parts need not be permanently fixed together, but might be made in two or more portions, and so arranged that the lower triangle might be used alone.

By means of this erection I am enabled to reduce the legs to the length of a walking-stick, which they would form, when suitably held together by means of a cap and ring, or otherwise.

This frame could be used without the legs when it was only required to raise the camera a little; it could be thus used whilst resting on the seat of a tricycle, a table, or on the knees, &c.

Instead of having the uprights attached to the triangle they might be fixed to the baseboard of the camera, and when in use either fixed to the triangle or directly to the top of the legs.

For small cameras it would not be necessary to have such an elaborate arrangement as that before described. One (or two) uprights would be amply sufficient, and this, which might be in one or more pieces so as to pack in the camera case, could have one end to screw into the bottom of the camera and the other into the head of the stand, which might be made solid and be fitted with a ball and socket joint, or turntable, so as to allow the camera to move independently of the stand.

The legs can be made in one or more pieces, which might fold together in any of the usual methods, but preferably should be connected by means of a screw joint, so that they could be screwed on when it was desired to use the stand at its full height.

The stand could be made entirely of wood or partly of metal, or any other suitable substance.

To enable a camera to be screwed to the stand, a piece of metal or wood is fixed, or pivoted, to one side of the triangle, of such length that it catches in a notch in the opposite side.

In case one or two uprights are used, they might be of any shape, tubular or otherwise, furnished with lateral supports or connected together by cross pieces in any way to give rigidity to the stand.

Two or more of these methods of raising the height might be combined together in one stand.

A Scarlet Liquid for the Treatment of Negatives in the Art of Photography, by Means of which Liquid Clouds can be made and many other Useful and Artistic Effects Produced.

No. 16,238. Harry Hibberd Beale, Somerley, London-road, Reading, Berkshire.—*December* 13, 1890.

It is often found necessary to "doctor up" a negative before it is in a fit state to give good prints. The negative may be a thin one without any clouds showing, and yet be dense enough to print from with aristotype or similar paper. Of course clouds can be printed from a cloud negative, but this is a trouble. "Nonactinine" is a great help under these circumstances, and good clouds can easily be laid on with this substance at the back of the negative with a soft piece of rag or wadding or a large soft brush—the more liquid used the whiter will be the clouds.

This preparation, which is the result of much thought and many experiments, consists of a brilliant and transparent permanent scarlet solution of such a nature that it may readily be applied to the back of the negative (previously well cleaned), and when dry cannot be rubbed off in ordinary use. Of course it can be removed by rubbing with a wet rag if so desired for the purpose of alteration or doing it afresh. It may be put on the film side for some purposes, but it is risky work. As to this see under.

"Nonactinine" consists of gelatine, aniline red, prepared colourless ox-gall, creosote, and water. To make, say, one pint of it, take one pint of water (distilled or not, it does not matter as long as it is clear and pure), and of best sheet gelatine six and a quarter drachms (375 grains). Cut the gelatine in pieces and place in the water, and allow to soak for several hours. Then heat gently until the gelatine is dissolved, and add two and a half drachms (150 grains) of aniline red (get the best and most permanent sort that can be obtained). Then add one and a quarter drachms (seventy-five minims) of the prepared ox-gall; and, lastly, put in about ten drops of creosote, and mix all carefully together by continual stirring with a glass rod. In preparing the nonactinine it is best to put the materials in a large jar and place it in another vessel containing water, which must be heated gradually over a stove or fire. If required, strain it through muslin before bottling it.

It is hardly necessary to state that the paper will be acted upon by the light according to the variations of the depth of colour, and this must be arranged to suit the requirements of each individual negative. In that nonactinine is of a red colour it is manifest that the application of it to a negative for the purposes herein mentioned is in accordance with well-known scientific principles. Negatives are like children. In order to make them turn out well each peculiar idiosyncrasy must be made a matter of study and attention. Suppose, again, there is a negative in which the trees and foliage are weak, this may be strengthened by the judicious use of nonactinine at the back. Any objectionable part of a negative may be entirely blocked out by a thick coat of nonactinine. It must be put on as smoothly as possible in this as in all other cases; it may also be put on the film side of the negative, but very great care must be taken so that it does not trespass on any part where it is not wanted, for of course it cannot be wiped off like it can when it is on the back. If it is to be put on the film side there must be no retouching medium or varnish previously used; if there is any it must all be taken off, otherwise the film will not take the colour. If there are any transparent spots, or flaws, or defects in the negative, paint them with nonactinine on the film side several times until they are a deep red colour. Allow to dry each time before a fresh application. This will quite block them out. If desired they need not be painted so deep a colour, but so as to be equal to the surrounding film. Sometimes in a sea view the horizon is bad, and the line of the sea invisible. In such cases it is best to first lightly pencil in the sea line, and then put some nonactinine on a little pad of rag, and quickly rub it along the back of the negative where the sea line ought to come, and make clouds as well if there are none, but don't disturb the colour of the sea line; be sure and leave that sharp and clear. There are many other cases in which this substance can be used.

In portraits it is a great acquisition, and saves the trouble of doing so much retouching. If there is too much shadow on one side of the face, a little nonactinine at the back will set matters right. Suppose, too, that the hair has come out weak, just put a few touches of nonactinine at the back, and it will be all right. A little soft paint brush is best to put small touches with. Sometimes in a portrait the clothing prints too dark, a little nonactinine at the back will remedy this. For this purpose it must be put on evenly, and to cover all the clothing if required.

If a portrait be taken as a statue, and nonactinine is applied all over the face at the back of the negative, the print will have a nice white face, and it will render a great amount of retouching unnecessary in such a case.

If it is desired in any case to make the colour graduate at the edges, it can easily be done by gently dabbing it with a little soft pad of wadding, slightly damped, if required. The substance can also be scratched carefully away from any part of the glass where it may have encroached on portions which are already sufficiently dark in the negative. When all is done that taste and ingenuity can suggest and devise in the application of the nonactinine, place the negative face downwards, flat, on a piece of clean paper in a place of safety and free from dust, and it will soon dry and be ready for the printing frame. If, when dry, there are found to be any opaque spots, &c. (due to a large quantity of nonactinine having been applied to the back), they must be lightly touched with a paint brush dipped in a little water. It is best to put a piece of tissue paper over the frame while printing (if in the gun). This prevents any harshness in the print.

Fine effects can be obtained in platinotype with a negative treated with nonactinine, but such a negative gives good results with all kinds of papers. Don't forget to put tissue paper, it gives a soft effect. It is best to warm the bottle before using the nonactinine, and also slightly warm the negative and hold it in a horizontal position in a good light over a mirror or a piece of white paper while applying the nonactinine.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. That nonactinine is infinitely superior to water-colour paints, matt varnish, coloured varnishes, &c., black lead, and other similar unsatisfactory and troublesome substances now in vogue, because it is transparent and makes no nasty marks on the print. 2. That it keeps moist long enough on the glass to allow of its being worked up as much as necessary. 3. That it runs on the glass easily, and so can be managed with great comfort. 4. It can be applied quickly, and it gives fine results. 5. That when an even coat is put on over any clothing or other part of the negative which has come out weak, it has the same effect as if that particular portion of the negative had been intensified, and gives a better and softer print than that which is generally obtained from an intensified negative. 6. That it helps to reduce the necessity for so much retouching. 7. That it can be easily removed from the back of the negative if required, but if it is left alone it will adhere quite firmly and will not rub off. 8. That clouds, &c., can be permanently put on the negative, thus doing away with the necessity of using a cloud negative or other contrivance, and as the nonactinine can be washed off if so desired, other clouds can be worked up if it is wished to make a variety in the prints from any particular negative. 9. That by its use many a weak and apparently useless negative can be rescued from destruction, and made capable of giving good prints. 10. That nonactinine is a boon to every one interested in the art of photography.

[The patentee in this case appears to have quite misunderstood the nature of a "claim" in the patent sense of the term. The word has several meanings. When he *claims* "that nonactinine is infinitely superior to water-colour paints," or "that it is a boon to every one," he merely states or asserts the thing. What he ought to have claimed is the special mixture by which the alleged advantages described in his ten so-called "claims" are secured.—Ed.]

Change of Address.—All letters and communications to be addressed in future to Camera Club, Charing Cross-road, London, W.C.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 12	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 13	Great Britain	5A, Pall Mall East.
,, 13	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 13	Derby	Society's Rooms, Derwent-bldings.
,, 13	Bradford.....	50, Godwin-street.
,, 13	Manchester Amateur.....	Manchester Athenæum.
,, 13	Carlisle and County	CathedralHall, 57, Castle-st., Carlisle
,, 13	Paisley	Committee Rm., FreeLib. & Museum
,, 14	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 15	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE first meeting of this Society in its new quarters, the "Champion Hotel," Aldersgate-street, was held on the 1st inst., Mr. A. Cowan in the chair.

A copy of Dr. Emerson's work, *Wild Life on a Tidal Water*, presented by the author, was received, and the thanks of the Association ordered to be conveyed to Dr. Emerson.

A letter was also read from the Great Yarmouth Photographic Society announcing that all members of the Association were at liberty to attend any meetings or excursions of the Society. A suitable acknowledgment was directed to be sent.

Mr. A. HADDON referred to the sudden death of the wife of one of the members, Mr. J. Traill Taylor, and proposed that a vote of condolence should be sent in the name of the Association, which was ordered to be done.

Mr. A. MACKIE called attention to conflicting statements in two photographic publications, one to the effect that in a matt varnish excess of benzole produced a finer grain, whilst the other stated that coarser grain resulted from a larger proportion of benzole.

The CHAIRMAN said that more benzole produced a coarser grain.

Mr. MACKIE also read some extracts on a work on photography for architects by Mr. F. W. Mills, which he and the members who spoke considered misleading.

Mr. F. P. CEMBRANO opened the discussion of the evening on the subject of developers. It appeared that he, as well as most of the other members who spoke, still preferred for general use pyro, with bromide and ammonia, and that he ordinarily employed the proportions of two grains of pyro, one grain of bromide, and two minims of ammonia to the ounce. When he wished to obtain additional intensity, he diminished the quantity of water and increased the dilution to obtain softness. For some kinds of work, however, he used eikonogen and hydroquinone in the proportion of three of the former to one of the latter. For interiors, where there was a tendency to too great intensity, he diminished the quantity of pyro.

Mr. W. E. DEBENHAM remarked that Mr. Cembrano had spoken of diminishing the quantity of water as giving greater intensity, and increasing the water as giving less intensity, or more softness. He remembered some examples shown by their present Chairman, Mr. Cowan, some years ago, to illustrate the effect of dilution of the developer, from which it appeared that the effect was only to cause longer time to be required in the solution to complete development, the final result being identical.

The CHAIRMAN said that that was so. Even in the case of the developer which was so much diluted as to require sixteen hours in which to do its work the image was of the same character and intensity as that which had been most rapidly developed in the strongest solution. With the diluted developer, however, there was more time in which to note the progress of the work and to know what to do.

Mr. J. S. TEAPE said that in cases of very great contrast he had found it best to use no bromide in the developer in order to get the best range of tone.

Mr. PARFITT inquired whether soaking the plate in water before development tended to increase the contrast.

Mr. TEAPE thought the effect would be the contrary.

Mr. CEMBRANO said that he observed a peculiarity in developing lantern-slide plates. He had found that whilst washing the plate after development density would come suddenly.

Mr. HASTINGS had found that effect when using carbonate of ammonia.

Mr. P. EVERITT remarked that so little had been said about the use of sulphite; he had found great difficulty during the last few weeks in getting intensity; he used acid sulphite with the pyro.

The CHAIRMAN said that temperature had a great deal to do with the time required in getting up density; then, again, more alkali would be required to neutralise the acid sulphite.

A question then arose as to the frequency of the use of sulphite, and on a show of hands being taken, it was found that rather more of the members used it than did not. A second question was then put as to whether those members who did use sulphite used it merely on account of its preserving the pyro solution or for its effect on the character and colour of the image, and it was found that by far the greater majority used it as a preservative only.

Mr. MACKIE said that he used a very large quantity of sulphite in developing collodio-bromide films, simply because he developed them in the hand, and the spillings did not then so strongly stain the fingers.

Mr. COOKE did not use bromide to restrain over-exposed negatives, but increased the quantity of pyro.

The CHAIRMAN mentioned a case where a known over-exposure of forty times had been corrected by placing the plate in a strong solution of bromide as soon as the image appeared.

Mr. HADDON considered that sulphurous acid was the proper preservative of pyro. He mentioned a formula in which it was directed to use ten drops of sulphuric acid with a certain quantity of sulphite of soda as a pyro preservative. This he thought very absurd, because samples of sulphite differed so much that sometimes there would be an acid and sometimes an alkaline condition left.

It was decided to continue the discussion on developers on the 15th inst., when strangers as well as members are invited to be present.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held on the 2nd inst.—Mr. W. Benham in the chair.

Three applications for assistance were considered and granted.

WEST LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 2.—Technical Meeting.—W. A. Brown, President, in the chair.

The first part of the evening was agreeably spent in examining an exhibition of apparatus, the work of members. Mr. Rogers showed an apparatus for making lantern slides by reduction, the whole of which, including the dark slides, being constructed of pine. He also exhibited a tourist's half-plate camera and slides, both the reducing and tourist's camera being constructed by himself. Mr. Winter explained a novel form of walking-stick tripod for hand cameras constructed entirely of metal. Mr. C. Whiting exhibited some prints from wet plate negatives which had been orthochromatised with erythrosine, also a very convenient revolving cutting knife for cutting out lantern masks, and a useful developing brush made of a piece of felt fixed in a wooden handle.

The annual exhibition of members' work and conversazione will take place on Friday the 9th, at the Broadway Lecture Hall, Hammersmith. On Saturday the 10th there will be an exhibition of the prize slides at half-past seven.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 2,—The President (Mr. F. W. Edwards) in the chair.

Mr. HOWSON gave a demonstration of the new lantern plate brought out by the Ilford Company. Before doing so, he remarked that a great want had been felt for a plate which was more suitable than the Alpha for reducing in the camera, and with which a cold black, or rather a soft grey, tone could be obtained. This want, he thought, the new plates supplied, while at the same time the processes were simplified, no toning being necessary. He then exposed a number of plates behind quarter-plate negatives; four in particular being exposed for seven and a half, fifteen, twenty, and twenty-five seconds respectively, at eighteen inches from a batswing burner, using the same negative in each case, and developed them altogether. The only difference to be detected was in the time of development, the results being indistinguishable when fixed.

In reply to inquiries, Mr. Howson said he strongly recommended hydroquinone for the new as well as for Alpha plates, and considered the former to be about sixteen times as fast as the latter.

The SECRETARY then passed round some slides he had made on the new plates, the tone of which was a fine grey.

At the next meeting, Friday, January 16, Mr. Warnerke will give a demonstation on *Mechanical Printing as applied to Photography.*

Correspondence.

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

WARM TONES ON BROMIDE PAPER.

To the EDITOR.

SIR,—Will you permit me to make good an omission of my own in my letter of last week on the above subject? The directions for using the developing formula should have read, "Use equal parts Nos. 1 and 2, *and add four parts water.*" This addition makes a material difference in the warmth of the developed print. Apologising for again troubling you—I am, yours, &c., J. WEIR BROWN.

Croydon, January 5, 1891.

HALATION.

To the EDITOR.

SIR,—The discourses on blurring in photographs, recently appearing in different directions, forget one point which seems to my mind to settle the question.

Every piece of a photograph out of focus represents nature not so much indistinct, but wrong in drawing, distorted in contour, and for this reason such work cannot be recommended or for one moment considered as a work of art.—I am, yours, &c., F. B.

THE FIRE IN FULLWOOD'S-RENTS.

To the EDITOR.

SIR,—With reference to the disastrous fire on the evening of the 5th inst. at Messrs. Stone's premises adjoining our factory, 9, 10, 11, Fulwood's-rents, would you kindly allow me to state in your paper, in consequence of the numerous inquiries that we are receiving, that our premises are

only injured in a moderate degree, and not sufficiently so to materially inconvenience us in the conduct of our business?—We are, yours, &c.,

W. WATSON & SONS.

313, *High Holborn, London, W.C., January* 6, 1891.

A CAUTION.

To the EDITOR.

SIR,—In your last issue "C. G." complains of being victimised over purchasing a photographic business, and asks for advice. Unless the vendor is a man of means, I am afraid it will be throwing more money away; and even if you succeed in getting a trial, the costs will be heavy. Solicitors do not always advise for the best in such cases. I recently purchased a "high-class," or so-called, business, where the returns were stated to be considerably over a thousand, and by the inspection of the books all tended to this amount. On entering possession, I soon discovered I had been nicely taken in. Persons had been written to to give sittings—no charge would be made; a sitting fee of 10*s.* was entered against each such patron; this amount was calculated up at the end of each week as so much business done; six, eight, and even ten negatives were taken of each sitter to swell the day-book, and make the affair look important. Another move adopted by this clever vendor was to make enlargements, and send them home on speculation, no bill being rendered till a considerable time had elapsed; in fact, in nearly all transactions of this business, the patrons were treated with the greatest liberality. I need scarcely state ready money taken was hardly sufficient to cover wages. "Qualified assistants," for the most part, consisted of apprentices. On the strength of such barefaced robbery I consulted a solicitor, who engaged counsel, &c., and entered for trial, and at the last moment was thrown over by being told I had inspected books, &c., and should lose the day. This gentlemanly vendor has another high-class affair for sale, and no doubt in due course will have another thousand pounds to his banking account, and another purchaser victimised.—I am, yours, &c.,

C. M.

[In the London Law Courts we have known cases of a similar nature unhesitatingly characterised as fraudulent, and the transaction set aside.—ED.]

Exchange Column.

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

Wanted, Grubb's single aplanatic lens, five and a half to eight inches focus (old or new make); exchange Ross' No. 2 portable symmetrical, good as new.—Address, W. A., 13, High-street, Wexford, Ireland.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

D. McNeille, Stratford-on-Avon.—*Two photographs of Holy Trinity Church, Stratford-on-Avon.*

OSCAR F. LEHMANN.—Received.

EDWIN A. JOWETT.—Thanks. The pastel free portrait has been exposed repeatedly.

J. TAYLOR (Newcastle-on-Tyne).—Either of the lanterns mentioned will answer very well.

E. C. (Smyrna).—We use No. 7 on your list. We also use a medium No. 9. Either of these may be relied on.

W. K. BURTON (Tokio).—Received. Thanks. You will have observed that we had previously been made aware of the sad news.

S. ROME.—Of the two we recommend the oxy-calcium light. This will give, with your lantern, a better illumination on an eight feet screen than the lamp.

T. A. C. (Leeds).—Primuline may, we know, be obtained from Brooke, Simpson, & Spiller, Hackney Wick, and probably some of the German houses. Messrs. Hopkin & Williams also supply it.

ERNEST LAMBERT.—We do not know where you can see any of the actual originals by Mrs. Cameron, but the portrait of Lord Tennyson, of which you have so poor an opinion, is considered an example of her very best work.

FLORENCE.—You will not experience any difficulty in taking your apparatus and plates into Norway, nor with the Customs on your return.

FELIX (Nice).—We fail to discover any mistake in the contribution in question. If a glossy surface is required the means recommended by the author of the articles is the best of obtaining it without having recourse to "enamelling."

COLLODION.—A slight excess of bromide will confer keeping properties on the emulsion. To intensify, apply a mixed solution of pyrogallic acid and citric acid (three grains of the former and two grains of the latter to one ounce of water), to which add a few drops of nitrate of silver solution.

MONTAGUE TROUP.—There are no works devoted exclusively to making lantern slides by the wet collodion process by daylight or any other light. Any old treatise on the wet collodion process will furnish all the information necessary except the toning. Articles on the subject have appeared in back volumes.

J. R. HINE (Kilburn).—Your query is so indefinite that we fear we do not understand it properly. Of course the lenses of all cameras are suitable for 'photo work,' or ought to be. Any optician will supply a lens specially constructed for portraiture, if that is what you require. Perhaps you had better repeat your query more definitely.

E. J. HUGHES says: "I shall feel obliged if you will let me know through the medium of your 'Answers to Correspondents' column where I must apply for permission to photograph in the Royal parks."—For permission to photograph in the Royal parks application must be addressed to the "Ranger." For other parks to the authorities under whose control they are.

STEREO.—1. Three and a half inches is a suitable distance apart for the lenses on the camera. 2. The five and a half inch focus combination mentioned is what we employ. 3. For slow exposures a flap shutter will answer nicely. For giving exposures down to half a second we use the focussing cloth. 4. For rapid exposures either of the two shutters named will prove very effective.

S. E. A.—Thank you for the photographs of the ruins. They are very interesting, that of the church especially so. We cannot estimate the commercial value of the negatives; better apply to some of the publishing houses. As large pictures they will be of only passing interest, but as lantern slides they would always be of interest as showing what is possible even in the City of London.

J. W.—1. The studio described is very good for portraiture. The *light* side-light becomes, with proper use, practically a top light, or as much of a top light as is requisite. Many studios are constructed on this principle. 2. The process in question was understood to be equivalent to the carbon process, in which the pigment was ceramic colour. None of the working details were published; they were treated as a trade secret.

W. SLADER asks: "Will you kindly inform me how to make a negative from another negative direct without taking a transparency? I have tried the formula in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1878, page 39, but failed. I would like the most certain and simple way, and by the old wet process, for that is what I use."—This cannot otherwise be done than by the wet collodion process. Why not try a dusting-on process, developing with powdered graphite? Formulæ will be found in the ALMANAC.

T. BENKE sends us a number of photographs taken in his locality under wintry aspects, and asks our opinion as to their merits for Christmas and New Year cards? The majority of them are excellent for the purpose, and far superior to the chromo-lithos usually sold. We would suggest to our correspondent that the proofs he intends to submit to publishers should be either platinotypes or on bromide paper. The highly glazed albumen paper of the prints sent us greatly retracts from the artistic merits of the pictures. Warm red tones are not in keeping with snow scenes.

PUZZLED.—It is quite impossible in this column to give rules by which to find the optical centres of photographic lenses, as several illustrations would be required. But we can condense in a sentence the method by which the optical centre of a single lens can be found: Having ascertained the curves of the lens, draw its form on a sheet of paper; then draw two parallel radial lines, one from the centre of each curvature, both being oblique to the axis; then connect the points at which they touch the curved surface by a line which, in the case of a meniscus, must be prolonged till it meets the axis. The point at which this junction line touches the axis is the optical centre. You will find a dissertation on this subject in the number of this JOURNAL for July 13, 1883.

HERBERT A. HUTCHINSON inquires: "What minimum ought a shutter to work at, on a half-plate or 5×4, with an eight-inch focus lens, to secure a sharp negative of a man walking, say, three miles an hour at the following distances from lens:—(1), ten feet; (2), twenty feet; (3), thirty feet? I have never seen the above worked out in any periodical connected with photography, although for hand-camera work (for which I should like this information) some such calculation is needed. To save calculation, three miles an hour equals, say, ninety yards in one minute, four and a half feet in one second, and six inches in one-ninth of a second. If you can give me this I shall be very much obliged."—Perhaps some reader who has time to make this computation will reply.

W. Moore.—The pictures are very interesting, but unfortunately they are all over-exposed. Sufficient allowance has not been made for the light reflected from the snow. Possibly, if some of the negatives were cleared, and afterwards intensified, they might be much improved. Thanks for kind wishes.

Sidney Williams complains that he recently had a lantern from a London house, fitted with a compound lens as an objective, and to all appearance it is an ordinary quarter-plate portrait lens, and it gives a very good definition on the screen. He says he "had a flange made, and fitted the lens on a camera, but on trying to take a portrait with it the result was anything but good. Upon applying to the one who supplied the apparatus, he replied that he only undertook to supply a good lantern lens and not a photographic one, and I want one to answer both purposes, and for this the optician asks an increased price. What shall I do?" If the optician has supplied a good apparatus as ordered, what more should he do? If something more is required, we imagine it will have to be paid for. It must be borne in mind that the best lantern objective is not necessarily a good photographic lens.

A. D. Loman (157, Warmesstraat, Amsterdam), writes: "In consequence of an article by Rev. Locke Macdona in your British Journal Photographic Almanac (pages 519-521), I beg to direct your attention to the fact that a similar camera is invented already, and has been patented in your country (No. 15,163, 1889). Messrs. Mawson & Swan are London agents for this camera. Would you kindly communicate to me whether a swing front has practical features in ordinary portable cameras? I ask this because all best cameras have got this arrangement, and I don't see why it is necessary. My personal opinion is that a swing back and rising and falling front is sufficient, but I may be in error."—It is rather singular that when this letter was delivered we were engaged at the time in examining Mr. Loman's "Reflex" camera with a view to giving a description of it, which we hope to do next week. With regard to a swing front, it is of no use whatever (except as a convenience in folding) when a camera has a swing back and a rising front.

F. J. Quick writes: "1. Ought eikonogen to be black when in crystals? I have just had some supplied to me in that condition, and imagine the solution would stain a gelatine film. 2. What is a saturated solution of eikonogen? 3. Where can one find instructions how to make ferric oxalate? None of the books give any, and the dealers do not sell it; at all events, they do not price it in their lists. Boiling ferric oxide in oxalic acid produces, on evaporation, a dark-green colloidal body that does not seem what I want."—1. Crystals of eikonogen are prone to become dark by keeping, but the discolouration can be removed by washing them in cold water. Unless they are very black this treatment is unnecessary in practice. 2. A saturated solution is, as the water will take up at any given temperature. 3. Several different methods of making ferric oxalate are given on page 454 of our volume for 1882. The article is too long to reproduce in this column. The Platinotype Company supply ferric oxalate, and in all probability our correspondent will find it more advantageous to purchase it than to make it.

Hand Camera writes as follows: "All things being equal, is an enlargement from a celluloid film negative equal to one from a glass negative? The reason I ask is that two years ago I took some quarter-plate negatives on Wratten's special drop-shutter plates, which I sent to be enlarged 12×10, and I was perfectly pleased with them. This year with the same camera, lens, &c., I used extra rapid films, and sent them to the same firm to enlarge, but they are none of them at all equal to the others. There is a 'fuzzy,' 'out of focus' look, not by any means artistic, about them, even though they have not been enlarged to the same size. They were taken in Switzerland, and the saving in weight to a traveller is so great that I was in hopes with films I should get as good enlargements, but my confidence is shaken. What is your experience?"—All things being equal, there is no reason why enlargements from celluloid films should not be as good as those from glass. Celluloid is as transparent as glass, therefore there should be no difference. Some celluloid films, however, have a matt surface on one side, and when this is the case quite so crisp an enlargement may not be possible.

Fred. Geo. Smith writes: "Being on the look-out for anything in connexion with blisters, with which I at one time was sorely plagued, I welcome the method of Mr. A. W. Clarke in last week's Journal—viz., boiling water—which I intend trying at my earliest chance. Up till now I have been using the method described on page 619 of last year's Almanac, and must say I like it very well; but if the hot water is sufficient it will be better, as it costs nothing. Turning over another leaf in last week's paper, I see W. D. Richmond says the spirit (page 619) makes it difficult to judge the tone, but I am in the habit of using it after toning, and so find no inconvenience; but if this is any cause of my not getting the best results—I mean as far as colour and brightness of the prints are concerned—I use a very highly albumenised paper, and always notice the finished prints are not so plucky as the paper leads me to expect. Is this the reason why? Is it correct that some paper only requires two ounces of hypo to the pint, while four ounces is what is generally stated? If so, do the prints require double time? Some time back you told a correspondent that twelve changes were enough to remove all traces of hypo; would this apply to a batch, say, of a hundred *cartes* and cabinets? In looking over some of my last year's negatives I find them all covered with brown spots, in some cases as fine as pepper. I am told it is caused by the hypo not being changed often enough. I am in the habit of using the hypo till it is a decided brown colour. Is this wrong, or how many negatives ought a solution to fix properly?"—Two ounces to the pint is too weak for fixing. Change the hypo more frequently and wash the negatives more perfectly.

Photographic Club.—Subject for discussion, Wednesday, January 14, *Dark-room Illuminants*. January 21, lantern night (American slides).

The Lantern Society.—On Monday, January 12, at eight p.m., E. M. Nelson, F.R.M.S., will read a paper on *The Lantern in its Relation to Photography and the Microscope*.

Liverpool Amateur Photographic Association's Exhibition.—Those intending to send their works to this International Exhibition should lose no time in making application (before the 20th inst.) to the Hon. Secretary, Mr. T. S. Mayne, Fenwick-court, Liverpool.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—The London Camera Club collection of Mr. Lyddell Sawyer's principal photographic studies: old Newcastle places and faces, river scenes, marine subjects, instantaneous effects, *genre* studies, &c., are now on exhibition in Central Exchange Art Gallery, Newcastle-on-Tyne.

Prizes at the Edinburgh Exhibition.—When announcing the awards last week it was found that, owing doubtless to an oversight by the Secretary's clerk, there was a blank in his MS. opposite the enlargement class. Our printer therefore assumed that no awards had been made in that class. We now learn that both a silver and a bronze medal were awarded, the silver to Mr. F. H. Worsley-Benison, Chepstow, and the bronze to Mr. T. G. Whaite.

Lantern Catalogues.—Mr. Walter Tyler, Waterloo Bridge-road, has just issued a catalogue containing an unusual number of pages. The first part of it is devoted to lanterns, their fittings and appliances, this being followed by lists of slides kept in stock, of which there are very many.

Mr. J. H. Steward, Strand, sends us a finely bound copy, for office use, comprising his various lantern catalogues, which in their individual form we have had previous occasion to notice in this Journal.

Manchester Photographic Exhibition.—*Errata.*—We are asked to make the following corrections in the spelling of the names of two prize winners given in our last, viz., the prize for illustrating the line from one of Bryant's poems was awarded to W. G. Coote (not "Cooke," as we had it); while another prize winner's name, which was given as "J. R. Colley" should have been T. R. Cobley. Will secretaries or others who send us reports kindly note the importance of writing names as distinctly as possible?

Serious Fire in the Metropolis.—A most disastrous fire broke out on the night of the 5th inst., on the premises of Messrs. Stone & Co., photographic mount makers, 7 and 8, Fullwood's-rents, W.C. The flames were first noticed at about 12.30 a.m., shooting through the roof of No. 8, and the firemen at once received a call. It was some time before an adequate supply of water could be used, on account of the difficulty in approaching the building, and, meantime, the fire had spread to No. 7, and huge sheets of flame sprung into the air, lighting up the whole of the metropolis, and bringing sightseers from all parts. The contents of the building were mostly papers, and these, especially in the upper floors, were very inflammable, as this portion of the premises is heated by steam, and the large sheets of paper are separated there for drying. It was not till four o'clock in the morning that the fire—after the united efforts of some sixty or seventy firemen and twelve steam engines directed by Captain Shaw in person—was got under; and, meantime, it had spread to the adjoining premises, No. 6, Fullwood's-rents, occupied by Sir Joseph Causton & Co., wholesale stationers, and also, at the back, to Walduck's private hotel, of which the whole of the back portion was completely gutted. Fortunately the wind was from the north, and took the flames in a southerly direction, for the adjoining premises on the north side—a large factory occupying the space of three houses, Nos. 9, 10, 11—is in the occupation of W. Watson & Sons as a photographic cabinet shop, and here are stored immense piles of dry wood, used by them for their cameras, and had this once caught alight nothing could have prevented an enormous conflagration. It is really a marvel that the building escaped; but it did so, and, excepting a few charred beams, which were extinguished almost as soon as they lighted, the fact that nearly all the back windows and skylights were broken, and that the basement is flooded with water, Messrs. Watson & Sons have escaped. Messrs. Stone's premises were reduced to a shell, and there apparently is no salvage of value remaining. The mass of burning material in the basement was so hot that it was practically impossible to enter the building during the 6th inst., and the hose was kept playing on the ruins all day; late in the evening, however, this was discontinued, but firemen were left on duty all the night in case a repetition of the outbreak should occur. This precaution proved necessary, as about three o'clock in the morning flames again broke out, and at four o'clock the fire was almost as bad as on the previous night; however, it was eventually conquered, but the hose was kept playing till a late hour on Wednesday. Messrs. Stone & Co. are well known to photographers for their mounts. They have occupied these premises for twenty-six years, and this is their first experience of such a disaster. They were insured.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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COMPENSATION PRINTING.

We borrow this title from an expression in Mr. James McGlashan's paper, *A Means of Printing from Negatives Having Excessive Contrasts*, which appeared in our issue of the 2nd inst., and to which paper this is intended to be somewhat supplementary.

The means recommended by him for obviating the thin shadows that *will* sometimes appear in a negative is to prepare a mask of paper and lay it on the printing frame about a quarter of an inch from the negative.

When, owing to the too great contrasts between the high lights and the shadows, a negative produces prints in which all details in the shadows are merged into blackness, we have found it an excellent plan to equalise them by coating the glass side of the negative with any preparation that is sensitive, and then exposing the face side of the negative to light. The luminous action proceeds most vigorously through the transparent parts representing the shadows of the subject, and thus renders them less transparent; while, as the high lights debar all access of light to the portion opposite to them, no darkening takes place there. Judgment is, of course, necessary in determining the extent to which this darkening of the shadows is to be carried, for, as will be well recognised by the intelligent photographer, by exposing too long, the compensation print on the back of the *cliché* might eventually be so strong as to prevent all detail being seen.

Concerning the special sensitive backing to be applied to the hard negative (by hardness we mean a too sudden transition from the high lights to the shadows), it is probable that collodio-chloride of silver will prove the most convenient. We have in our possession negatives which were thus compensated or equalised, and as no difficulty was experienced in doing so we will give the formula by which the collodio-chloride was made. It is that of Dr. Just, of Vienna, published twenty years ago:—

The following solutions are all made separately:—

The Normal Collodion.

A.—Guncotton	15	grains.
Ether	10	drachms.
Absolute alcohol	10	„
B.—Chloride of magnesium	15	grains.
Alcohol (sp. gr. ·838)	10	drachms.
C.—Powdered nitrate of silver	5	drachms.
Distilled water	7½	„
Alcohol	17½	„
D.—Powdered citric acid	4½	drachms.
Boiling water	4½	„
Alcohol	5⅛	ounces.

To prepare the chloride of silver collodion, take a yellow glass bottle which does not admit the actinic rays. Pour into it—

A.—Normal collodion	600 parts.
B.—Solution of chloride of magnesium	50 „

Shake well and add—

C.—Solution of nitrate of silver	60 parts.

Shake well for several minutes and add—

D.—Solution of citric acid	40 parts.

Shake well, and use the collodion thus made some eight or ten days afterwards, for it improves by age.

The back of the negative having been made quite clean, a sponge charged with diluted albumen—the white of one egg to a pint of water—was pasted over it to ensure adhesion of the collodio-chloride, which was poured upon it after being quite dry. When this film had become dry, the negative was placed upon a piece of black velvet and exposed, face out, to light. After the printing had been carried sufficiently far it was fixed and washed by aid of a sponge, no toning being necessary.

By way of experiment we have also applied the collodio-chloride to the face of the negative, exposing it to light through the back.

The carbon process in careful hands also affords a means of subduing contrasts in negatives; but on the details of this we shall not at present enter.

PREPARING FOR THE COMING SEASON—DARK-ROOM ARRANGEMENTS.

At this period of the year we are usually called upon to advise in innumerable cases of proposed alterations in existing arrangements, or in entirely new preparations for the approaching campaign; and certainly no more appropriate season could be chosen for such work. Not only is outdoor photographic work at a practical standstill, but the long evenings, unless devoted entirely to social purposes, offer very little employment of any other kind, and the thoughtful worker may, therefore, find profitable amusement in getting his house in order and making ready for the busier season now closely approaching.

Photographers as a class, whether amateur or professional, are remarkable for the "all-round" character of their capabilities, and it is rarely that more or less aptitude in mechanical directions does not accompany the chemical and artistic acquirements of the average practitioner. Such being the case, it is but natural that the photographer should in the majority of cases prefer to at any rate plan his arrangements, if he do not actually execute them, rather than delegate that portion of the labour to the ordinary British workman, whose foibles are proverbial. By this arrangement he not only

ensures that the work is done in a proper manner, but probably saves a vast amount of time and expense that would be otherwise wasted in superintending or in altering the performances of his not too intelligent assistant. It stands to reason that the photographer understands the practical requirements of his art better than a builder or carpenter, and if at all apt in the use of tools, is in a position to direct their use to the best advantage. The paid mechanic is sadly prone to go to business in the most roundabout way possible for the sake "of making a job of it," and a little interested and intelligent supervision is absolutely necessary.

To the ordinary carpenter a window is merely a window; and so long as it admits a certain amount of light it is immaterial to him where it is placed or in what direction it throws its illumination. To the photographer who wishes to work with the greatest amount of convenience and comfort these points are of the very highest importance; indeed, it may be said that the quality of his results are in a very great measure directly dependent on the personal comfort he enjoys in the performance of the various manipulations. At the best of times the amount of light admissible in the developing room is limited, but if matters are made more uncomfortable by imperfect arrangements, it becomes impossible to work with any degree of accuracy or certainty. This is not a question of mere luxury—though it certainly is a luxury to have a well-equipped workroom—but an absolute necessity which the prudent operator will not be slow to recognise.

In response to the usual crop of inquiries on the subject of dark-room arrangements, and to save the trouble of individual answers, we propose to make a few general remarks on the subject. Obviously it is impossible in the space at command to go very minutely into details, as the conditions must necessarily vary so greatly with surrounding circumstances. One correspondent, for instance, requires to fit up a room for special purposes on a palatial scale with every convenience that can be possibly secured. Another wishes merely to utilise some corner that may be darkened off with a minimum of trouble, as occasion may arise, for the development of a few plates. A third desires to combine with the dark room an operating room for enlarging; while yet another includes plate making and general chemical work amongst the multifarious uses of his laboratory. We have, therefore, to confine ourselves as much as possible to the leading principles to be observed in the fitting up of dark rooms generally.

First and foremost, the question of lighting must be considered. In the majority of instances the source of light will be daylight, at least for general work, though no dark room can be considered complete unless provided with some means of employing artificial light when necessary. Many operators, it is true, owing to the variability and uncertainty of daylight, make a practice of relying solely upon artificial light as being conducive to greater uniformity of result, and perhaps in a professional studio this is a good plan; but we venture to think that most amateurs will prefer to rely mainly on daylight, and to resort to artificial means only when compelled.

With the former, of course, greater care is necessary in the selection of the coloured medium to be employed, both on account of the greater power of natural light under the best circumstances, and also its changeability. The depth of screen needful in summer weather would be altogether unfit for the dark, dull weather of winter, and *vice versâ*. It is, therefore, in every way desirable to make provision for a variable or adjustable illumination. This can be done in a variety of ways: by having a series of sliding frames fitting into one sash a glazed with material of different degrees of intensity, l means of adjustable blinds of coloured material, or by varyi the area of illumination by the use of opaque blinds or scree The precise method adopted remains to be selected by t individual.

With regard to the material employed, nothing exc coloured glass in permanency, though it is more costly th the different fabrics employed as substitutes. In the long ru however, it will be found the most satisfactory, for, unless t cheaper substitutes be kept under constant and close supe vision, the change of colour may lead to serious difficulties. good plan consists in glazing the window in the first place wi "pot orange" glass of good depth, supplementing this with blind of deeper colour. The protective action of the oran glass will prevent the rapid bleaching of the fabric that wou ensue if it were freely exposed to light.

This presupposes a window that is to be permanently dar ened, but in cases where the room is required for other purpos and only occasionally darkend, other means must be adopte For this purpose nothing is better than a light wooden fra mortised together and made to fit to the flat of the windo frame. If of large size it may be formed in two parts, fittir together with a rebate to make the junction safe. The fra may be partially covered with black twill, or two or thr thicknesses of brown paper strained smoothly on it, a sufficie portion being left to be filled in with suitable coloured materi The screen can be fixed in position in a minute or two b means of simple buttons to press it closely against the windo frame. If the latter be uneven and permit light to leak in, t screen may be padded with strips of list to make it "bed neatly.

If artificial light is to be employed, there is such a variety suitable lanterns on the market that it is scarcely needful make any remark on the choice beyond pointing out the desi ability of having *enough* light, even though it may not l always used. It is an easy matter to screen off an excess light when working with specially rapid films, but it is in t highest degree inconvenient to have to work slow films with insufficiency of light. It has been over and over again la down that it is preferable to work with a large volume of *so* light rather than with a feeble supply of doubtful. In emplo ing any of the coloured fabrics or papers, two thicknesses medium density are better than one of greater thickne especially if placed a little distance apart, as chance faults the separate screens are thus neutralised.

The position of the window is of some importance. Thoug usually placed immediately in front of the operator, it is que tionable whether this is the best position. In our own practi we prefer to have the light on the left-hand side, or at a rate removed from the immediate front. When placed in t latter position, the light falls constantly upon the eyes, a causes considerable strain if the source be a powerful on besides rendering it more difficult to watch developmen When, however, the illumination falls from the left or le front, the eyes avoid the direct glare, and the plate is bett lighted by the contrast, without actually receiving any mo exposure. Under no circumstances should the window be the right, unless the operator be left-handed, or the hands a developing measures will always be casting a shadow ov the film.

Where artificial light is employed, it is especially importa to protect the eyes from the direct impingement of the lumino

rays, especially when glass or a transparent medium is used. The eyes unconsciously fix themselves on the flame of the lamp and become temporarily paralysed, besides being submitted to constant strain. Many of the better forms of lanterns are provided with opaque screens for this purpose. A convenient and comfortable position for the lantern, if of the "shadowless" description, *i.e.*, throwing an unobstructed light downwards, is above the head and a little in front of the body when seated or standing at the work. The eyes are effectually protected from direct rays, and the whole of the work-bench is better lighted; indeed, in many respects we consider this as good a position as any.

Whatever pattern of lantern is used, care should be taken that it is properly constructed as regards ventilating arrangements. We took away with us on a journey on one occasion a new lantern, by a well-known firm of manufacturers, that was so badly planned that the paraffin became heated to such an extent as to take fire inside the body, and it was only by carrying it out bodily into the open air at the expense of burnt hands that a catastrophe was averted.

PHOTOGRAPHERS AND THEIR RESIDUES.

As usual at this season, when photographers are sending their year's collection of waste to the refiners, we have received several letters expressing disappointment at the returns. When this is the case it is very common, as in a letter now before us, by insinuation at least, to impugn the integrity of the refiner, and that without any justification whatever. We say without justification, because in the majority of instances the photographer has no data whatever upon which to form an opinion, beyond that so many pounds weight of material was sent.

Only those who have had the opportunity of seeing the heterogeneous mass of rubbish often sent to refiners can have any conception as to what some photographers term residues. Some little time back we were shown a parcel of waste, weighing some ten or a dozen pounds, from which was taken over a pound of broken glass and about half that weight of metal, in the shape of broken printing-frame springs, nails, tacks, and pins, also a quantity of partially burnt brown paper, leaves from trees, &c. There must also have been probably a pound or more of water in the undried chloride and sulphide. Whether the return made for this particular batch met the sender's expectation or not we are unaware. It would quite appear that the estimate formed by some as to the value of residues is based upon no better data than the quantity of nitrate of silver consumed, or the mere weight of the collected waste.

It is not uncommon with some of the older photographers to make comparisons of the values of the residues now and formerly. In doing this they should bear in mind that the paper used now is but weakly sensitised—in some cases baths of only half the former strength being employed—and further, often a large proportion of the free nitrate is removed from the surface before drying. Consequently, the ash of the paper when burnt, although it may weigh the same as it used to do, cannot contain half the same proportion of silver. Again, as the paper contains very little free nitrate, and only a small proportion of chloride, it follows that there must necessarily be but a proportionately small quantity of silver to be recovered from the washing waters and the fixing baths. When these facts are taken into consideration, it will be seen that no comparison should be made between the value of residues, weight for weight, of the present day and those of former times; particularly when it is taken into account that the price of metallic silver is lower, while that of the nitrate is, proportionately, higher than it was formerly. At one time nitrate of silver used to be sold for a little, if any, more than the value of the metal it contained. That is not the case now.

We have on several previous occasions endeavoured to impress upon our readers the desirability of reducing the wastes to the smallest possible bulk and weight before sending them to the refiner. Also the absolute necessity of so doing, if a correct estimate of their value is to be formed before they are despatched. To recapitulate. The paper should be burnt completely. If the quantity be large, this may be done in an open stove; if small, it is accomplished best in an iron pot over the fire. In any case, the ashes should be allowed to smoulder, so that they become reduced to a white or grey powder. The chloride should be thoroughly dried, which may be done in the kitchen oven, and then reduced to powder in a mortar. The sulphide from the fixing baths should be similarly treated. The whole is then passed through a coarse sieve, which will take out such extraneous matters as pins, tacks, broken glass, &c., and at the same time thoroughly mix the powder. It may be said that this involves a deal of trouble. Yet it does not, and the time will be well repaid in the cost for reducing, while the work can be as well done by the errand boy as any one else. It has sometimes been recommended to keep the different residues separate, but this is quite unnecessary in practice.

When the whole of the residues are in the state of a homogeneous powder, their value can be estimated to the extreme nicety by any one familiar with the use of the blowpipe. As, however, all photographers are not, here is a very simple method by which the value can be arrived at with the greatest accuracy.

Weigh out a given quantity—say half an ounce—of the powder and mix intimately with three drachms each of carbonate of potash and bicarbonate of soda, put in a small clay crucible—"a skittle pot"—capable of holding two or three times the quantity, and then subject it to a strong heat until the silver is reduced. Heat, sufficient for dealing with so small a quantity as that mentioned, can be obtained with a coke fire in an ordinary good drawing stove, especially if a blower be placed in front; or the domestic kitchener may be utilised. As the heat is applied, the contents of the pot liquifies and then boils. The boiling must be continued until ebullition ceases, even when the heat is increased; complete reduction is then ensured. If, after the pot has been boiling some time, the contents assumes a stiff pasty condition, a crystal of nitrate of potash, about the size of a pea, may be dropped in, which will immediately render it more fluid. It is a good plan, when the operation is about complete, to drop in a small crystal of borax, and then stir the pot with an iron wire. This causes any small particles of metal adhering to the sides of the pot to settle down to the bottom. When the pot is cooled and broken, the weight of the button of silver wil indicate the exact proportion of metal in the bulk of the residue.

THE GENEALOGY OF A PHOTOGRAPH.

When we read among the advertisements that a new printing-out surface has the recommendation of being the only paper of its kind made in the United Kingdom, we are given matter for reflection of an interesting and, indeed, of a suggestive kind, so

that we instinctively wonder to what extent photographers may in other respects be dependent upon foreign manufacturers for the means of producing their pictures. The answer, we surmise, would form an instructive object lesson in the genealogy of a modern photograph, and might help to remind us of certain little facts which would infallibly act as correctives to the pride we often feel and sometimes display at the part this country is taking to-day in perfecting the manufacture of the materials necessary for the successful prosecution of photography.

Who that is acquainted with the general literature of the time has failed to come across one or more of those pleasant little works which treat in a lucid way of the evolution of a piece of coal, of a brass pin, of a match, and other indispensable articles of civilisation from their elements? They are made to relate, as a rule, their own autobiographies, and to tell us a great deal that is useful which would scarcely arrest our notice if dished up for us in a less attractive, albeit more scientific, form. So, just in the same way, a photographic print of any kind, if set to tell us faithfully its own history from the beginning of things, would furnish the world with some nice, amusing, and profitable reading. For our present purpose it would also "let out" much curious imformation.

If we go and take a photograph of a country scene, we are only certain of the nationality or place of origin of one of the factors in the operation, namely, the scene itself. The lens we are using may very likely have been made in either Paris, Vienna, Berlin, or New York; although the camera, the dark slides, and the stand are probably of native workmanship. The odds, however, are in favour of the support of the sensitive film, be it glass or be it celluloid, coming from Belgium and America respectively; of the gelatine having been made in Germany; of the soluble salts used to form the silver haloids owning a similar birthplace. Thus, up to the moment of exposure, we may, and possibly do, have largely to rely upon remotely sent help to enable us "to take the cap off." Native opticians are second to none in skill, but very many foreign lenses are sold in this country, and those of them that are cheap—they are not all so—are not commonly optically inferior to the higher-priced instruments. Then there are skilled manufacturers of glass, gelatine, celluloid, and chemicals at home; and yet dry plate makers find it advantageous to place their orders for these articles in alien hands for other reasons besides cheapness.

Let us proceed to the development of our picture and we shall find that pyro, hydroquinone, eikonogen, at least, are of foreign origin. The alkali and fixing agent are perhaps produced at home, and so the honours here are divided. Move on another stage, to the printing. In its palmiest days the albumen silver printing process, when ready-sensitised paper was used by photographers, owed little of its supremacy to the merits of the English papers. Not merely was the actual support itself made abroad, but the home albumenising was certainly no better than, if as good as, the foreign; while as to the excited paper, the French makers took a lead some twenty-five years ago which was never afterwards wrested from them. The French papers generally yielded prints of good quality and always possessed better keeping properties than other brands. And so it is to-day. But, alas! the fate of the process is sealed, so that it would be bootless further to reproach our compatriots with their absence from the van.

That metallic silver, to say nothing of gold and platinum, must come to us from abroad, is nobody's fault; but why should so many of the prepared silver papers? It is true there are several excellent bromide papers of native make now on sale here, but how many would there be, we wonder, if an American company had not appeared a few years ago to push and popularise the process? The emulsion papers we use are all foreign—is there something so difficult in the manufacture of them that only Germans can master it? For the practical introduction of film photography our thanks are due to the stranger within our gates. What proportion of the cards we use are imported? and of other things, which, in the ancient phrase, are too numerous to mention? A glance round any large dealer's will show how much we are indebted to foreign producers for things in the manufacture of which we do not attempt to compete. A photograph produced at home may, as regards every one of its material constituents, have been entirely made abroad, and very frequently is, without doubt.

If we consider the share this country claims in erecting the various portions of the splendid edifice which modern photography now presents to the world, it is singular that at the present time we should be under so many obligations to those who, to say the least of it, have never long been abreast of us in the march of discovery for the wherewithal to produce the pictures we have done so much to render practicable. America was not the birthplace of bromide printing, and emulsion printing-out processes did not originate in Germany; these, of course, are only two of a number of cases that may be cited in evidence. The reasons for our backwardness in such things are plain enough, and yet they somehow carry a haze of inexplicability about them which blurs a comprehension of them. We have been assured by plate makers that foreign glass, especially in the lower qualities, is better than that made here at the same price, and that it is difficult to get emulsion gelatines at home as cheap and satisfactory to work with as the products of foreign houses; these, again, are only two cases out of many. Does this arise from inability or unwillingness on the part of home manufacturers to cater for their own market agreeably to its requirements, or from that beautiful British contempt of innovation, and neglect to move with the times, which the Consuls abroad are constantly denouncing in their reports?

But this is no essay on commercial lethargy, and still less a denunciation of foreign competition. We started to allude to the circumstance that many, perhaps too many, of the means we have for producing our pictures do not originate at home when there is really no valid reason to the contrary, and we trust our illustrations of the accuracy of what we allege have been forcible and instructive. Perhaps the hint thus given may be useful to those who love to lament that the manufacturing branches of photography are not what they were, so that by-and-by foreign made emulsion papers, as well as other photographic requisites, will be the exception and not the rule with us.

THE very considerable effect produced in photographic operations by small quantities of what are apt to be looked upon as inert substances is a very suitable subject for further research, and might lead to results of practical value. Experienced wet collodion workers, for example, are aware that a difference of one-tenth of one per cent. in the amount of iodide of silver present in a dipping bath is capable of influencing the quality of the resulting negative most materially. Again, all modern workers are familiar with the effect of a very minute proportion of bromide of potassium in the pyro and other developers. Many of the sulphates, chlorides, nitrates, citrates, and other salts are either believed, or have been proved, to possess special powers when added to the developer. For a long time past there

have been expressed doubts as to the action of sulphites in the developing solution—whether they did or did not interfere with its action in bringing out the effect of the fainter radiations. This is a point worthy of accurate investigation. The same also may be said as to the loss of a certain portion of its properties by dissolved pyro and sulphite after keeping. One fact in this connexion may be noted: Alkaline pyrogallol solution will, after being kept a little time, evolve a considerable quantity of carbonic oxide. Where a difficulty in finding subjects for papers for photographic societies is felt, we have here indicated one of real importance.

M. Cailletet, whose name is celebrated in connexion with the liquefaction of the "fixed gases," has lately communicated to the *Société de Physique* a process for soldering glass or porcelain to metals, which, as it may be of use in the construction of some photographic apparatus, we here note. He gives to the glass to be utilised for the purpose a thin coating of platinum in the first instance (or sometimes one of silver, the former metal being the best for the purpose). To do this he makes a mixture of neutral chloride of platinum and oil of camomile, and lays it, by means of a brush of spun glass, upon the portion of the glass to be utilised, and then evaporates slowly until the white odorous vapours have disappeared. Next, the glass is heated to dull redness, upon which the platinum becomes reduced to a brilliant metallic film; and upon this, when cold, it is easy to reduce, by electricity, a coating of copper, to which may be soldered another piece of glass, similarly treated, or any required metal. Soldering so performed resists the high pressures, upwards of three hundred atmospheres, employed in M. Cailletet's apparatus for gas compression.

It is an unpleasant but by no means uncommon experience of photographers, equally with others using electric-light apparatus, to find their watches going wrong, owing to partial magnetisation of the steel portion of the works. According to Mr. P. D. Richards, of West Medford, Mass., the effect can be remedied in an easy and simple manner. The apparatus required is simply a compound horseshoe magnet. This is placed erect, its poles uppermost, and a suitable support placed two or three feet above it, say a piece of lath supported by books on a shelf. From this support is suspended by a twisted thread a cardboard tray, on which is placed the watch to be demagnetised. When in position the supporting thread is allowed to untwist, and the watch gradually removed (by raising it higher and higher) from the magnetic field.

Landscape photographers are well aware of the great differences of power in light at certain seasons of the year, even when the action is noted at a uniform altitude of the sun. This is no doubt owing to atmospheric absorption or filtration of the actinic light, and some experience is needed to become thoroughly cognisant of the danger to correct exposure its presence causes. It appears that a similar uncertainty attends upon astronomical photography, Mr. Isaac Roberts, at a meeting of the Royal Astronomical Society, having observed that certain effects noticeable in one of his photographs he took to be evidence that the actinic power of a star's light varies greatly from time to time owing to atmospheric absorption due to causes not noticed by the eye. No visible clouds had been noted during the exposure, he stated.

Successful and wonderful photographs of certain nebulæ have been taken from time to time; but for purposes of parallax they are useless. Professor Holden, however, has ingeniously suggested that if a nebula be photographed with decided under-exposure its brightest portion only impresses itself on the plate as a point of light; this is perfectly measurable from surrounding stars, and as effectual when taken at suitable intervals as those photographs made from actual stars.

BORAX.

Borax, or biborate of soda, has in various ways conduced to the aid of the photographer. As a flux when reducing and melting down small quantities of the precious metals, and also as a means of obtaining aqueous solutions of shellac for print varnishing and other purposes, its value is well recognised, while not less so is its agency in the formation of toning baths for silver prints. It is believed, therefore, that a brief account of this valuable salt, showing how it is obtained, will prove of interest to our readers.

Borax occurs in nature in its crude state, and the chief deposits of it are found in North America, there being no less than ten marshes in that Continent. Of these deposits, five are situated in California, and five in the neighbouring State of Nevada.

The Californian marshes are at Saline Valley, Furnace Creek, and Armagosa, all in the county of Inyo, Slate range in San Bernardino County, and Lower Lake in Lake County. The Nevada marshes are at Rhodes, Columbus, Teels Marsh, and Fish Lake in the county of Esmeralda, and at Saltwells in Churchill County. By far the richest marsh is Saline Valley, a plain eighteen miles long by twelve miles wide. There the crude borax covers an area of over a thousand acres to a depth of from six to eighteen inches.

The borax is found mixed with sand, sulphate of soda, carbonate of soda, and other salts. The colour of the crude material as it lays upon the plain is of a peculiar greyish yellow, giving the surface the appearance of snow somewhat tinged by age. The material varies in richness from ten to ninety per cent. of pure borax.

Surrounding the plain is a complete circle of mountainous hills, with here and there a copse of mesquit, manzanita, or shellac wood. On looking over the dry and arid marsh towards the mountains, the traveller may descry small streams of pure, fresh water, affording not only a pleasant relief to the eye, but a great boon to those employed in the industry.

Saline Valley is situated on the eastern slope of the Sierra Nevada mountains, eleven miles from the Carson and Colorado railway line, and its topographical aspect is best described by comparing it to an immense oval dish.

The crude material is collected from the surface of the plain and dissolved in suitable pans with the aid of hot water, from which solution the pure borax crystallises; and when this has been completed, the salt is separated from the mother liquor and packed into sacks for commerce.

Borax now finds employment in no less than eighteen different industries, so remarkable are its different qualities. As a glaze it is utilised by earthenware, hardware, and textile manufacturers; as a meat preserver by pork packers and others in the provision trade; as a solvent by silk weavers, hatters, and timber workers; as a drug by pharmacists; and as a reagent by colour manufacturers.

REVIVALS AND OTHER MATTERS.

That "there is nothing new under the sun" has been reiterated times without number, and must be taken in its general, rather than its literal sense, patent as it is to everybody that things must have a beginning if they are to exist at all. In photographic matters, a process is generally definite and complete at an early date, and does not afford opportunity for *much* improvement in a comparatively short time after its introduction, that is, if it is accepted as a good thing, and becomes generally used. It is somewhat curious that why after the lapse of time, sometimes longer, sometimes shorter, part or the whole of a process is forgotten as though it had never existed, so far as any use is made of it. The reason why this forgetting takes place is somewhat difficult to explain, especially when a process is a permanent advantage, and of as much use in the present as when it was introduced, maybe years ago. Such is, however, indisputable, and a conundrum for somebody or other to solve.

I am induced to make these remarks in consequence of reading a communication made to the Edinburgh Photographic Society on an improved plan of printing from hard negatives. With regard to silver printing, as much was known about it a quarter of a century ago as there is now, and as good prints were made then as in the present day, perhaps with the advantage of greater permanence. Almost if not all the dodges and devices for making the best of a negative had been tried, to be approved or condemned according to their deserts, in a comparatively short time. The ultimate silver print required then as now the same qualities to render it perfect—brilliancy, softness, clear lights, and velvety blacks, qualities that will continue to be necessary till silver printing as a process ceases to exist. A certain result being required, it almost invariably happens more than one person will

endeavour to produce it by similar, if not identical means, without any idea that other minds have been working in the same direction.

It is fourteen or fifteen years ago, perhaps longer, that Mr. W. Brooks read a paper before the then South London Photographic Society on a method of improving negatives by the same device that Mr. McGlashan proposed to the Edinburgh Society the other day; there were some few modifications in its application that may now be found useful. In those days, as almost all negatives were made by the wet collodion process, and baths were apt to get out of order, the sky and water portion of the negatives suffered in consequence by developing too thin, or having defects that militated much against their beauty. As a remedy, Mr. Brooks proposed to print a silver print of a sufficient depth, according to the requirements of the negative, and then without fixing remove all that part of the print that did not require modifying by brushing over it a solution of iodine in cyanide of potassium, which entirely dissolves the silver image, leaving white paper. The print was then washed and attached to the *back of the negative*, and here is a slight difference in the two procedures, Mr. McGlashan sticking his prints to a separate glass. In those days a clean, clear sky was a *desideratum*. Natural clouds were the exception, not the rule, and the public were contented with white paper or a graduated tint. Some beautiful sky effects were produced about that time, and photographers began to see how much good clouds improved a landscape. Mr. H. P. Robinson produced some large landscapes with very effective cloud effects, and gradually the liking for blank, white, or tinted spaces gave way to the infinitely more artistic and beautiful natural clouds.

In the earlier days of photography, clouds were regarded as something especially difficult to secure even alone, but in conjunction with landscapes almost beyond possibility on any plate larger than stereo size, rapid exposures on large plates being rare, the average time for an ordinary well-lighted landscape being from fifteen seconds to half a minute. With such long exposures, estimated by our modern working, it was very rarely that clouds could be secured in any form save an indefinite blur, that instead of conferring artistic, had an undoubtedly detrimental effect on the picture. To remedy this, stopping out skies was universally practised, and Mr. Brooks's plan of a paper transparency was a very good one, especially in those cases where objects projected beyond the horizon into the sky. He also recommended it for the purpose of equalising the printing of hard negatives in precisely the same manner as advocated by Mr. McGlashan, but, if my memory serves me right, always attaching the print to the back of the negative, and not having it on a separate glass. The principal drawback was the extra length of time required in printing. Of course the print could be rendered more transparent by waxing or oiling, but it was apt to get dirty and discoloured in use, still further retarding the printing, when only the entire renewal of the mask would be an effectual remedy.

Gelatine negatives when hard are very much more difficult to deal with than wet collodion, *if only masking* is resorted to. The time required to print out a blurred window to get anything like the proper depth is generally so long, even in a good light, that it rarely gets done, rubbing the negative down with methylated spirit being usually preferred. The addition of a paper mask would, of course, slow it still more. To get over this retardation, a transparency on glass has been frequently substituted with good effect, one on celluloid would probably be better. The reduction of the negative itself by chemical means, when practicable, will save a deal of after trouble. The kind of plate used has a great deal to do with its after treatment. If a subject with strong and abrupt contrasts is taken on a *rapid* bromide plate, an interior, for instance, with windows in front, or an avenue of over-arching trees with a sunny distance beyond, it will be found that the exposure required for the dark parts is so much in excess of that for the light ones, that the light ones will be much over-exposed, and also partially or entirely reversed, so that no development or after treatment will ever make good a negative. There are so many stages between correct exposure and entire reversal, that with some plates hopeless flatness will set in long before thorough reversal takes place. In all instances of this kind neither rubbing down nor masking will make a good print.

A moderately rapid plate containing a fair amount of iodide is much the best for any work possessing great contrasts; in fact, I very much doubt if the best results *could* possibly be obtained with a rapid studio plate on subjects of this character. A white glass window may be thoroughly exposed in a small fraction of a second; the interior which it illuminates may require at least half an hour, or longer, to get a proper amount of detail in the shadows. The consequence is such hopeless over-exposure of the lights with the rapid plate that the negative is practically spoiled. I think the proportionate exposure between the rapid and slower plates is not nearly so great in the shadows as in the lights; consequently, a moderately dark object will show less difference in exposure than a light object will—in other words, the slower plate will give a very much more harmonious rendering than the rapid plate, and also be *very* much less subject to reversal under any circumstances.

That some plates are so much more prone to this fault than others suggests the idea that moderately rapid plates might be prepared that would not reverse, which, on the face of it, does not seem at all impossible. If staining the film with a yellow dye, after the plan adopted by the late Colonel Stuart-Wortley on his collodion plates, and out of which the colour was removed in development and washing, could be applied to gelatine plates *without detriment*, this advantage might possibly be gained, although some other reason than colour of the film seems to be the cause of reversal, as is evidenced by the recent investigation of Colonel Waterhouse, whose homeopathic doses of thiocarbamides induces the very effect we wish to get rid of.

EDWARD DUNMORE.

GAS PRESSURE GAUGES.

USERS of compressed gas cannot be without some means of ascertaining the amount of gas after use (or before an exhibition) that remains in the cylinder. How can this be done without running unnecessary risks? In the first place, if pressure gauges are used they must be of the very best make, with steel tubes on which the gas exerts its pressure and causes the indications to be shown on the dial; second, the gas must not be allowed to *rush* into the gauge; and third, the gauge must not be used alternately for oxygen and hydrogen or (its equivalent for limelight work) house gas. As regards the make, there are one or two names as makers that carry with them an assuring guarantee, such as Schäffer & Budenburg's; and recently a patent has been applied for, for an improvement or adaptation to these and other good gauges, by which the tube is filled with a fluid which is acted on by the gas, and consequently it is turned for the time being into an hydraulic gauge, and consequently no explosion from firing can take place. The maker is disposed to guarantee (from the experience he has already had with them) for a year, and probably, if they are all right for that period, they will be for some time longer, until they require refilling. Then as regards turning the gas on from the cylinder, there are so many of the screw-down valves that require a considerable effort to turn the key, and no matter how careful one is, the gas *will* rush in. A very good suggestion was made the other day as follows:—To turn on the gas *before* putting on the gauge, and turning it down to the speaking or singing point; it would then be an easy matter, after the gauge was made sound at the joint by screwing, to gradually turn on sufficient to indicate the proper pressure.

Then as to the use of a gauge alternately on oxygen and hydrogen cylinders; it has been recently stated by experts in a court of law that it is risky, and under certain conditions dangerous, especially if a portion of house gas (carburetted hydrogen) happens to be in the gauge. The carbon in this is apt to fire by compression in the same way as the particles of oil that were originally left in after testing the gauges would fire, and so cause the gauge to explode. This latter source of trouble is carefully attended to by the makers, as they are very particular now to remove all traces of oil before sending out on sale.

For those who would resort to some other means for ascertaining the amount of gas in a cylinder, there is, fortunately, another method available with oxygen gas, viz., by weighing it. The weight of oxygen is one pound for twelve cubic feet or thereabouts, the chlorate of potash oxygen being as near as possible that, while Brin's is, perhaps, a trifle lighter. It is, however, sufficient to know the weight of the cylinder empty, and then see the weight full, reckoning three cubic feet of gas for each quarter pound over the normal weight. Any convenient good balance scale will do; but as they may not be at hand when wanted, it is suggested a portable scale should be carried as part of the lecturer's outfit, and a London optician and well-known lantern maker is having a special spring scale ma e that shall be small and handy, and yet weighs from the smallest cylinder up to forty feet cylinders.

As regards the patent check valve, recently mentioned by one of your correspondents in the JOURNAL, it is thought by those who have given considerable attention to this subject, and experimented as well, that it would not be a safeguard in case of a sudden rush, although it might have some uses.

Hydrogen and house gas cannot be measured by weight; but as the amount of oxygen gas can be ascertained, and the two gases are generally used in the proportion of seven feet of hydrogen or coal gas

to six feet of oxygen, one need not sail too close to the wind and start an entertainment if the oxygen shows that the limit for the entertainment is reached. G. R. Baker.

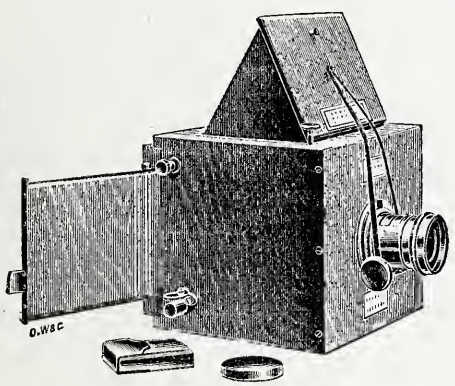
LOMAN'S REFLEX HAND CAMERAS.

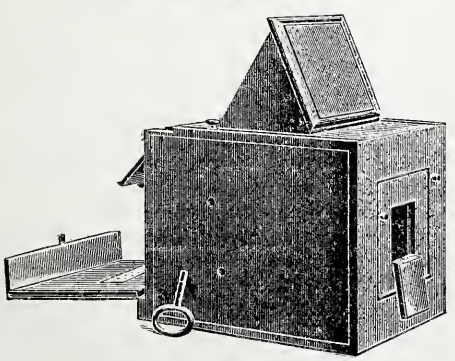
The leading idea in the Loman "Reflex" camera is the doing away altogether with a supplementary finder, and permitting the user to see on a ground glass on the top of the camera the image made by the lens exactly as it appears in nature.

This is effected by means of a mirror, hinged and placed at an angle of forty-five degrees to the axis of the lens, and, of course, in the body of the camera. The dark slide is placed at the back in the usual way, and is in register with the ground glass above.

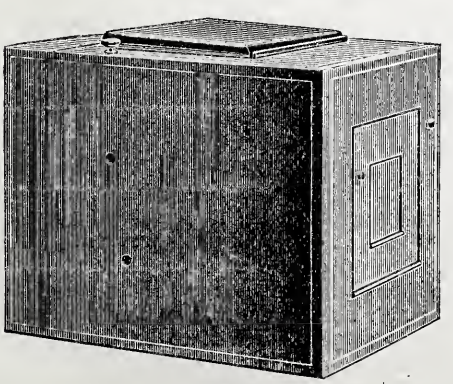
This system, as our older readers know, was first introduced by the late Thomas Sutton. M. Loman has his sensitive plate, when an exposure is about to be made, protected by a roller blind shutter placed immediately in front of it, and the eyes being kept upon the ground glass, and focussing being effected up to the last moment if necessary. The hinged mirror is then rotated to the requisite extent by a button or knob outside, by which it is quickly moved out of the way of the passage of light from the lens to the plate; but no sooner is this done than, by an automatic arrangement, the curtain shutter which shielded the plate from the action of the light is liberated and the exposure made.

We here present three different views of the camera, one showing it when closed up, the other two with the shade on the top thrown up so as





Open.



Closed.

to reveal the ground glass to the user. In one of these the lens is concealed in the body of the camera, while in the other it is placed outside.

What is claimed as being special advantages in cameras of this class is the seeing on the ground glass precisely what is to appear in the picture —no more and no less—and keeping an eye on the picture with the ability of focussing to the last moment. Messrs. Mawson & Swan, 33, Soho-square, W., who are the sole agents in this country for M. Loman, have shown us a considerable variety of these capital and ingenious Amsterdam cameras in various makes, and of several sizes, the leading idea in all being, however, such as we have here described. The workmanship is excellent.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—VIII.

Lecture by Mr. W. Hume.

For Saturday, January 3, the Executive Council determined to have and hold a musical evening, and accordingly arrangements were made with "The Western Choral Society" (a number of which body are also members of the Edinburgh Photographic Society) to hold a concert in the galleries as an additional attraction, but, according to the French proverb, "Men propose, God disposes," for the Board of Manufactures through their Secretary said *nay*, and they have entire control of the building in which the galleries are, notwithstanding the misleading title, Royal Scottish Academy's Galleries. The Board are custodians of the building for the nation, and can and do grant the use of the building for any public purpose of an elevating or artistic tendency, such as this photographic, or the recently held naval and military exhibition.

In the dilemma thus created, Mr. William Hume, a member of the Executive, was able at short notice to deliver to a crowded audience an illustrated lecture on the "Beauties of Perthshire," which comprised the exhibition, by the optical lantern, of upwards of fifty views of some of the richest gems of scenery in the country, and the lecturer did full justice to the fine quality of the slides with their historic importance, and almost always picturesque character. In addition, pictures of the Trossachs and about the locks of Tummel, Tay, and Earn, and Locks Katrine, Achray, and Lubnay, and many views of the water-courses and picturesque falls which end their course in these locks, were shown and admired. A recent trip to the Aberfoyle district of Perthshire by the lecturer enabled him to show much of the quieter beauty of the country, its thatched cottages, and home life, more especially in Rob Roy's country, which was fully illustrated, and thus admitted of many quotations from, and reminiscences of, Sir Walter Scott, who may almost be said to be the creator of the love of the picturesque in the Highlands of Scotland. It was a most successful exhibition, and passed over without a hitch.

Illustrated Lecture by Mr. G. G. Mitchell.

The popular lectures which have been inaugurated with this exposition seem to increase in interest and success as it reaches its close, which occurred on January 7. Mr. Hastie, A.S., occupied the chair on the evening of the 6th January, which was devoted by Mr. G. G. Mitchell to a descriptive lecture of "The Rhine from Cologne to Constance," and embraced about fifty excellent views of the scenery. They were of excellent quality, and the lantern arrangements, under Mr. W. Hume, perfect. One of the most prominent was a series of views of the great Cathedral of Strasburg, which allowed the more remarkable points in its long history, which extends from its founding about 1280 to its finish in 1880, to be noted. There are few things more remarkable than the continuance of its progress from the finished design of its first and only architect through that range of four hundred years, the original designs and drawings having been carefully preserved and worked out, a thing which can hardly be said of another Gothic Cathedral in Europe.

The more remarkable points were touched upon, and the beauties pointed out and demonstrated by the views taken from different points. The harmony of proportion is perhaps seen to the greatest advantage in the spire, which pinnacle is more than five hundred feet above the pavement, and whose elevation is one of the grand characters of its beauty. The massive base just terminates at that point where, if carried higher, it would become too heavy for the elevation, and it merges into the lofty, slender pyramid so delicately wrought that it hardly seems to be supported, and bearing almost to its pinnacle a profusion of mouldings and carved ornaments.

The Rhine was then ascended, and the more noted places on either bank placed in succession on the screen, to the appreciation of a crowded audience.

The paradise of Germany, as it is called, lies between Bonn and Mayence, rich in city, castle, tower, and fort traditions, and lavishly beautiful in all that human eyes hold beautiful in river scenery. With descriptions of the views of Rhineland and its wealth of legendary lore, the lecturer took full advantage, and here and there gave some of the stories, such as the Bishop tormented by the mice, the legend of the Lorelei Rock, and others, which combined to make up a very pleasant hour's entertainment.

Lecture by Mr. Alfred A. Murray, M.A., LL.B.

The subject chosen for this evening (January 5, 1891) by Mr. Murray was illustrative of a recent tour in Brittany, and had especial reference to the megalithic monuments of the district of Morbihan, which is situated in the north-west portion of the Bay of Biscay, in the district of Brittany. The series of views embraced many of the architectural remains which occur so plentifully there, street scenes in the villages, and their picturesque peasants and fishermen; but the special feature which was

given most attention to was the many views of the great and small standing stones, the stone circles, and the cromlechs, for which the Celtic corner of France is celebrated. The lecturer gave his idea of the possible origin of these and similar structures in Britain, such as Stonehenge, Stennis, and other archæological remains of a like kind. The audience filled the hall, and testified their appreciation by frequent rounds of applause. The lecturer received the thanks of the Society after his successful exposition.

Close of the Edinburgh Photographic Exhibition.

The last day of the Edinburgh Photographic Exhibition showed one of the best attended of the whole season, over 1000 people having attended; and in the evening the Assistant Secretary (Mr. Roddick gave the) finishing hour with the lantern, which, like all the others, was fully attended and the views much appreciated, but the feeling that it was the closing evening was evidently over all. After the lantern exhibition a final hour was spent among the pictures, those which had gained the awards naturally coming in for a full share of attention. The galleries closed at ten o'clock without any formal ceremony. Perhaps the rumour which had gone abroad that financially it was not likely to prove a success tended to put somewhat of a damper upon the spirits of those present. Anyhow, it must be stated as a fact that the simultaneous occurrence of so many bazaars for charitable and other purposes, and the extensive railway strikes and consequent wholesale dislocation of traffic, must have operated very seriously by using up people's spare cash on the one hand, and by preventing the usual inflow of excursionists during the holiday season. There has been no public statement by the Executive, but it is generally believed that the loss will amount to about twenty-five per cent. of the guarantee fund, so that it will not after all be anything serious.

SOME HINTS ON PHOTO-MICROGRAPHY.

[Read at the Photographic Club, January 7, 1891.]

It is not my intention to inflict on you a long dissertation on the subject of this evening's discussion, but merely to put my remarks in a more coherent form than I should by simply stating them in a conversational form; and in opening them I wish to direct your attention to one point in which I am personally interested, nor do I wish to claim for myself more than my fair share in the revival of the science of photo-micrography. Those who, like myself, are familiar with the progress of microscopical investigations, and have watched and followed their elucidations, have been familiar with the splendid work of Drs. Woodward and Draper in America, and Drs. Beale and Maddox in this country, done in former times. I am speaking now of between thirty and forty years ago, when work was accomplished which, for clearness of definition and amplification, cannot in our days of elaborate apparatus be surpassed, and that in the face of those physical difficulties which optical science has done little to overcome.

These difficulties are with us to-day, and in the nature of things must ever continue. I fear it was the appearance of these difficulties which discouraged many in the practice of photo-micrography; nevertheless, many continued in the practice of what must be always a fascinating branch of photography: but whatever was done by different workers in it was not published during the last twenty years, at least to my knowledge, and it seemed to have reached its ultimatum, and was well-nigh dropped out of sight.

All who study histology must have felt, as I did, that the diagrammatic engravings illustrating books on minute anatomy and on physiology very inadequately, if not incorrectly, represented the organs and tissues of which they treated, and from this dissatisfaction on my part I resolved to see if a more correct delineation could not be accomplished by photo-micrography. I therefore set to work, and having only limited means (or if I had had the means no suitable apparatus was at that time forthcoming) I made a very primitive, homely "rig up," for I can designate it by no other name, and succeeded so far that I showed my results to others whom I thought might be interested microscopically, who at first endeavoured to show me that it would never work, others had tried it and given it up as hopeless; but I did not coincide with their views, and, determined not to be deterred in my convictions, I persevered, and produced more correct representations of tissues than found in any text-books on histology extant at that time.

My example and my results stimulated others to try what they could do, and by demonstrations and exhibition of my poor prints at different scientific societies others were induced to take up the practice, infected by my example, and soon the revival was in full swing, till now the medical journals contain, in almost every issue, photographic representations of pathological specimens. So far I am greatly satisfied with the progress made since my first paper on this subject appeared in The British Journal of Photography in 1883. Photo-micrographs will henceforth give a more definite view of tissues than was ever the case before; they will, however, never supersede the microscope and microscopical observation, for however highly magnified, however clearly defined they may appear, none of them will stand examination with an ordinary magnifying glass; they can but indicate to the student the general appearances to be looked for, and will be fairly accurate representations drawn by the pencil of light, and free from any bias on the part of the draughtsman. They will also be accomplished in a much shorter time than can be done by the camera lucida, besides containing also all the elaborations of the most complicated tissue, which fairly defies the capabilities of the most painstaking and careful draughtsman.

To produce these results certain conditions must be observed, which experience on my part, as well as on that of others, has fully confirmed. Perhaps the most important is that *the photo-micrographic apparatus must be absolutely steady and free from the very slightest vibration.* There are very few houses in London or any other great town which are sufficiently stable not to be influenced by persons moving about in them, or that are not slightly shaken by tremors arising from the passing traffic, and therefore this tendency to vibration must be neutralised by selecting an operating room in the basement, on as solid a foundation as it is possible to procure. Next, the apparatus itself must be strongly constructed, that no unsteadiness exists in its constituent parts. It must be fixed on a firm baseboard, so that whatever slight vibration may arise will be communicated uniformly throughout the whole system of light, microscope, and plate. The baseboard must also be placed on some elastic support.

Various devices have been adopted to accomplish this by different workers with whom I am familiar. One hangs his apparatus on strong indiarubber rings, suspended from strong iron supports let into the wall of his operating room. Another places blocks of indiarubber as feet under his baseboard; others have put bags of cotton wool under. I find that a bundle of journals placed under each end of the baseboard, while firmly and steadily supporting it, serves to break any vibration that may arise, and, notwithstanding many sources of local disturbance, my results show very little, if any, evidence of vibration. Having overcome this difficulty, the next disturbance may arise from another source. Light your lamp, and accurately focus your object, and let things remain for ten minutes; then look at your object. It will now appear blurred and considerably out of focus. This arises from the expansion of all the metal parts of the apparatus from the heat of the lamp. Now focus your object again, and in another ten minutes examine it, when probably it may remain as sharp as when you first arranged it, and no further expansion will take place the rest of the evening.

The next precaution to be observed is that the light is accurately centred. This is most important, as upon this depends that freedom from diffraction without which it is hopeless to look for sharp definition. The plan to be adopted is simply to put on the microscope a low-power objective, say, a one-inch or one-and-a-half-inch focus, and if a diaphragm with a very small stop is attached to the condenser in the substage, rack the microscope out till the image of the stop occupies the centre of the focussing screen. This may be done by altering the relative position of the lamp to the condenser, but is more perfectly done if the condenser has adjusting screws attached to it. I find that having done this with a low power, if that is superseded by one of a higher grade, such as a one-third or one-fifth, the first centring is only approximate, and a further adjustment is required; but this is more easily done, having had the previous rough adjustment. Too much attention cannot be paid to this point, especially with the use of the higher powers, as any errors in illumination existing with the lower power would be exceedingly exaggerated when employing anything higher than a one-third of an inch focus.

In photographing with the lower power objectives, *i.e.*, from 1½ in. down to 4 in. focus, a great evenness of illumination will be derived from the use of a ground-glass screen interposed between the lamp and the substage condenser, the ground surface of the glass being placed next to the subject to be photographed. This glass acts as a radiant, and serves to diffuse a soft, even light all over the field of view, without perceptibly increasing the length of the exposure. It is well to mention this, as many who may feel inclined to take up photo-micrography would do well to begin with low powers before proceeding to high-power work.

Having attended to these three primary considerations, there remains one other which can only be overcome in two ways—I allude to the difference between the visual and actinic foci of the lenses. This difference exists to a greater extent in the lower powers, but also is found in those above one-fifth, but not in so marked a degree. I

seldom use any objective lower than a one-third, but with this and upwards I always find it advisable to withdraw the object to a slight, *but very slight*, appearance of fuzziness after I have obtained the maximum of sharpness; even then I cannot be always sure of my success, but in the majority of cases this will be found sufficient.

The makers of some objectives for this work have corrected them for the actinic foci, this is especially remarkable in the apochromatic lenses constructed at the present day, and which but for their high price would be most invaluable to many in the practice of this art; and it makes one regret that the necessity for economy prevents the acquisition of such important appliances.

Having, therefore, a steady apparatus free from vibration, a due regard for the expansion of the microscope by heat, a correctly centred beam of illumination, and a corrected objective, the practice of photo-micrography may be said to be reduced to the easiest conditions.

A few words might be said upon such subsidiary subjects as the proper preparation of the subjects to be submitted to this process, such as the flatness of the object and its proper staining; but as some specimens are to be passed through the lantern by way of illustration, the consideration of these subjects might be reserved for some future occasion. I will explain the slides as they are passed through, only asking you not to be hypercritical in your judgment, for I can truly say with Martial, "You cannot say harder things of my trifles than I have said myself of them."

T. Charters White.

RECENT PATENTS.

APPLICATIONS FOR PATENTS

No. 194.—"The Use of Photographic Transparencies in connexion with Mirrors." W. H. Forshaw.—*Dated January* 5, 1891.

No. 352.—"Improvements in Photographic Cameras." J. B. King and J. Bickle.—*Dated January* 8, 1891.

No. 402.—"A Magazine for Storing and Changing Photographic Plates." J. E. Thornton.—*Dated January* 9, 1891.

No. 443.—"Improvements in and appertaining to Cameras carrying their own Plates, and in the Arrangement of Plates therefor." R. Fowler.—*Dated January* 9, 1891.

No. 525.—"Improved Means and Devices for obtaining Optical Projections in Natural Colours." T. R. Dallmeyer.—*Dated January* 10, 1891.

PATENTS COMPLETED.

New or Improved Means of Exposing a Succession of Photographic Films.

No. 1715. Marshall Arthur Wier, 3, Palace-grove, Upper Norwood, Surrey.—*December* 13, 1890.

My invention relates to that class of photographic camera where a number of sensitised films are exposed one after the other without the use of dark slides.

It consists of a rectangular receptacle or film box for the purpose of holding the films.

To change the films after exposure, I cause the exposed film to travel from the front of the receptacle to the rear thereof, and in order to cause this action to take place I employ rollers, which are suitably placed on the film box or receptacle. The rollers may be placed thus:—One on the front, one on the top, and one at the rear side of the film box.

The front roller is a spring roller, on to which a band or ribbon of suitable material is wound a few times, the other end of the band being attached to the rear roller. On the front of the film box is placed a moveable or sliding frame, against which the edges of the films are caused to press by any suitable means.

When the film, after exposure, is to be removed to the rear of the film box, the front frame is first pushed up. This action brings one edge of the film into position between the front roller, the band, and the middle or top roller, and upon turning the rear roller, by means of a suitable handle, the band is wound upon it and the film is drawn up over the top roller and down into the rear part of the film box, the spring roller rewinding the band back again upon releasing the hold upon the handle.

Instead of the top roller a half-round fixed piece may be employed.

By means of the roller and band arrangement the exposed films may be drawn to any other place or position in the box by suitably adjusting their relative positions.

The above arrangement may be fitted into a box to form a hand or detective camera, or it may be formed into a separate narrow box, so that it may be used in a similar manner to the well-known roller slide.

Improvements in Enlarging Cameras.

No. 2023. Walter Griffiths, Highgate-square, Birmingham, Warwickshire.—*December* 13, 1890.

My invention has for its object improvements in enlarging cameras, by means of which I am enabled to enlarge to any extent, upon either glass or paper, from an ordinary negative, in a simple, quick, and effective manner, by daylight or with an ordinary lamp, and without the necessity of working the camera in a dark room.

In carrying my invention into effect, I form the enlarging camera with an oblong body or box, preferably square and open at the ends, and formed of any such suitable material as wood, metal, stout millboard or strawboard; but I prefer to form it of either of the two latter, the ends being in that case strengthened with wood bands. At the one end I fix the carrier in which the negative is placed, the lens being placed in the centre of the body, and is so constructed and framed in a sliding partition that it may be moved backwards and forwards within the body at the will of the operator. At the other end I provide an end which telescopes within the body, in which a dark slide, consisting of a frame with back and shutter, and having a plain glass fixed therein, which is provided so that either sensitive paper or glass can be used as required, and which at the same time registers a position for correctly focussing the plate by the use of a smaller piece of ground glass, which is hel l against the clear glass in the dark slide until the proper focus has been obtained by the telescope movement, after which the sensitive glass or paper is inserted in the place of the ground glass, in which position, it will be understood, it is exactly the same focus as the ground glass used for the purpose of focussing.

The action of using my enlarging camera is as follows:—

I insert the negative in the carrier with the film towards the lens, draw the shutter, take out the back of the dark slide, and adjust the lens partition and slide part until the required focus is seen upon the glass in the dark slide. To move the lens partition I remove the cap from negative end, which then admits the hands, after which I focus accurately by placing the square of fine ground glass against the large piece of clear glass about midway between centre and edge in any direction. I then charge the slide with the sensitive paper or plate in the dark room with its face next the glass, replace the back, and see that the shutter is closed, afterwards inserting the slide in the camera and exposing according to circumstances.

My improvements, therefore, consist in the particular arrangement and construction of the various parts, as well as the use of the clear glass in the dark slide, the whole forming a compact, portable, and cheap enlarging camera, easy of focus, and capable of being worked in the light and with an ordinary lamp.

[We presume that Mr. Griffiths's invention really consists in the special material of which his enlarging camera is constructed; that is to say, wood, metal, or millboard in contradistinction to a bellows body.—Ed.]

Improvements in Photographic Cameras.

(A Communication from Hugo Thümler, of 82, Potsdamerstrasse, Berlin, in the Empire of Germany, Manufacturer.)

No. 9715. Alfred Julius Boult, 323, High Holborn, Middlesex.—*December* 13, 1890.

The object sought to be attained in devising this improved photographic camera is to combine the greatest possible economy with the advantages of a camera capable of being folded together in a compact form so as to occupy a minimum of space when stored up for subsequent use or transport.

To obtain this result the camera is preferably made solely of paper and cardboard. A bellows of cylindrical shape, made of, preferably, black paper impervious to light, is folded in the same manner as is usual in the manufacture of Japanese lanterns. Into one of the folds a cardboard disc is inserted and suitably fixed by means of paste, &c. In the centre of this disc is fitted an ordinary landscape lens.

A few folds of the bellows remain free in front of the disc, and the front end of the bellows is pasted on to a square plate or sheet of cardboard in such a manner as to prevent the admission of light at the joint, and in the centre of which sheet of cardboard is provided a circular aperture for the admission of light. This wall fulfils the purpose of a blind or shutter for the object glass.

The opposite end of the bellows is also closed by means of a square sheet of cardboard pasted or otherwise attached thereto, so as to shut out all light at the joint. This sheet or plate is externally provided with a cardboard frame, the thickness of which should be somewhat in excess of the usual thickness of the glass plates used for emulsions, and to the other surface of this frame another plate or sheet is secured. Both the cardboard sheets at the inside and outside of the before-mentioned frame are provided with corresponding central openings, preferably of circular shape, whose size is proportioned according to the space the image is to occupy upon the negative plates. A square dry plate is inserted through the upper opening in the before-mentioned frame into a dark space provided for the purpose between the two last-mentioned sheets. The upper end of the outer sheet is extended so as to form a cover or lid, which carries on its inner side a piece corresponding to the portion which is wanting in the side of the frame, which side piece, when the said cover or lid is lifted, grasps the upper edge of the dry plate so as to hold the latter in position.

To prevent access of light to the dry plate when the camera is exposed to daylight, a narrow lid of a suitable fabric or strong paper is placed upon the front edges of the cardboard sheets, while a piece or cover suspended from the said narrow lid is placed against the rearmost sheet, which is made smaller on the sides and its lower edge than the frame and the sheet at the inner side of said frame. This deficiency is supplied by strips provided on the sides and the lower edge of the cover, which strips thus effectively shut out the light around the sheet. Two indiarubber bands attached to the rear of the cardboard sheet are passed over the cover at its top and bottom parts respectively, whereby the dry plate is securely locked in position.

The bellows has a tendency to remain in its central compressed position, so that when it is extended beyond this normal limit it exercises a spring action upon two stops diagonally fixed by means of flexible ties, preferably of fabric, each to one side of the front of the camera, and compresses the same between the sheets front and back of the camera.

These two stops consist of cardboard strips, and are of such length that when it is desired to obtain sharply defined photographic impressions they extend the camera exactly to the required extent.

When, upon opening the lids, and at the back of the camera, a ground-glass plate is inserted in lieu of a dry plate, the photographic impression received by

the camera may be inspected through the wide opening in the rearmost sheet. For the purpose of throwing light upon the emulsion plate a lid or door is arranged in front of the opening in the front plate, and adapted to be raised and lowered as desired.

To enable the camera to be readily moved from place to place all the lids are closed, and the before-mentioned stops are disconnected and swung about their flexible hinges and laid flat against the front plate.

The bellows is then compressed and attached to the rear of the door which is at the back of the camera by means of an indiarubber band, the whole being thus made to assume a compact form. The rubber band, passed over the front sheet or plate across the stops, and across the door or lid at the front of the camera, also serves to secure the latter in position, and the whole camera being by such means reduced to a portable size, may be easily carried about in the pocket or otherwise.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 19	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 20	North London	Wellington Hall, Islington, N.
,, 21	Bury	Temperance Hall.
,, 21	Hyde	
,, 21	Manchester Camera Club	Victoria Hotel.
,, 21	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 21	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22	Burton-on-Trent	The Institute, Union-street.
,, 22 ...	London and Provincial.....	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JANUARY 13.—Ordinary meeting.—Captain W. de W. Abney, C.B., in the chair.

Messrs. G. Scamell and F. Ince were appointed auditors of the Society's accounts, and Messrs. F. Ince, Chas. Sawyer, E. Clifton, J. Désiré England, and J. R. Gotz were named scrutineers for the election of officers for the ensuing annual meeting.

A copy of Dr. Emerson's work, *Wild Life on a Tidal Water*, was received.

It was announced that the Progress Medal had been awarded to Colonel J. Waterhouse, B.Sc., of India.

Mr. E. W. MAUNDER, F.R.A.S., delivered an address on *Photography Applied to Astronomy*, illustrated by a very large number of photographic slides projected by the Society's lantern. He premised his remarks by observing that he should have nothing to say about developers or sensitive plates, or anything technical belonging to the art of the photographer. He proposed to give a mere account of what photography has done for astronomy, and he should begin with photography of the sun, as that was its first serious application in astronomy. He commenced by showing drawings of instruments used—the Dallmeyer photo-heliograph used at Greenwich, and that of De la Rue. The first photograph was that of a sun-spot taken November 18, 1882, which was by far the largest spot ever photographed at Greenwich, and occupied an area of 3,500,000,000 square miles. It was noted that when this spot was at its height magnetic disturbance was very violent, that a brilliant aurora was visible, and that a severe magnetic storm occurred, interrupting the signalling at many telegraphic stations. A photograph exhibiting much finer definition was next shown of a spot occurring on June 5, 1885, taken by Janssen at Meudon. The next slide was of American production, showing the granulations and faculæ near the edge. Slides from charts followed, and then, after one taken at Granada, came several of the corona taken in 1878, 1882, and 1886, which were, however, composition photographs, printed from negatives variously exposed, so as to show gradation both in the high lights and where the illumination was weakest. A direct photograph of the corona of January, 1889, was also shown, as well as one of the corona of December of the same year. The first photograph of a comet was that taken by Janssen on June 30, 1881. There had been no success in that direction before that time, but it was speedily followed by a series of instructive photographs of the comet of 1882 taken at the Cape of Good Hope by a local photographer with the instrument placed at his disposal by the chief of the observatory there. About the same time the brothers Henry, of Paris, were working with an apparatus, the drawing of which was thrown on the screen. A set of photographs of double stars taken by them was then shown, illustrating the relative magnitude and varying positions of these bodies. A chart of a portion of the Pleiades, prepared by Wolf in 1874, containing nearly a thousand stars, was then shown. It had occupied about three years in making, and the slide was followed by another of the same subject, but photographed direct from the heavens by the brothers Henry with an exposure of three hours, which was more accurate than the hand-drawn chart, and contained many more stars. The photography of nebulæ was then gone into, and it was pointed out that in one case a nebula was discovered by photography, and their formation was materially explained by photographs which had been taken. In Mr. Isaac Roberts' photographs the effect of varying exposures on these bodies was very remarkable; and in a photograph by Mr. A. A. Common short exposure had given no nebulosity, where a long one had given it very clearly. Some photographs were shown of the planets Jupiter and Saturn taken by the brothers Henry, and at the Lick Observatory on Mount Hamilton; and then followed a series of six photographs of portions of the lunar surface from the latter observatory. A set of photographs of the nebula of Orion by Mr. Roberts, with exposures of from three seconds to six minutes, was thrown on the screen, followed by some of Mr. Common's, exposed from one minute up to one hour. A very instructive photograph of the nebula of Andromeda, taken by Mr. Roberts, of Liverpool, was shown in comparison with the best drawing of the same subject that had been previously made. In the drawing there were rifts the meaning of which had not been understood, but the photograph showed these rifts as part of a special convolution, and so gave a key to the formation of the nebula. A slide by Mr. Roberts of a field in Cygnus was shown containing 32,000 stars. Spectroscopic photography was next discussed, and the apparatus for comparing the solar spectrum with that of various metals was shown. Professor Vogel's apparatus at Potsdam was next put upon the screen, and the use of spectroscopic observations for showing the advance or retreat of stars was described, illustration being taken from the work done by Professor Vogel. Higgs, of Liverpool, had executed the most beautiful photographs of the spectrum yet seen, and portions of it, showing the lines with marvellous distinctness, were shown on the screen. In connexion with Mr. Common's photographs, it was mentioned that he worked with a reflecting telescope, first with a three-feet and then with a five-feet speculum.

Discussion being invited, Mr. W. E. DEBENHAM inquired whether, in astronomical photography, it had been attempted to use accessory exposure of the plate. In cases where it was desirable to get out more faintly illuminated objects than would otherwise be developed such accessory exposure might be employed. It would of course be necessary to test the plate carefully, and give it an ascertained amount. One of the comet photographs taken at the Cape illustrated the possibility of getting more out by subsidiary exposure, as where there was a faint light over the sky from the comet the stars were more numerous than on the rest of the plate.

Mr. MAUNDER thought that astronomers had for the most part been satisfied to give longer exposure to get out faint illumination.

Mr. J. SPILLER inquired whether orthochromatic plates had been employed in astronomical photography. He thought that different results from those on ordinary plates would be obtained.

Mr. MAUNDER said that no doubt that would be so to some extent.

A gentleman present said that Mr. Common was now experimenting in this way, using orthochromatic and ordinary plates on the same subject.

The CHAIRMAN thought there would be very little difference between orthochromatic and ordinary plates unless a yellow screen be used. With regard to what Mr. Debenham had said, if preliminary exposure is given the plate cannot be properly compared with another which has not received such accessory exposure. He was very pleased to notice that Mr. Common's reflector telescope had done such excellent work, and thought it a great mistake on the part of the Paris Congress to insist on the use of refracting telescopes for the photography of the general chart of the heavens.

Messrs. W. Barry, John Collier, Captain J. H. Cowan, H. Dixon, Rev. H. B. Hare, G. Strickland, S. C. Weston, W. Window, and Charles Winter were elected members of the Society.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 8,—Mr. W. E. Debenham in the chair.

In connexion with the removal of the Association to its present abode at the "Champion Hotel," Aldersgate-street, where arrangements permit of a library being formed, Mr. E. W. Parfitt presented a large bookcase, and the thanks of the meeting being rendered, the CHAIRMAN said that donations of books, each of small value in comparison with the bookcase, would now be acceptable towards the formation of the library.

Mr. A. COWAN said that as it had been suggested at the previous meetings that sulphurous acid was the active agent in preserving developing solutions when sulphite of soda was used, he had made up a solution of eikonogen, five grains to the ounce, and one grain of metabisulphite of potash. A portion of this he had set aside, and it discoloured in four minutes. Another portion had had one grain of sulphite of soda added to the ounce, a third had two grains of sulphite, a fourth four grains, and a fifth eight grains. Of these mixtures the only one that remained clear after standing for a night was the last named, *i.e.*, that containing eight grains of sulphite of soda to the ounce.

Mr. F. C. KELLOW inquired whether any member could give him an idea of the time of exposure necessary to give a lantern plate in the camera when copying from a negative with paraffin illumination.

Mr. H. STURMEY had tried some commercial lantern plates in this way with a light of about sixty candle power, and after five hours' exposure had got no image.

Mr. H. COWAN said that plates sold expressly for lantern-slide making were generally very slow. He had burned eighteen inches of magnesium wire close to the condenser for making lantern slides with the lantern, and found the exposure not enough. With eighteen grains of magnesium, used in a flash in the same way, he got no image at all.

Mr. PARFITT inquired whether lantern plates were slower than bromide paper.

Mr. COWAN replied that they were very much so.

Mr. F. A. BRIDGE said that with fairly rapid bromide paper enlargements could be made with the oxyhydrogen lantern in fifteen or twenty seconds with a suitable negative, but that it depended so much upon the colour of the negative that nothing was more deceptive than to judge of the time required by the apparent density without allowance for colour.

Mr. T. E. FRESHWATER said that in reducing it was best not to use the condenser, as there was a spot of light showing behind the lens. It was far better to illuminate a white surface.

It being a lantern night a large number of subjects were then shown on the screen, including views in Epping Forest, by Mr. P. Everitt; scenes of market life and rural subjects, by Mr. J. S. Teape; some examples of hydroquinone-developed slides, by Mr. T. E. Freshwater; of collodio-bromide, by Mr. C. H. Cooke, and a set by Mr. J. J. Briginshaw. There was also a set of one hundred slides sent for exhibition by the American Lantern Slide Exchange, and the thanks of the Society were tendered to that body for sending them, and to Mr. Sturmey who brought them.

Mr. COWAN commented upon the excellent mode of packing adopted with these slides; the grooving was of indiarubber, and there was a felt pad at the top and bottom of the box—precautions which ought to ensure the safety of the contents.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 6,—Mr. W. Bishop in the chair.

The subject for the evening was *Night Work*, by the HON. SECRETARY, with demonstrations in copying, lantern-slide making, and enlarging. The demonstrator had brought with him the portable apparatus for working by gaslight, the construction of which has been fully described in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1891. In his prefatory remarks the Secretary stated that, like many other amateurs, the principal time which he could devote to their attractive art-science was at night, for during the summer months nearly every spare moment of daylight had to be devoted to outdoor work in the shape of making negatives, and then, thanks to bromide, Alpha paper, lantern plates, opals, &c., one was enabled, with proper apparatus, to convert these negatives into positives, which should be "things of beauty and a joy for ever." But in addition to the negatives made during the summer months there were many other pictures from books, and from old engravings, &c., which one wished very often to convert into lantern slides, or transfer to opals, &c. This wish could be gratified with very rough arrangements, but very early, in working by gaslight, he had found that if one wanted to work in comfort, and be ready at any time to copy a picture, to reduce a negative of any dimensions to lantern size, to print upon an opal, upon bromide or Alpha paper with certainty as to light and exposure, or to enlarge a picture to any required size, even though one did not possess a condenser large enough to cover the negative to be enlarged, it was necessary to construct an apparatus which would answer all these purposes, and bit by bit the arrangement before them had grown, until now he would be enabled to show them that in a very few moments he could convert this apparatus to any and all of the purposes which one might require to work at by night, and which, when done with, could be easily folded into a small compass and packed away in a corner. Some might say that this apparatus was not by any means original, but all he could say was that long before any apparatus for working by gaslight was brought before the public he had been using a somewhat similar contrivance to that which they saw before them, and some might remember a set of slides which he had exhibited to the Society more than a twelvemonth since, and stated at the time that the negatives and slides had all been made by gaslight. The demonstrator then proceeded to describe his arrangements piece by piece. An engraving in black and white was soon placed in position for copying. A large and deep frame was also shown, in which either a book of any thickness, an albumenised print, or an opal, centred by means of a set of mats, could be placed for copying. It was shown how the two gaslights, one on either side, could be arranged so that the grain of the paper would be destroyed, the picture equally illuminated, and all ghostly shadows and reflections avoided. With two minutes' exposure the print was converted into a negative. A number of negatives made in the apparatus were then handed round, as were also the lantern slides made from them. The apparatus was then soon arranged so that lantern slides could be made from any sized negative, the light being given by a large reflecting lamp containing a gas burner for focussing by, and in which a foot of magnesium ribbon gave sufficient illumination to convert the negative into a well-exposed slide. A negative was then placed into position, the enlarging bellows arranged in front, and by means of the same lamp a well-illuminated enlargement was soon thrown on the screen. The arrangement was then described by which this screen could be raised or lowered by the turn of a screw, or moved to the right or left so that the picture might be conveniently in position. A printing frame was then shown in which a negative could be placed upon a sheet of glass, and by means of a mask cut to lantern size a plate was placed in position. This frame, the demonstrator showed, could be hung upon one side of the apparatus, and the gaslight being brought within the necessary distance and raised or lowered to give the required amount of light, this distance and the light would remain the same, and thus a certainty of exposure could be got upon paper or lantern plate which could not otherwise be obtained. A lantern slide was then made upon one of the new Ilford plates for black tones, from a half-plate negative, by contact and half a minute's exposure to the burner well turned down. The Secretary said he preferred, especially for thin negatives, to work with a small light. This slide was a success, giving clear glass and sufficient density with the new hydroquinone developer recommended by the Company. A number of slides made upon these plates, both by contact and in the camera, were then handed round and greatly admired; as was also a small enlargement upon one of Fry's opal plates.

The CHAIRMAN said that the means of lighting adopted by Mr. Clarke was doubtless the only true method for illuminating pictures by gaslight, and although others had adopted similar means, he knew that the Secretary had been working upon these lines for a long time past, and no doubt, as time went on, he would make further improvements, not so much in the principle as in the arrangements of the apparatus, which would make it even more useful than it was at present.

Several questions were then asked by the members and answered by the Secretary.

The next meeting of the Society will be on January 20, which will be a Members' lantern night.

WEST LONDON PHOTOGRAPHIC SOCIETY.

THE annual exhibition and *conversazione* of the West London Photographic Society was held at the Broadway Lecture Hall, Hammersmith, on January 9 and 10, the President (Mr. W. A. Brown) occupying the chair.

The exhibition presented a very attractive appearance, the entire wall space available being covered with pictures, the frames being set off by a background of rich dark-blue cloth. Upwards of two hundred frames were hung, there being a marked general improvement over the work shown at the last exhibition. The room was tastefully decorated with various coloured draperies and choice specimens of dried grasses. Light refreshments (provided by the President) were served during both evenings, that department being under the management of Miss Annette Browne, Mrs. Blackmore, and Mrs. John Hodges. An excellent musical programme was provided, which contributed in no small degree to the success of the evening.

The PRESIDENT, after formally opening the proceedings, said that upon the occasion of the last exhibition they were favoured by the attendance of the judges, who, in a few kindly remarks by way of criticism, gave the members much useful information; unfortunately, the judges could not make it convenient to be present that evening, therefore he regretted very much that the members would not have the opportunity of benefiting by their comments. He congratulated the Society on the number of the pictures exhibited, and hoped one result of the exhibition would be to induce others to join the Society.

The HON. SECRETARY (Mr. John A. Hodges) then read the following report of the judges:—"We, the undersigned, having examined the photographs exhibited at the West London Photographic Society, award as follows:—Silver medal: No. 48, *Crypt, Canterbury Cathedral*, Charles Whiting. Bronze medal: No. 5, *A Nocturne*, L. C. Bennett. Bronze medal: No. 7, *Where Duty Calls*, G. F. Blackmore. Bronze medal: No, 24, *Near Rockford, N. Devon*, John A. Hodges. Bronze medal: No. 31, *Black and Silver*, Dr. F. H. Low. Bronze medal: No. 41, *The Distant Sea*, Harry Selby. Bronze medal: No. 69, *A Snow Scene*, C. Winter. Bronze medal: No. 50, *Drying the Nets, Whitby*, J. Wilson. We have also examined the lantern slides sent in for competition by projection on the screen, and award as follows:—1st, Bronze medal: *Hoar-Frost Study*, J. E. Kellow. 2nd, Bronze medal: *Waiting to Embark*, J. A. Hodges. We have much pleasure in expressing our gratification at the more than usual merit of the exhibits generally; at the same time we should liked to have seen more figure studies, the photographs sent in being to a large extent topographical. Speaking of the exhibits generally, the selection of the point of view in the landscapes is exceedingly good. We further consider that it is gratifying to see that albumenised silver printing is becoming a thing of the past with the members of the West London Photographic Society. (Signed) J. GALE, J. B. B. WELLINGTON, THOS. CLACK."

Dr. F. H. LOW, in proposing a vote of thanks to the judges, said the establishment of tradition in a young society appeared, no doubt, a very desirable thing in the minds of those who had asked him to undertake the duty, for it was his good fortune to be placed in a similar position last year. That the thanks of the members were due to the judges for performing what was agreed to be a difficult and invidious task, no one would doubt, especially when it was remembered that in their report they referred to the "unusual merit of the exhibits." Their praise, however, was a little discounted by speaking of the landscapes as being of a "topographical nature." The word was, no doubt, a very good one, and had been much used of late by certain critics; but in this instance he (Dr. Low) thought it was not quite the word which was intended.

Mr. G. F. BLACKMORE, in seconding the motion, said the judges must have had a very difficult task in deciding upon the prize pictures, the average merit of the exhibition being higher than it had ever been before, and he could not help feeling that it was extremely creditable to the West London Photographic Society to bring such a fine collection of pictures together.

The motion was carried unanimously.

Mr. CHARLES WHITING wished to supplement the Chairman's remarks by thanking the Hon. Secretary and the Exhibition Committee for the very excellent way in which they had performed their work. A glance round the walls must convince every one that the pictures could not have been hung to better advantage. He confessed that at one time he did not think the room very suitable for an exhibition, but he was very agreeably surprised to see the marvellous transformation which had taken place.

The motion, having been seconded by Mr. GEORGE LAMLEY, was carried.

Mr. CHARLES BILTON then proposed a vote of thanks to the ladies and gentlemen who had contributed so much to the success of the evening by providing a musical programme, which was carried unanimously.

On Saturday evening the proceedings were brought to a close by the exhibition in the optical lantern of the competition slides. The two prize slides were first shown, Mr. J. E. Kellow taking first medal with a very beautiful rendering of hoar-frost, the second medal being awarded to Mr. J. A. Hodges (Hon. Secretary) for a pretty figure study, *Waiting to Embark*. Among the other sets sent in, those of Messrs. Whiting, Scanlan, Rogers, and Wilson were of a high order of merit. A loan collection of prize slides made from Mawson's plates were then exhibited. Some views in Norway, by Paul Lange, and other views by prominent slide makers in the Liverpool Society, were then shown, the entertainment being brought to a close by the exhibition of Mr. Charles Whiting's fine and well-known series of Canterbury Cathedral and Stratford-on-Avon.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

ANNUAL General Meeting.—Mr. J. Humphries, F.S.A., in the chair.

Mr. G. R. Martin resigned the secretaryship, and Mr. E. S. Paul the treasurership.

Alterations in the rules were made by which the title was changed from the North Middlesex Photographic Club to the North Middlesex Photographic Society, and the membership of the Council was enlarged from eight to twelve.

The following officers and members of the Council were elected:—*President:* Mr. J. Humphries, F.S.A.—*Vice-Presidents:* Messrs. W. T. Goodhew and H. Walker.—*Curator:* Mr. F. Piper.—*Council:* Messrs. C. Beadle, H. Beckett, F. Cherry, T. W. Cox, C. Gill, T. C. Lathbridge, W. A. Lavanchy, G. R. Martin, J. C. S. Mummery, F. L. Pither, J. Saville, and H. Smith.—*Treasurer:* Mr. J. W. Marchant.—*Hon. Secretary:* Mr. J. McIntosh, 14, Lowman-road, Holloway, N.

HACKNEY PHOTOGRAPHIC SOCIETY.

JANUARY 8,—The President (Dr. Gerard Smith) in the chair.

Mr. Dean showed some prints on Alpha paper with tones ranging from red to blue.

Mr. BARTON asked what experience had any of the members of Shew's adapter.

The PRESIDENT said he had used one, but had suffered by having fogged plates.

Mr. BECKETT said he thought a large stand would be necessary.

Mr. A. MACKIE then gave his demonstration of the collodio-bromide process. Prefacing his demonstration with a short history of the process and its discovery, he made the working of it clear to the non-workers of this charming process. After coating a plate, he proceeded to expose it, for about one second, by magnesium ribbon, and develop it by a modified alkaline developer, and fix by ordinary fixing bath. He further illustrated the process by explaining the composition of the emulsion, method of preparing it, &c. Lantern slides made by this process were shown on the screen, which were the work of Mr. Mackie and Mr. Hume. The slides in question, before being put through the lantern, were first warmed to prevent their being broken by the heat.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

AT a meeting of the Photographic Section of this Club on Friday, January 9, Mr. A. W. CLAYDEN, M.A., read a short paper upon the use of black glass mirrors for the photography of clouds. The method has been known theoretically for some years, but is practically new. It consists in having a camera mounted so that it can be easily moved in either a horizontal or vertical plane, and can be clamped in any position. A rectangular block of wood is fitted around the lens close behind the hood, so that it can be rotated with moderate friction. To this block some brass arms are attached which support a mirror of black (not blackened) glass cut to a true flat surface. This mirror makes an angle of thirty-three degrees with the optic axis of the lens, and can be turned round the lens by rotating the block of wood without changing that angle. With this attachment the author had experienced no difficulty in securing good photographs of the most delicate cloud structures. The camera was exhibited and also a number of lantern slides made from negatives taken with it. Mr. Clayden concluded with an appeal to the photographers present on behalf of the British Association Committee on Meteorological Photography, of which he is the Secretary, explaining the scientific importance of the work, and soliciting their co-operation.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

SIDCUP, January 7,—The President (Mr. Andrew Pringle) in the chair.

The usual business having been gone through, Mr. Pringle then presented his silver medal to Mr. E. J. Crowe for a very fine set of twelve lantern slides; and the Society's silver medal for best paper read before the Society to Mr. J. Reeves, won by him after a very keen competition. The remainder of the evening was spent in a lantern exhibition.

Next meeting will be held at Bexley, January 21.

ENFIELD CAMERA CLUB.

JANUARY 7,—The President (Mr. D. G. Pinkney) in the chair

The PRESIDENT read a paper on *Eikonogen*, and afterwards gave a practical demonstration with this developer as compared with hydroquinone. In the course of his remarks Mr. Pinkney said he had found with an under-exposed plate eikonogen certainly brought to view some details which hydroquinone was apparently unable to do, and he produced for inspection two of Thomas' extra rapid quarter-plates which had received identical exposure, namely, two-thirds of a second, at 2.50 p.m. on December 20 under a dull sky. At first sight it would appear that the hydroquinone-developed plate was superior, because it had such vigorous black in the high lights and almost clear glass in the shadows. The eikonogen-developed plate, however, was of a grey colour, and, while the sky was quite dark enough for printing purposes, there was undoubtedly more detail in the shadows than in the other negative. At the same time he remarked that the exposures having been purposely cut short in order to test the pretensions of eikonogen as the developer for a really under-exposed plate, it must not be inferred that hydroquinone was the inferior of the two; indeed, his opinion was decidedly the reverse.

Mr. Pinkney then proceeded to develop before the members two of Thomas' lantern plates, two Ilford special lantern plates, and two pieces of Eastman bromide paper, with eikonogen and hydroquinone, the conditions being precisely the same as regards exposure of the plates and papers. It was clearly shown, first, that eikonogen was much slower than hydroquinone; and, second, that eikonogen produced a thin veil on lantern plates (which clearing would not remove) which was entirely absent with hydroquinone. The black tone on the bromide papers produced by hydroquinone was much preferred by the members to the cold grey by eikonogen.

A number of slides by members were then exhibited in Mr. James' lantern, kindly lent by him, and a flash-light picture of those present was taken by another member, Mr. R. F. Lodge.

MANCHESTER PHOTOGRAPHIC SOCIETY.

DECEMBER and January meetings.—The meeting on the 11th of last month was presided over by Mr. Alan Garnett, the President, who announced a special extra prize in connexion with the exhibition of members' work.

Mr. F. EDWARDS opened a discussion on *Hand Cameras* by a paper, and described and exhibited a camera of his own design and construction. He strongly advocated this form of apparatus for holiday work, as it was much more convenient than the tripod form of camera when travelling, and the results taken on small plates or films when enlarged formed pleasing reminiscences. He showed a number of pictures, half-plate size, enlarged from $3 \times 2\frac{1}{4}$ film negatives, which, though not possessing extreme sharpness, were both bright and effective.

Mr. Edwards's camera was considered a very compact and practical piece of apparatus, a special feature being the automatic release of shutter when sky shade or lens cover was raised.

Mr. Bebbington exhibited his patent detective or hand camera, which is adapted to take different forms of film or plate holders or slides, and contains a special means of changing plates from exposing slide to storing chamber.

Mr. H. M. Whitefield showed a hand camera made by himself to take the Burnett dark slides.

The "Presto," a cheap camera, which seemed capable of all claimed for it, Tyler's guinea camera, and several earlier forms of the "detective" class, were shown by members.

Mr. W. T. WILKINSON, the well-known authority on photo-mechanical printing, very fully described the collotype process, and gave a demonstration of the method of working as far as was practicable.

Mr. W. B. WOOD made some interesting remarks on collodio-bromide, and exhibited some transparencies made that evening from emulsion made in 1879, and though no particular care had been taken with the emulsion, and it had been often exposed to light during the last ten years, the results were all that could be desired in a lantern slide. Mr. Wood, by general request, offered to look up the formulæ and give further particulars at another meeting.

AT the meeting on January 8, with Mr. A. Heywood, jun., in the chair, a report on the recent successful exhibition was read and the judges' awards announced. These, with the exception of one for enlargements, recently appeared in the JOURNAL.

The prize for enlargements was awarded to one by Mr. F. Edwards, a 15×12 bromide picture from a $3 \times 2\frac{1}{4}$ Eastman's film negative of a view near Ullswater, taken with a hand camera.

Mr. W. B. WOOD, in compliance with his promise made at the previous meeting, gave full particulars and demonstration of his method of working the collodio-bromide process for lantern slides. He said he had been unable to obtain a sample of guncotton as good as that which he used ten years ago, and the recent severe frost had prevented him making a number of experiments he was desirous of doing. Full particulars of Mr. Wood's method of preparing the emulsion appeared in the JOURNAL some years ago; but he had since varied it a little, and promised to rewrite and include any fresh knowledge he had since gained.

The remainder of the evening was occupied by experiments with the flash light, different methods of producing the flash being employed in photographing groups of those present. The interest of the meeting was kept up until a later hour than usual.

LEWES PHOTOGRAPHIC SOCIETY.

JANUARY 6.—At the Fitzroy Library, High-street, Lewes (where the future meetings of the Society will be held).—The President in the chair.

Mr. A. E. Venn was elected a member.

The evening was devoted to an exhibition of over two hundred lantern slides.

An exhibition of members' work, with lantern entertainment and concert, will be held on the 28th inst.

On February 3 a paper will be read by Mr. A. H. C. Corder on *Printing Processes.*

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

AT the first meeting of the year of this Association the business consisted of a motion that lady amateurs be admitted members, and a second proposition that the Nottingham Camera Club be invited to join the Association.

It was decided to set apart a whole week for the production of lantern slides of local views for exchange with kindred societies.

Mr. Henry Cooper, "The Towers," was elected a member.

The special meeting having closed, Mr. S. Wells (President) took the chair at the smoking concert with which the members inaugurate the new year. Mr. Woodhouse presided at the piano. Altogether the evening was most pleasant and enjoyable, and augured well for the success of the Association.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

JANUARY 8,—Mr. B. J. Taylor in the chair.

It was announced that the winners of the President's prizes were as follows:—1st prize, Mr. E. Beck, *With the Morning Tide;* 2nd prize, Mr. Thos. Hibbert, *Cloud Effects.*

The SECRETARY reported that the Vice-President (Mr. A. Davy) had given 2*l.* 2*s.*, and Mr. Draper a bronze shield, to be given in prizes as the Council should decide; and also that the Rotherham Photographic Society intends holding an exhibition on February 10, and asks for loan of pictures and lantern slides.

A resolution was passed instructing the Secretary to write Mr. J. A. Hodges, London, to offer the support of the Society to endeavour to get the same concessions from the railway companies which are now enjoyed by the fishing clubs all over the country. After which, Messrs. Hibbert and Furniss gave a two-man lantern exhibition.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.

JANUARY 13,—The President (Surgeon-Major Foster) in the chair. *Photography* prize lantern slides were exhibited.

TORQUAY PHOTOGRAPHIC ASSOCIATION.

JANUARY 13.—A paper on *Platinotype* was read by Mr. George Edwards. Afterwards several successful experiments in development were made.

ENFIELD CAMERA CLUB.—The first annual exhibition of photographs will be held in the Lecture Hall, Chase-side, Enfield, on Saturday, January 31, from three to six p.m., and from half-past seven to ten p.m. The exhibition will be opened by Captain H. F. Bowles, M.P. There will be on each occasion an optical lantern entertainment and a selection of vocal and instrumental music.

Correspondence.

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

THE PRIMULINE PROCESS.

To the EDITOR.

SIR,—Some months back you referred to certain experiments you were making with this process. I should be glad to know whether you know anything about a developer for green or blue, as Mr. Bevan, I think, stated in a paper that he read some time back that in developing a green the process passed to that colour through blue? Can you also tell me why, when trying eikonogen, I get a dirty green, and not a black? I have not had time to repeat this more than twice, but the result was the same each time.

Do the patentees really want diazotype to become much used? I went to New Cross-square to Bevan & Cross, and was shown some prints, and found that the smallest quantity I could obtain was half a guinea's worth. Such a charge is outrageous for one who wants merely a sample to try a new and untried process. Fortunately, I knew my way about better than that, and eventually obtained half an ounce each of all the necessary chemicals, including primuline, at an expenditure of about 4*s*. The only substance I have not yet obtained is the beta-naphthol di-sulphonic acid. Can I prepare it myself?—I am, yours, &c., AMATEUR.

[Eikonogen gives "ink black" tones, as we pointed out when we first published the fact of this agent acting as a developer in the primuline process—the colour exactly matching such ink as we had in use in our office, but some misunderstanding seems to have arisen in several quarters in consequence of Messrs. Green, Cross, & Bevan having in their subsequent recommendation of this developer described the colour simply as "blue." (*Jour. Chem. Ind.* 1890, p. 1001). It is certainly not blue in any ordinary and unqualified sense of the word. Some approximation to a green may be produced (*a*) by the successive action of eikonogen and phenol developers, the first used not being allowed to complete the reaction; (*b*) the simultaneous action of the above; (*c*) similar use of eikonogen or orcin or resorcin. Possibly our correspondent's "dirty green" tint may be the result of using an insufficient amount of the developer, and not having washed in soap and water afterwards, as we recommended. We know nothing of the intentions of the patentees, but as a general thing inventors of processes desire to encourage experimenters, in the hope that their work may lead to new or more expensive uses. Primuline, and all the other chemicals used, are sold at the Atlas Chemical Works, Hackney Wick, by Messrs. Spiller & Co.—ED.]

SHUTTER SPEED FOR MOVING OBJECTS.

To the EDITOR.

SIR,—The figures for which your correspondent, Mr. Hutchinson, asks are:—(1) $\frac{1}{377}$ sec.; (2) $\frac{1}{188}$ sec.; (3) $\frac{1}{120}$ sec. I send only the results, presuming that you do not care to have the details.—I am, yours, &c., CLIFFORD E. F. NASH.

Glenfall Lawn, Cheltenham.

To the EDITOR.

SIR,—I enclose a calculation which will, I believe, fulfil the requirements in the query of Herbert A. Hutchinson in your issue of the 9th inst.

Let x = distance of image from lens (*i.e.*, focal length) in feet;
y = ,, object ,, in feet;
d = amount of movement of object permissible in feet;
v = velocity of object transversely to axis of lens in feet.

Assuming that the amount of movement of the image on the plate permissible is $\frac{1}{100}$ inch, that is, $\frac{1}{1200}$ foot, we have

$$\frac{d}{\frac{1}{1200}} = \frac{y}{x}. \qquad \therefore\ d = \frac{y}{1200\,x}.$$

Now, $\frac{v}{d}$ = the number of times the object traverses the permissible distance in each second.

∴ Time lens may be uncovered (speed of shutter) =

$$\frac{1}{\frac{v}{d}} \text{ sec.} = \frac{d}{v} \text{ sec.} = \frac{y}{1200\,xv} \text{ secs.}$$

Examples:—

If $x = 8''$ ($\frac{2}{3}$ foot), and $y = 10$ feet, and $v = 4\frac{1}{2}$ feet per sec.,

then Speed of shutter $= \frac{10}{1200 \times \frac{2}{3} \times \frac{9}{2}} = \frac{1}{360}$ secs.

If $y = 20$ feet speed $= \frac{2}{360} = \frac{1}{180}$ sec.

If $y = 30$ feet ,, $= \frac{3}{360} = \frac{1}{120}$ sec.

With many shutters very little effect is produced on the plate during the periods near opening and closing, and it is probable that the minimum time of exposure in such cases might be one-fourth or one-third more than the above without producing visible blurring.—I am, yours, &c., W. GROVES.

Etheldene, Melford-road, Forest-hill, S.E., January 12, 1891.

KALLITYPE.

To the EDITOR.

SIR,—We are sorry to notice that in page 744 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC you have given a previous formula for kallitype developing solution. We enclose you a copy of the instructions that have been in use for the last six or seven months.—I am, yours, &c., J. LEWIS & CO.

99 *and* 100, *Gladstone-road, Sparkbrook, Birmingham.*

[The following are the new formulæ:—

DEVELOPING SOLUTION.

Nitrate of silver	50 grains.
Citrate of soda	1 ounce.
Bichromate of potash	1 grain.
Tap or rain water	10 ounces.
Ammonia, ·880	½ drachm.

Dissolve the nitrate of silver in about an ounce of the water, and the citrate of soda and bichromate of potash in the remainder, and mix. Add the ammonia, and filter.

This solution is very cheap and very easy to make, but those who prefer to do so may purchase from the manufacturers developing salts to make ten ounces of solution, post free, for 1*s*. 3*d*. Be careful to obtain pure, neutral citrate of soda.

WASHING SOLUTION, No. 1.

Kallitype developer	½ ounce.
Citrate of soda	2 ounces.
Tap or rain water	20 ,,

To be returned to bottle after use, and used over and over again as previously described.

WASHING SOLUTION FOR BATHS NOS. 2 AND 3.

Citrate of soda	1 drachm.
Ammonia, ·880	2 drachms.
Tap or rain water	1 quart.

—ED.]

SWING FRONTS AND SWING BACKS.

To the EDITOR.

SIR,—Some time ago THE BRITISH JOURNAL OF PHOTOGRAPHY was quoted as an authority against me by one of the best London camera makers, as I insisted on having the front of a 12 × 12 camera to swing; and seeing you have once more made the assertion (in note to a correspondent last week) that a swing front is no use in working, perhaps you will allow me to say that my experience, as well as my knowledge, attest to me that when the camera is tilted upwards to a high building, unless the front be swung parallel with the back when brought to a vertical position, not only will the perspective be vitiated, but the foreground will be out of focus? Of course you could sharpen it up by a smaller stop; but, then, what if you dare not use a smaller stop? Take a street view with a surging crowd and a high-domed building, using a shutter set to one-twentieth of a second, stop *f*-16 or 20, with front merely raised, but with back parallel to building. Then try again on same subject with front swing parallel with back and see for yourself the appearance of things.—I am, yours, &c., J. PATRICK.

Edinburgh, January 12, 1891.

[Quite correct, good friend; but if you consider a little farther you will perceive that the arrangement described is really the equivalent of placing the camera level and raising the lens by its sliding front to a considerable height. This is a very excellent system where it can be done; but it necessitates the employment of a lens that can cover sharply a much larger plate than the one in use, as its axis may perchance have to be placed, in an extreme case, opposite to the upper margin of the plate. Subject to this, the system recommended is excellent, and is employed by many experienced photographers, including Mr. F. York (probably the most experienced of all). But with a lens that covers but little more than the plate in use the swing-back and tilted-up lens are necessary. It is a case in which both sides are right. Indeed, we ourselves often employ a McKellan camera and a Watson's "Acme"—both of which often lend themselves admirably to the arrangement—in both ways.—ED.]

"SUN ARTISTS."

To the EDITOR.

SIR,—I really am at a loss to understand "the cause of our offending," but our fifth number, issued with absolute honesty in the effort to "show a Catholic appreciation of good work," appears to have made you forge

the honourable part you have played in the history of photography so far as to hit below the belt. We are, however, so well supported by the great body of educated critical opinion that we can afford to ignore an attack of this kind.

I have already pointed out to you (see my letter in your issue of November 28, 1890) that our treatment of Mrs. Cameron's pictures has been identical with our treatment of pictures reproduced in all our other numbers; that in seeking these pictures for reproduction we went to the fountain head, Mrs. Cameron's son, who holds the copyright, and that these reproductions are identical with those shown some months ago at the Camera Club in all respects except process and size.

Notwithstanding the fact that these statements have never, to my knowledge, been controverted, you now refer in an editorial paragraph to our reproduction of the head of Sir John Herschel as a "stippled-up copy," that would receive Mrs. Cameron's "unqualified condemnation were she now alive," and, regardless of grammar, throw a doubt upon the genuineness of Mr. Cameron's collection. Although I am entitled to receive a satisfactory reply to my last letter before proceeding to investigate any further charges, I cannot resist taking this opportunity of asking you to produce your evidence that the portrait of the late Sir John Herschel now being exhibited in the Edinburgh Photographic Exhibition was printed from the original negative and is "absolutely untouched," and this being satisfactorily settled, what reason you have to suppose that Mr. H. Cameron, *as owner of the copyright*, furnished our engravers with any other than such untouched original.—I am, yours, &c.,

W. A. Boord, *Hon. Sec.*, "*Sun Artists*."

7, *Temple-chambers, Temple-avenue, E.C., January* 8, 1890.

[Nay, we never "hit below the belt," nor can we find in our critique on *Sun Artists*, a semblance of anything that could warrant such an imputation. We expressed sorrow that for the sake of an estimable periodical an essay containing many offensive phrases occupied its hitherto admirable pages, and stated that, with that exception, the work maintained its high position. But we gave a specimen, extracted *verbatim et literatim* from the essay in question, of what we deemed, and still consider, offensive phrases, such as that in which the writer, Dr. Emerson, spoke of the 1865 exhibition of the Photographic Society of Scotland (the judges in which had failed to discover in Mrs. Cameron's works merit equalling a picture by H. P. Robinson, for which a medal was awarded): "Had Mrs. Cameron been well advised she would never have entered for these contemptible exhibitions; the judges were incompetent, her competitors beneath contempt, and her public uneducated." Does Mr. Boord endorse this kind of language? He refers to educated critical opinion as supporting his periodical, and encloses that of the *Saturday Review*, in which it is stated that *Sun Artists* "contains admirable plates illustrative of the wonderful skill of the late Mrs. Cameron." It is no reflection on the originality of the *Saturday Review* (which, by the way, is not universally considered to be a judge in matters photographic) to say that the above opinion appeared three weeks after we had written that "the illustrations surpass in technical excellence those of her works which we had seen printed in silver from the original negatives," and that "the engraver has done his part of the work well.' And does Mr. Boord consider the following, which we extract from the number of *Sun Artists* under contention, as a specimen of "educated critical opinion?"—"Adam Salomon is a *petty modeller* beside her, and Rejlander is a *mere mechanic* when compared with her." (The italics are ours.) It is true that Dr. Emerson, in the same page of his essay admits that Mrs. Cameron "was in no way original," and "a great artist she was not." With respect to any question as to the precise difference between Mrs. Cameron's original pictures and modern reproductions, we were quite familiar with the former (including the head of Sir John Herschel) at the time of their first exhibition, and it is that knowledge that warrants us in instituting any comparison that may have been made. But Mr. Boord himself has made a statement from which we are justified in assuming, if so inclined, that a certain something has been done to the originals, for he twice asserts that Mrs. Cameron's son "holds the copyright." Mr. Boord, as editor of an art and literary periodical, must surely know that there are *no copyrights* in the original actual works of Mrs. Cameron; these expired some years ago, and any one is at liberty to copy them and make *his productions* copyright. Is this the nature of the tenure of Mr. Cameron's present copyrights to which Mr. Boord makes reference? It might with more justice have been construed as hitting below the belt had we spoken of several of her pictures *not* published in *Sun Artists*, some of which elicited much ridicule at the time, such as the conversion of children into "angels" by affixing a goose's wings to their shoulders and then photographing them, or others of which Dr. Emerson is himself compelled to speak of as "trivialities," "a little unreal, noisy, and lacking dignity," "a theatrical air which makes it poor art," and so forth. Dr. Emerson, speaking of her works, also says, "Unfortunately many of them suffer from retouching and working up." All this we did *not* do, but all this has been done by Dr. Emerson in the very number of *Sun Artists* under contention. Concerning the letter alluded to as having appeared in our issue of November 28, it is for Mr. Mansfield to reply to if he considers it necessary.—Ed.]

"NOTES ON REVERSALS."

To the Editor.

Sir,—I am glad to see that my short article in the Almanac has had the desired effect of inducing some one with time and means at their disposal to experiment with Obernetter's process.

If Mr. Bedding looks up your contemporary, the *Photographic News*, for about the time I indicated, he will find the process is the subject of a leading article.

If he will also refer to one of the accounts of the Crystal Palace Exhibition of 1889 in The British Journal of Photography, he will find that some enlarged negatives produced by this method were exhibited, and were, as far as I can remember, described as being "bright and clear."

Mr. Bedding makes a joke over the quality of plate required. Those used by Herr Obernetter were of his own manufacture, I believe by a peculiar process. I am also inclined to think that it is not so much the maximum of silver which is required as the maximum of gelatine. Mr. Gotz is agent for Obernetter's successors, and I believe he could enlighten us on the subject.—I am, yours, &c., Francis T. Beeson.

15, *Bradiston-road, Maida-hill, W., London, January* 12, 1891.

SELLING PHOTOGRAPHIC BUSINESSES.

To the Editor.

Sir,—The veil of anonymity adopted by the writer of a letter appearing in your last week's issue may perhaps be sufficient to shelter from an action for libel, but there are some data given that point out the case he refers to as one in which I was consulted by the vendor as to the acceptance of terms proposed by the purchaser of the business that had been sold; and, if so, the representations now made are so far from being facts that some statement should be permitted in contradiction. First, the amount of business had been, allowing for ordinary percentage of bad debts, what was stated of it, considerably over 1000*l.* per annum. That it did not continue to be so in fresh hands, with different methods of business and style of work, will bear an obvious explanation. The statements as to fraudulent entries, "to make the affair look important," are untrue. If they were true, the fact that books had been inspected would not have sufficed to induce the legal advisers of the purchaser to advise him that he had no claim. An ugly light was, however, thrown upon the action by the persistent efforts of the purchaser's representatives to induce the vendor to forego some portion of the balance of the purchase money due, on the pretext that their client had not the means to fulfil his engagements, so that the vendor would fail to get substantial redress, although he got a verdict. The vendor, however, was prepared to have the case fully gone into in open court, and declined to yield to this attempt at beating down of the agreed purchase money, and settlement was made by the purchaser on the basis of withdrawing all imputations and paying the balance in full. If the case had been such as described by "C. M.," the Law Courts would, as mentioned by the editor, have been ready to set aside the purchaser and condemn the vendor in costs.

Audi Alteram Partem.

ANOTHER CAUTION.

To the Editor.

Sir,—I can quite agree with your correspondent "C. M." as regards swindling transactions connected with the sale of a photographic business, that unless the vendor is a man of means it is worse than useless to take proceedings at law; it is far better to make the best of a bad job and put up with the loss. I can speak from experience, as I had the misfortune to purchase a business (?) of the "Gentlemanly Vendor" after a full inspection of books, &c., which had been faked up for the purpose of representing genuine business, the system being to tout the whole district by complimentary tickets, presenting sitters with copies of various size photographs, and entering such as good business. It is almost impossible to get these unsuspecting accomplices to give evidence in a court of law, as they object to be mixed up in such an affair.

In my case I threw over the books and negatives and commenced work afresh, which I found a very uphill game, the "Gentlemanly Vendor" being in debt all over the place; but I succeeded and met with sympathy and support.

I believe the "Gentlemanly Vendor" has another "business" on the stocks, in fact it is his "special line."—I am, yours, &c., S. R. B.

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the Editor.

Sir,—May I again claim a little space to remind your operative readers of the meeting to found the above trade union? It will be held on Wednesday evening next (21st inst.), at eight o'clock, at the Polytechnic Institute, Regent-street, London, W. Mr. Thomas Bolas, of Chiswick, will

preside, and will be supported by Mr. R. W. Baxter (President Lithographic Artists, London), Mr. A. Anning (Photo-Zincographers' Union), Mr. R. Wallace (Clerks' Union), Mr. W. Parnell (Alliance Cabinet Makers), Mr. H. Snowden Ward (Editor *Practical Photographer*), Mr. W. B. Moore (Lithographic Artists, Manchester), Mr. J. Brown (Photo Cabinet Makers' Union), Mr. G. J. Nield, and others.

A word to the employers. Our motto is "Defence, not defiance;" we are ready to clasp hands with our friends wherever they may be found, and we invite and expect the co-operation of good masters in our efforts to defend the worker from unscrupulous and worthless employers.

I specially invite artists, printers, studio and dark-room assistants, lady assistants, and photo-process workers to the above meeting. Bills may be obtained from me on immediate application.—I am, yours, &c.,

Maidstone. ARTHUR FIELD.

SHARPNESS.

To the EDITOR.

SIR,—I have read with interest the various opinions as to Mr. Davison's picture, but I have not seen that any one has noticed what I did. When I looked at it from the same distance from which I viewed the other pictures I quite agreed with all that had been written against it; but before leaving I went to have another look, but was not able to get close, and to my surprise, being just the distance to avoid seeing the texture of the paper, the picture appeared as sharp as it need be, while the *sharp* pictures were quite indistinct. I think, therefore, that while for prints to be mounted in albums or for portfolios sharp pictures must have the preference, but for large pictures for framing, Mr. Davison's plan has a decided advantage. I cannot see an ordinary sharp print correctly at a greater distance than twenty-four inches.—I am, yours, &c.,

Silvermere, Woodberry Down, N., January 7, 1890. D. W. HILL.

PENNY FERROTYPE PORTRAITURE.

To the EDITOR.

SIR,—The automatic machines have been in existence here at Brighton for some months. Two are situated on the Promenade at the Aquarium. I have seen several dozen pictures—about fifty per cent. are passable. The worst feature is, the picture comes out of the machine wet, and, as a consequence, the public, in picking them out of the drawer, leave an impressive "thumb mark." Since November the machines have been covered up in sackcloth, as the moisture, I believe, condenses on the lenses during the winter months, from what I have noticed. An assistant gives his attention frequently between the two machines. I also am informed another has been fitted up at the "Hotel Metropole," King's-road. —I am, yours, &c., MORA.

P.S.—Size of picture, ordinary postage stamp.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the EDITOR.

SIR,—Will you kindly allow me to inform our numerous members and friends, through the medium of your JOURNAL, that we have just been presented with a handsome bookcase by one of our members (E. W. Parfitt, Esq.)? We now desire to fill it with photographic literature as speedily as possible, and I am requested by the Council to state that all gifts of books, &c., for that purpose will be most cordially acknowledged if addressed to us at the "Champion Hotel," 15, Aldersgate-street.—I am, yours, &c., R. P. DRAGE, *Hon. Sec.*

95, *Blenheim-crescent, W., January* 12, 1891.

THE FORTHCOMING INTERNATIONAL EXHIBITION AT VIENNA.

To the EDITOR.

SIR,—The letter from an "English Photographer" in your issue of January 2 calls for a few words of explanation from me.

First of all, the official communication signed by Mr. Srna, the President of the Club, as published in the various journals, contained nothing whatever but :—"Sir,—Appended I have the pleasure of giving you a list of the gentlemen who will form the jury at the International Exhibition to be held here next spring ——," and then followed the list, without one word of comment. At the same time another person altogether sent you some remarks on the composition of the jury and on the members of it. Of this latter Mr. Srna was completely unaware till he saw it in print, having nothing whatever to do with it, either directly or indirectly.

Again, your correspondent has quite misunderstood the remarks in question. The gentleman who asked me to send you the notice assured me at the time that any comparison with other juries applied only to Continental ones, and that on the Continent no photographic exhibition has hitherto had a jury of painters and sculptors, and that the Vienna jury will be different.

Here photography has always been looked down upon and so it was thought, and rightly, that if the first painters and sculptors would act as jurors, that in itself would show people here that they do not share the prejudice commonly entertained by Continental artists against all photography. For that reason it was thought that the exhibition would assume an importance unsuspected till it was known that non-photographic artists would form the majority on the jury. In England there are many men well acquainted with art in photography, some of them having written abiding works on the subject; but here the number of such people is far more limited. But then if photographs are works of art, why should they not be judged by men who have made a life-long study of art?

I must most energetically protest against the totally unwarranted assumption that the remarks on the jury as apart from the mere list of names and callings proceeded from the Committee. In future your correspondent would not do his own reputation any harm if he obtained some little evidence before rushing in print to accuse an honourable body of men of pride and prejudging.

It is infinitely to be regretted that we have not the original wording of an "*English* Photographer's" letter that has evidently been tampered with by some foreigner, which has led to a curiously rare and delicious uniting of idioms.—I am, yours, &c., ENGLISH AS SHE IS SPOKE.

Vienna, January 8, 1891.

Exchange Column.

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

I will exchange Chadwick's oxygen gas generator, in good condition, for backgrounds or studio accessories.—Address, J. K. TOWNSEND, 197, Mansfield-road, Nottingham.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, April to December, 1888 January to December, 1887, for lantern slides or accessories.—Address, ARTHUR Kirkintilloch, N. B.

Will exchange a fifty-two-inch bicycle, ball bearings, lamp, and all fittings, for a half-plate or 5×4 camera, lens, and stand, complete.—Address, L. GREENWOOD, Grove-place, Friendly, Ovenden.

Wanted in exchange, pair of stereoscopic lenses for any of the following:—Quarter plate camera lens (one slide), a 5×4 plated lens, large dipping baths, and other articles.—Address, SIDEY, 35, Richmond-road, Dalston, E.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

Herbert Bell, Ambleside.—*Two photographs of clouds and water taken at the head of Windermere Lake.*

C. C. and WASTE.—See leader on another page.

ARTHUR WOOD.—We cannot answer any of the queries except the last. The powder process is described in our issue of August 2, 1889.

J. RHINE.—Judging from the print enclosed, we conclude that the negative is much over-exposed. The lens will not account for the want of density.

ALPHA wishes to know where he can obtain some moderately large sheets of very transparent talc. Perhaps some of our readers will favour him with the desired information.

S. A.—Celluloid or xylonite dishes are very good for all photographic purposes, except those in which the use of alcohol or ether are involved. Both of these are solvents of the material.

PHOTO (Rugby).—For perforating photographs, after the manner that postage stamps are perforated, a special apparatus is required. Possibly Messrs. Marion & Co. supply it. If not, we imagine that Messrs. De La Rue & Co., Bunhill-row, will do so.

T. W. A.—The failure is due to too short an exposure. Good pictures in the "fiftieth of a second," with a lens working at *f*-12, are impossible at this season, even when the light is "fairly good." Prolong the exposure, and increase the aperture of the lens if it will bear it.

VACUUM CAPUT.—Portraits certainly can be taken by gaslight if you have a sufficient number of burners suitably placed, and using a rapid portrait lens with very sensitive plates. Instead of fitting the studio with gas, we should advise you to try magnesium as the source of illumination.

H. W. B. writes: "I photographed a gentleman in September, 1890, and supplied him with a number of portraits in September and October, and he died in December, 1890. After he died I made it copyright. Can I stop any one now from copying any of the portraits I supplied in September or October?"—In reply: You cannot.

ENAMEL.—We do not remember your former query. What is the object in wanting to strip the "enamel" surface from the print? In your attempt you have taken part of the image from the paper. Is this what is required? If a second coating of collodion is applied to a plate already coated the first will be dissolved, or partially dissolved.

AN AMATEUR (Leeds).—1. Any of the formulæ will do for the rapid emulsion, but you had better, perhaps, select one from the author's own work. 2. The same formula will do with less cooking. Chloride may be used if desired. 3. Advertise for the work if it is out of print, you will then experience no difficulty in obtaining a copy.

W. L. N. writes: "Mr. T. N. Armstrong, in his second letter to you on *Copying*, says that he places a 15×12 white mount 'between the picture in the frame and the camera.' If this is to be taken *literally*, it would mean that all view of the picture was to be cut off from the lens of the camera. In what position does he really mean to say his reflector is to be placed?"—Probably Mr. Armstrong will reply to this.

ALBUMEN.—None of the American brands of albumenised paper mentioned are sold here. You will have to get them specially from the States. There are so many good brands of paper in the English market, that it would be invidious to mention any particular one. It is impossible to say by what bath the print was toned, but with a good vigorous negative any would yield a similar tone, which is a purple black. It is *not* on double albumenised paper.

B. SIMCOE sends some capital instantaneous pictures of skating scenes, but complains of the foggy appearance of the distance, and asks if there are any means by which it can be removed in the negatives. There is no effectual method by which it can be removed, and, what is more, it would be very undesirable to do away with it if there were. It is this haze in the distance that completes the pictures as winter scenes. If it were absent the pictures would suffer.

B. HIBBLEWHITE.—For printing from phototype blocks the ordinary glue composition rollers are used for inking. In photo-lithography the ink is applied with the usual leather roller. Judging from the example sent, the fault is not in applying the ink, but in the block itself. It has not sufficient relief. Aim at increasing the relief, and there will be less difficulty in the printing. You might, to verify our opinion, send the block to the nearest letterpress printer and get him to pull you one or two proofs.

YORKS writes: "Can you oblige me by naming the type of lens described as follows: The front and back lens are slightly concavo-convex, one and a quarter inches in diameter; front lens convex side out; midway between the two lenses is a small one seven-eighths of an inch in diameter; immediately behind this the diaphragm is placed; this also is concavo-convex? Perhaps the sketch will help the description."—The lens in question is the old triplet. A very good form of instrument, but now practically obsolete.

PRINTS inquires: "Can you give me any idea as to how these prints got stained? I toned and washed, &c., in the usual way. I have often had one or two stained when having a large batch, but this time I only had about one dozen to do. Kindly let me know in 'Answers to Correspondents.'"—The stains are evidently due to careless manipulation, as the prints appear to be imperfectly fixed on looking through them. Apparently the prints were not kept moving while in the fixing bath, or the bath was too weak, or too cold, or possibly the tone of immersion too brief.

DOUBTFUL says: "I have just met with the following developer, strongly recommended as a great improvement upon the usual ferrous-oxalate formula for bromide paper:—A. Potassium oxalate, 2 ounces; water, 16 ounces, adding a few crystals of oxalic acid until slightly reacting upon test paper. B. Ferrous ammonium sulphate, 1 ounce; water, 16 ounces. Using equal parts of A and B gives a perfectly clear image. Kindly advise me whether there is any objection to the above as regards permanency, or in any other particular. Thanking you in anticipation."—There is no objection to the use of this developer, particularly if it will yield better results than that compounded with the plain sulphate of iron.

J. E. BECKETT.—The picture is a very interesting one, and as probably years may elapse before an opportunity will occur of obtaining such a one again it will be well worth while to expend some trouble and time on improving the negative. In the first place coat the back of the negative with matt varnish. Then scrape away with the point of a penknife where the negative prints so very chalky. Next apply *very* sparingly, with a leather stump, plumbago to those portions that come too black, and finally take a print to see the result, and do further work if necessary. If with the matt varnish alone sufficient cannot be accomplished, it may be supplemented by thin mineral paper, and the proceeding repeated with that as with the varnish.

NITRATE BATH says: "I have an old nitrate of silver floating bath registering 120 grains to the ounce, but being doubtful as to its purity, I should esteem it a favour if you will tell me in your 'Correspondence Column' how to ascertain its purity; and in the event of its being impure, how I may proceed to ensure its purity."—If we had such a bath to deal with, we should dilute it to the strength desired, float a piece of paper upon it, and then take a print. If it worked right, as we expect it would—if it had not been tampered with—nothing more would be required. If, however, it did not, we should add a little carbonate of soda to neutralise any acidity and expose to a strong light for a few days, filter, acidify slightly, when, doubtless, it would prove all right.

JUSTICE writes: "I am informed that there are photographers who at the present time are successfully defrauding the public by selling them bromide prints instead of platinotypes. I should like to make a protest against such a practice."—Will "Justice" furnish us with the names of any who are guilty of this fraud?

F. G. HILL writes as follows: "Will you please answer this for me? After I have been in the dark room my eyes go watery and sometimes sore. They are strong, I think, but lately when I am out in the air they water sometimes when I have not been in the dark room. Do you know of anything to prevent them?"—We strongly suspect that the sudden transition from the obscure light of the dark room to the strong light of day is the cause of the trouble. We recommend him to put on dark glasses, such as those known as "London smoke," after working in the dark room before coming into the light, also when out of doors in sunlight. If this does not effect a cure an oculist should be consulted. Possibly our correspondent is using a more feeble light in the dark room than is absolutely necessary.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, January 21, *Photography*—American Slides; January 28, Annual Lantern and Musical Entertainment.

STEALING PHOTOGRAPHS.—Henry Charles Barran, caretaker, and James Perryman, a photographer, of High-street, Camden Town, were placed in the dock (West London Police Court), on Monday, charged with stealing and receiving a number of photographs. Mr. H. L. Mendelssohn, a photographer, said he had a studio in Pembridge-crescent, Notting-hill-gate, the prisoner Barran being the caretaker. Since March last he had missed plates, photographs, and other things. He complained to Barran, who said he knew nothing about them. On Saturday he went with the police to Perryman's shop, and saw a number of his pictures exhibited in the showcases outside. He went upstairs and saw his pictures in frames in the prisoner's reception room. In the studio five of his pictures were nailed to the wall. He found in all sixty-eight photographs in different sizes, a number of dry plates, and other property of the value of 25*l*. The prisoner Perryman said, "Please don't give me in charge. I know I have done wrong in taking pictures from Barran." He also asked him to have mercy upon him as his wife was ill, and it would probably kill her. The name on the photographs had been removed. He afterwards saw Barran, who made no statement to him. Cross-examined: Barran and his wife were both in his service. He had some old photographs which were broken up. He told the prisoner to break them up and burn them; not any of them to go out of the studio. Most of the photographs found at Perryman's were perfect. Sergeant Hallmark stated that he accompanied the prosecutor to Perryman's shop and took the prisoner into custody. He said the photographs were given to him. On the way to the station he said, "Mr. Barran gave me the pictures, saying, 'You are just starting, and they will make you a show, as I shall have to throw them on the dust-heap.' The plates are mine. I would not have had it happen for 500*l*." The other prisoner stated that he gave the photographs to Perryman, thinking they were no good. Mr. Plowden committed the prisoners for trial, Perryman not pleading to a felonious receiving of the photographs.

FLASH-LIGHT BOMB.—An explosion of magnesium loosens a coping stone on the city hall.—"Run! the building is falling!" This cry came from the throats of a thousand people standing on the east side of City Hall at 9.45 o'clock last evening. There had just been a heavy explosion, and a great stone had fallen from the roof. Both were the result of an effort to photograph the new Pulitzer building. On the roof had gathered six young men, preparing to take an instantaneous picture. They stood on some planking reaching from the coping of the building to a point where the roof begins to slope. One of the men dropped a spark from a blazing match into a box of magnesium or flash-light powder. The report that followed exceeded anything the celebrators on the other side of the street had dreamed of. It could be heard a long distance, and the big building was rocked to its base by the explosion. The six men on the roof were thrown flat on their backs, and a three hundred-pound coping stone went crashing down to the pavement below. The space all along the hall seemed packed with human beings watching the celebration opposite, and yet no one was harmed. Nor were those on the roof hurt in any way. The janitor's family had invited a dozen young women to spend the evening, and their fright was great for a time; but they calmed down at last, and went around to learn what damage had been done. They discovered that about every window pane on the east side of the hall had been broken, but otherwise no damage had been done, so far as could be learned. Roundsman Thomas Hyland, in charge of the police station in the basement of the building, thought the structure was surely falling; and when he heard the report of the stone, he felt certain some one must have been killed. He went out and searched for the injured, and was greatly relieved at not having his fears realised. A lot of small stones were also thrown from the roof, and these struck a good many people, but no one was seriously hurt, although there was a general scattering from fright.—*Brooklyn Journal.*

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NATURALISM OR IMPRESSIONISM.

The views first put forward by Dr. P. H. Emerson less than five years ago have, perhaps, created far more abundant discussion than might have been anticipated by those who have noticed—and, may be, lamented—the general backwardness of the human mind to even consider fresh aspects of things. Indeed of late so numerous have been the papers and discussions on the "naturalistic" view, that it becomes rather difficult to resist a conviction that the photographic mind is exceptionally ready to consider or to discuss new views, perhaps one result of the art-science itself being little else than a constant succession of innovations.

Indeed, in this short time not only have the words of photographers been influenced, but also their work, as there is now scarcely an exhibition in which definite results of the "naturalistic" teaching may not be traced; but in pointing this out we by no means commit ourselves to the statement that these results are altogether such as give just grounds for congratulation, although in relation to several points there is certainly a change for the better which may be traced to the teachings of the advocate of naturalism.

All things considered, the author of *Naturalistic Photography*—a work now in its second edition—may reasonably congratulate himself on the attention and following his doctrines have received up to the present time; but at the same time the essential points of his teachings have to a very great extent been overlooked or misunderstood, and matters of secondary or occasional significance have been debated as if the whole question depended upon them.

As an instance of this, we may refer to the matter of definition in focussing, many persons of intelligence and observation really appearing to suppose Dr. Emerson's teaching is little else than an advocacy of taking photographs out of focus, although, as a matter of fact, he makes no allusion whatever to the focus question in his original paper read before the Camera Club in the early part of 1886—a paper which, notwithstanding, contains all the essentials of his later teaching. Indeed, so much has the matter of focussing been looked upon as of the nature of an essential in the matter, that out of it has arisen a vast amount of recondite discussion between optical specialists, discussion interesting in itself, but for the most part entirely devoid of any bearing whatever on Dr. Emerson's views; and perhaps we may say that to the following extent only does the focus question essentially affect the "naturalistic" view.

That photography can, under favourable conditions, give an image containing more detail than the eye actually distinguishes when looking from the standpoint of the camera, is a bare experimental fact; and much of the scientific value of photography rests upon this fact. Now let us assume that a photograph has been taken in which excess of detail exists, and we will suppose the case of two individuals looking at that photograph. One person may look at the detail of a part, rather than on the picture as a whole—in fact, as if he were looking at part of the original scene through a telescope; and for this purpose he will generally place his eye much closer to the sheet than the focal length of the lens employed—a proceeding which generally involves the use of a magnifying glass if the picture has been taken with a short-focus lens, but not if the picture was taken with an objective of long focus. Such a person fails to realise the full pictorial value of the photograph—at any rate, if we take the naturalistic standpoint. He does not see what the unassisted eye would see in nature, but rather what would be seen with the aid of a telescope. Another person may look at the picture as a whole, abstracting the mind from a consideration of such excess of detail as may exist in the photograph—a condition of things favoured by selecting a point of view about as far from the picture as the focal length of the lens used. Such a person sees the photograph naturalistically as far as definition is concerned.

If now the detail of the photograph were just so much softened as to destroy all definition beyond what the eye could see in the original, this one source of possible distraction from the pictorial side would be removed. The first observer whom we have supposed, would be delivered from the temptation of looking closely into the detail (with or without a glass), while the second observer would see as he saw before, and the average beholder would see more in accord with what nature manifests to the eye. There is a gain, because no person can lose the general effect by straining his attention upon what he would not have seen in nature.

If the softening or destruction of detail were carried the least beyond such a point as we have indicated, the result would be fuzziness or destruction of structure, both of which are totally inconsistent with the "naturalistic" or "impressionist" view. Indeed, the result would simply be pictorial untruth—but untruth of the worst kind, because it could not be converted into truth by such a visual effort as we have supposed our second observer to make when looking at the highly detailed photograph.

Putting aside for the moment some of the matters which arise out of the question of differential focussing, we may take it that the general tenour of Dr. Emerson's "naturalism," as far as it bears on definition, is that in making a photograph which is rather to be a picture than a scientific diagram, all trace of blurring beyond what the eye would see in the original land-

scape is to be carefully avoided, and at the same time such excessive detail as shall render possible a mis-viewing of the photograph, is inadmissible. In illustration we may quote from his *Naturalistic Photography* (second edition), p. 119. " . . . It (the picture) should be made just as sharp as the eye sees it, and no sharper. . . . All things out of the plane of the principal object, it is perfectly obvious from what has been said, should also be slightly out of focus, but not to the extent of producing destruction of structure or fuzziness." Not only here but in other places he emphatically and repeatedly cautions the student against fuzziness—even as regards subordinate objects in the picture.

Here, then, is laid down a condition of things to be aimed at in focussing, according to the naturalistic contention; but the actual determination in practice of what corresponds to the eyesight may be a matter of individual judgment on the one hand or of scientific measurement on the other hand, and determinations by either of these methods may err. Indeed, we think that in his earlier photographs Dr. Emerson has certainly gone somewhat beyond his own teachings, but innovators so generally do this that there is nothing very remarkable in the fact; still his latest work, *Wild Life on a Tidal Water*, bears evidence, we think, of far more careful and exact application of his own principles.

The aim and theory of differential focussing are actually at one with what we have stated above, and by slightly subordinating such objects as the "artist"—we now use the word advisedly—does not regard intently in contemplating his scene, it is intended that the beholder of the resulting picture shall have his attention so constrained towards the main or central subject that he shall unconsciously fall into the same visual mood, so to speak, as the artist. If this could be done with certainty, or even a good approximation to certainty, it would open up wide fields in art; would, indeed, almost enable the mass to see nature with the eyes of any given artist. We may, however, say confidently that the tools and appliances of the photographer—or, speaking broadly, the technical conditions—are not such as render an exact differential focussing possible in any very extended sense. As an instance, we may refer to the fact that use what care one may, some insignificant object, being unobservedly within the plane of best definition, is likely to make the result other than was intended. Such expedients as the artificial blurring of parts by tricks in printing we may pass over for the present.

In the above we have touched rather on a side issue of "naturalism" than on the central idea, and the consideration of this latter we must reserve for a second article; but in the meantime we may refer to a short pamphlet just issued, and which will be found reproduced on another page, in which Dr. Emerson may be seen to have much modified his views as to the powers of selection and rejection possessed by photography, and, if we mistake not, his future position is, we think, likely to be one in which he will regard differential focussing as so difficult and uncertain as to be undesirable except in special instances.

BROMIDE PRINTS FOR PLATINOTYPES.

In such hard times as these the temptation to a great many professional photographers to substitute developed silver prints for platinotype pictures in executing their clients' orders, so as to increase their scanty profits by the difference between the cost—now considerable—of working the two processes, this temptation must indeed be strong; but all the same, we find ourselves both unwilling and unable to believe that such conduct distinguishes, or, rather, disgraces, any but a very small minority of the craft. The old saying has it that there are black sheep in every flock; and such a large flock as photographers now make cannot possibly enjoy exemption on that score. To these persons, who if they were not disgracing photography would be drawing obloquy upon some other calling, and to these alone can we attribute such malpractices.

It is fraud, pure and simple, as we remarked the other day to our correspondent who wrote to us in regard to the matter, to accept a client's order and payment for platinum pictures and supply him with impressions in silver, and the offence is one with which the criminal as well as the civil courts are quite ready to deal. We imagine that a photographer who acted thus and was summarily brought to book would fare just as unpleasantly as the vendors of spurious articles of diet, diluted ales, and so forth. These gentry, as the student of the newspapers in recent times well knows, have been pretty heavily fined, and we are not sure if in some very flagrant cases the delinquents have not been remitted to durance vile.

There must be a distinct agreement, however, between photographer and client that the pictures should be composed of platinum, otherwise there is no statutory offence. But above and beyond this there would still remain a tolerably open field for the exercise of a little of that peculiar astuteness which is almost as bad, and some specimens of which we have ere this encountered ourselves. Not all photographers identify the processes which they work to their sitters, who are, as a rule, just as wise, whatever be the nature of the information offered them. Thus, for example, you may see on the back of a photographer's mount, or on his card of terms, or painted up in his studio, such ambiguous sentences as: "Portraits by the New Instantaneous Process." "Enlargements and Portraits by the New Permanent Process." "Our *Specialité:* One dozen Cabinet Portraits by the New Permanent Process, 10*s.* 6*d.* No fading; no discolouration;" and so on. The term "permanent" has a great effect upon the lay mind just now, and a wily photographer can easily induce a sitter to believe that he is getting platinum pictures without actually committing himself to a deliberate statement to that effect, but of course not omitting to charge accordingly. If the bromide prints are satisfactory the sitter is not likely to do anything which would lead to the destruction of his own blissful ignorance or the photographer's reputation for fair dealing. We suggest that it is in some such manner as this that the "bromide-for-platinum dodge" is worked by those who are unscrupulous enough to adopt it, and we hope that the number of such rogues is small.

The educated public forms, perhaps, no more than a moiety of a photographer's clients, so that there is plenty of room for deception of a franker kind than the foregoing. The smattering of photographic terms, added to the misty acquaintance with the outlines of current processes, which we so commonly find in possession of those "above the salt," and which enables them when they visit a photographer's studio to talk photography more or less intelligibly to him—all this has probably not yet reached the lower middle classes, among whom, therefore, a dishonest photographer could reap a considerable harvest. What meanings can such technical terms as "bromide" and "platinotype" carry to them? And if they pay for platinotypes, and are supplied with bromides, what are the

odds they would understand or care about the difference if it were ever discovered and told them?

There are not a few experts who are often puzzled to tell off-hand a platinum print from one of silver. All other things being equal it is not an easy job. Some profess to be able to do so by applying the edge of the tongue to the print. If it is of an adhesive kind then the presence of gelatine—to which the adhesiveness is due—settles the point. But most papers are more or less adhesive judged by the tongue test, and platinum papers are not innocent of "sizing," so that the method is not at all a reliable one, and as a matter of fact there is an easy and obvious test which we have no doubt would be accepted even in a court of law, and we append it in order to make our article of practical value.

Let a small portion of corrosive sublimate in solution—the strength is immaterial, but, say, ten grains to the ounce—be applied to the picture under review. If it be a bromide of silver print it will "bleach," *i.e.*, the mercuric chloride will enter into combination with the metallic silver to form a double chloride of mercury and silver. Upon the platinum picture no such reaction will take place, so that the test is practically an infallible one.

We recommend the foregoing tests to those of our readers who have reason to suspect that they are being dealt with unfairly, but for the sake of an honourable calling we express the hope that their suspicions may not receive confirmation in any instance. One way and another, professional photographers—nay, photography itself—have enough "weight to carry" without needing any addition to the burden. Once it became known, or even rumoured, among the public that it was probable such a form of deception as we have drawn attention to was practised, an incalculable injury would be done to the profession.

SENSITOMETER INDICATIONS.

An article in the *Chemical News* last week, contributed by Professor Victor Schumann, though decidedly polemical in tone, contains interesting matter and suggestions that should not be lost sight of. Incidentally it may be said that nothing could be written to show much more forcibly the need that exists for a practicable and trustworthy standard of light, especially in the department of testing the comparative rapidity of plates. To proceed with an examination of the Professor's remarks, the opening sentence at once arrests and challenges criticism, if not contradiction. "As long as photographers," he says, "employ exclusively collodion or gelatine plates, sensitive only for blue and indigo, and, to a limited degree, to ultra-violet rays," &c. This is a direct statement, and opposed to all previous beliefs and recorded experiments. It will be observed that it is absolute, and not qualified by the use of the word comparatively. Unfortunately, we have in this country few investigators in this theoretical aspect of photography, Captain Abney practically "holding the field" by reason of numerous extended investigations recorded in the *Proceedings* of the Royal Society and elsewhere. Professor Schumann has not always been in entire accord with him as to the correctness of the published results; but they are sufficiently received where unchallenged for it to be said that Professor Schumann's inceptive remarks need qualifying. The maximum effect lies as he states; but the average gelatine dry plate of commerce is considerably sensitive for rays well towards the yellow of the spectrum, and not alone in the regions he states. The first object of the article is to point out the inefficiency of the Warnerke sensitometer for orthochromatic plates, and here no novel ground is broken; but we have a distinct statement that, at any rate to the eye, the light emitted by one of the Warnerke tablets is of one sort only when examined by a prism. We may here say that there is not sufficient light emitted by the tablet for its examination under ordinary conditions with a spectroscope. If it be examined by the familiar pocket instrument, we have not been able to discern any trace of a spectrum. Professor Schumann placed a piece of cardboard with a narrow slit cut into it (two mm. wide) over the luminous surface, and then observes it through a prism. "The whole spectrum" consists of "a single band only, equal in colour, as well as width, to the luminous slit . . . . but neither yellow nor red is perceptible." We have not attempted to concentrate the light to a degree sufficient to observe it in the ordinary way, but should imagine that if the radiations were taken up by a concave mirror and concentrated upon a suitable optical arrangement in contact with a slit placed upon the prism, a more satisfactory result would be obtained. However, be this as it may, the Professor echoes opinions already expressed when he indicates the uselessness of this sensitometer to some orthochromatic plates. With regard to these he ventures the prediction that "not the least doubt can exist" that these plates will be "generally adopted." We now come to a very important portion of his remarks. In examining plates, he says, "Heavy flint glass, like that of the Amici prisms, should, however, be entirely excluded from the instrument; these glasses are impenetrable to ultra-violet. Violet even, and not less so indigo and blue, are held back with much energy, while the luminous rays, yellow and red, are allowed to pass through them without any hindrance almost." (The word "flame," doubtless a misprint, is used where we write "them.") This is a very serious consideration when it is remembered that a great many of the objectives in common use at the present time have as one of their constituents a lens of heavy flint. It would be inferred from this quoted statement that all these lenses must be very detrimental to rapidity, and that the older forms of photographic objective, where less dense flints were employed, must possess a decided advantage as regards rapid action. At the present time we can do no more than draw attention to the statement and its necessary corollary.

The concluding portion of Professor Schumann's paper, divested of polemic, is devoted to indicating a true method of testing plates for sensitiveness to the different rays of the spectrum. His plan seems a valuable practical one, subject only to the drawback we have alluded to—the want of a standard light, the absence of which enables two experiments to obtain entirely different results in the same examination, one stating that the daylight employed by the other was unsuitable and devoid of power to give trustworthy data. The method recommended is as follows:—"To find the behaviour of plates towards any light source, a series of spectra, with regularly increasing time exposure, should be photographed, the plates dried and examined in regard to the time required to produce a developable impression by different colours. The different sensitiveness will then be found to be reversely proportioned to the time of exposure. . . . . As long as the sensitiveness alone is the object of inquiry, the intensity of the plate is of no importance whatever. *It is totally wrong to determine numerical value of light-sensitive films by the density of the negative.*" The italics are the writer's own. It will be seen that matter which may be the subject of argument is here

introduced; but, in any case, a practical plan is propounded, further remarks on which our space will not now permit, though we may return to the subject at some future period.

As will be seen in another column, Dr. Emerson renounces all that he has written in connexion with "Naturalistic Photography."

The letters that have appeared in our correspondence columns with reference to the sale of photographic businesses should, and doubtless will, serve to caution those about to purchase a business. It is no uncommon circumstance for a purchaser to find that the business for which he may have paid a high sum, on the representation that the returns have been a certain amount, is, in his hands at least, not nearly equal to what he was led to believe. In almost every business or trade there are numbers of persons who derive a good income by buying businesses which may have been neglected, or opening new ones, and, by enterprise, working up a good trade and then selling them at a large profit. We were unaware, however, that this practice ruled in photography, though it now appears to be not unknown. One of the first things that a purchaser requires to see is the books; but if these contain entries of fictitious character, such as those alleged by entering complimentary sittings as *bonâ fide* business, then the transaction becomes fraudulent, and a court of law will give the purchaser redress. But, as one correspondent points out, this is sometimes difficult of proof. From the letters that have already appeared, it seems that the mere inspection of the books, when buying a business, must not be implicitly relied upon.

There is one point in connexion with the purchase of a business that the buyer should take into consideration, namely, its probable lasting character. It is tolerably well known that in some provincial towns, when the photographic trade has fallen into a moribund condition amongst the old hands, a new comer with enterprise often quickly establishes a good business. He obtains sittings from the clergy, the prominent local authorities, and the leading gentry of the neighbourhood, publishes their portraits, makes a feature of enlargements done on speculation, and perhaps publishes local views. His books, of course, show a good return of *bonâ fide* business, as the amounts were actually received. In a year or so the business is sold on the strength of this evidence, but the purchaser is frequently disappointed, because he finds that his predecessor, by his energy, has fairly "used up" the neighbourhood, and the majority of the people are well supplied with all they are likely to want for a considerable time to come. As we once heard remarked, in a similar case some years back, "the orange was sucked dry before it was parted with." Under circumstances such as those just mentioned there is neither fraud nor misrepresentation. The books show a certain return, and that amount of trade was actually done. Still, the purchaser finds that he has made a bad bargain.

When legal proceedings are taken with reference to fraudulent misrepresentation in the sale of a business, the usual defence is that the goods supplied by the purchaser were of inferior quality, the business was not conducted in the same manner as formerly, inattention to the requirements of customers, &c. A similar defence would no doubt be raised in the case of a photographic business, and it would be difficult to disprove. It is not always the best photographs that are liked by the sitter, but the most pleasing portrait. And obtaining these depends upon the artist. In photography there is as much in individuality as there is in the medical profession. A doctor may sell his practice to even a cleverer man than himself, but he cannot be answerable for the patients liking him so well. So it is with photography. Unless the purchaser of a business is as pleasing and agreeable to the sitters, and produces as good results as his predecessor, he will not retain their patronage.

While on the subject of the business phases of photography, we may allude once more to the growing practice, even amongst photographers of standing, of obtaining apprentices with tolerably large premiums. What is there to learn in an ordinary portrait business to demand a heavy premium and some years of service at a nominal salary? Before the advent of ready-prepared dry plates the case was different. But then apprentices with premiums and nominal salaries for long terms were very exceptional. If those who pay the premiums were to have it definitely stated in the indentures what the apprentice is to be taught—and this always ought to be done—they would often find they have but little value for their money. In a short time an intelligent youth becomes a valuable assistant, and his services are secured for a long period at little more than a nominal salary, sometimes without any at all for a time.

"Can you use the knife?" is now one of the first questions put to a retoucher when a candidate for an appointment. This, when interpreted to the uninitiated, means—Can you with the aid of a knife or similar appliance scrape or cut away in a negative such portions as cannot be dealt with by the pencil and then make them good again? That is, reduce too pointed a nose, remove a prominent jowl, or take away a double chin, or perhaps convert a matronly and robust waist into a slim and delicate one. Alas! for the veracity of photography. No wonder that photographs are not now received as unqualified evidence in law courts, particularly when some of the learned judges are amateur photographers themselves; and, what is more, none of them are at all averse to retouching in their own portraits. Are photographers to be condemned for this sophistication? They carry on their business as a trade, and he who pleases his customers best is the one who receives the largest patronage. It is a question of demand and supply. Who is to blame?

Two or three months back the Photographic Club got up a lantern and musical entertainment for the benefit of the Photographers' Benevolent Association. We were, at the time, in the hope that the example would be followed by other societies. Up to the present, we regret to say, we have not heard that it has. The lantern season is now in full swing and the Society is a very deserving one. Societies might bear in mind that while they may be helping the Association, they would be conducing to their own enjoyment.

Many of the pictures now on view in specimen cases have a very incongruous appearance. Portraits of persons in light summer attire, with a sunny landscape background, certainly look a little out of season when every one is clad in the heaviest style and the snow is inches deep upon the ground. In some few instances portraits are shown in winter costumes, but the backgrounds are seldom in keeping. A lady in heavy furs in front of a glowing sunlit landscape certainly look a little inconsistent. Those who rely upon their showcases to attract custom would certainly find it to their advantage to give some attention to the seasons.

LOW TEMPERATURE A CAUSE OF THE FADING OF PRINTS.

Several examples of yellowness in prints from imperfect fixation have been forwarded to us of late, the senders not being able to account for the defect, inasmuch as all the manipulations have been conducted as usual. It should be borne in mind that the solvent action of hyposulphite of soda on the silver salts is greatly retarded by a low temperature. The fixing bath at thirty-five or forty degrees is far less energetic than it is at the normal temperature of from fifty-five or sixty degrees; therefore, a longer time must be allowed, unless the bath is heated up to the latter temperature.

The same remark also applies to the washing after fixing. When the water is abnormally cold, as it has been of late when taken direct from the tap, its solvent power on the hyposulphite compounds is very much reduced; consequently, cold water alone should not be relied upon for eliminating the "hypo compounds" in very cold weather. A few changes of tepid water will do more in freeing the prints from the hyposulphites than many hours of running water as it comes from the tap just now.

HYDROQUINONE IN WINTER USE.

WHATEVER may be said in favour of hydroquinone—and it has many good points to recommend it—few, I imagine, would specially select it for employment during such weather as has recently been with us, on account of its slowness of action even at the best of times. However, for a particular purpose, a few days ago I reached down my bottle of stock hydroquinone solution for the first time during many weeks, and the lesson I learnt may possibly be of some use to others, and act as a warning to those who are only occasional workers.

The solution is a pretty strong one—very strong for a purely *aqueous* one—but I use a small proportion of alcohol to assist in dissolving the necessary quantity, and there is also present the usual addition of sodium sulphite. The bottle, I may say, had been standing not in my developing room, but on a shelf in an exposed position in a room in which there had been no fire during the whole period of frost, and had probably been at times exposed to a temperature as low as 26° or 28° Fahr. I mention these circumstances as partly explaining the condition in which I found the contents of the bottle.

It is no unusual occurrence in ordinary weather to find the stock bottles of pyro or hydroquinone, when accompanied by large quantities of sulphite, to show a deposit of crystals, but in this instance I found not only the usual crop of solid crystals at the bottom of the bottle, but in addition the whole volume of solution appeared to be a nearly solid mass of crystalline matter. When the bottle was upturned a small quantity of liquid ran into the neck, leaving a compact network of long needle-shaped crystals closely interlaced, occupying the space previously filled by the solution, and having the appearance of representing a larger quantity of solid matter than should be contained in the full bottle of solution.

From curiosity more than any other reason, I drained the liquid portion away from the crystals, and these were subsequently shaken out of the bottle into a porcelain dish—at least the needle-shaped ones—the solid layer at the bottom being left *in situ*. They were dried at a gentle heat applied for three or four hours and then weighed. In appearance they had the characteristics of pure hydroquinone, but the weight, representing more than three-quarters of the total quantity of that substance that should have been present in the volume of solution, seemed to point to their being mixed with a considerable proportion of sulphite of soda. As the readiest means of forming an approximate estimate of the true quantity of hydroquinone, a weighed portion was heated on a piece of platinum foil (also previously weighed), with a view of ascertaining by the residue left after volatilisation of the hydroquinone how much sulphite was present on the weighed sample. After heating carefully for some time, the foil never being allowed to approach redness, the whole quantity practically was volatilised, for all that remained formed scarcely more than a stain on the platinum, proving that the crystals were practically pure hydroquinone.

There was no doubt as to the absolute dryness of the crystals before performing this last experiment, as I took means when drying to test for loss of weight, and when this had ceased for some time it was fair to assume that all the moisture had been driven off. As hydroquinone contains no water of crystallisation, and so far as I am aware cannot be made to form hydrated crystals, it follows that the effect of the intense cold had been to eliminate upwards of three-quarters of the hydroquinone from the solution; and at the same time there was little if any more deposit of sulphite than I should have expected to see under less severe cold. Consequently the developing power of the solution—that portion of it that remained liquid—may be better imagined than described, weak as it would be in developing agent and proportionately over-charged with sulphite.

The moral of this is, that hydroquinone, from its comparative insolubility in water as compared with pyro, requires far more careful watching in the colder months of the year than other developers. Pyro solution under nearly the same critical conditions exhibited no abnormal behaviour, the solution being so far removed from the point of saturation that short of absolute congelation of the whole liquid the intensest cold would produce no effect. Saturated solutions of ferrous sulphate and potassic oxalate, or their solutions as kept for oxalate development closely approaching saturation, would no doubt under similar climatic conditions produce grave uncertainty unless carefully examined, but, I venture to think, nothing approaching hydroquinone.

But there is another point of view from which the matter may be looked at. Hydroquinone dissolves very slowly in water at the ordinary temperature, heat being absolutely necessary to get any reasonable quantity into solution in a moderate time. It is probable, therefore, that many weeks or months of "thaw" would have been necessary to bring that solution into its normal condition, if it ever resumed it without being artificially heated, and that I greatly doubt; so that in the hands of a careless worker there is no guessing how many plates would have been spoilt, and how many plate makers would have been condemned for issuing films with a false character for sensitiveness and other qualities.

Such an extreme case as I have related could perhaps scarcely occur in a laboratory in constant use, or that was kept properly warmed; but, as I have explained, my bottle had been on the ordinary chemical shelves in a cold room seldom used. The incident may, however, serve as a warning, and emphasise recent advice as to the necessity for properly warming the developing room.

W. B. BOLTON.

LANTERN-SLIDE MAKING.

[A Communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

CONFINING my work almost entirely to the production of lantern slides, I have thought it expedient to take up a portion of your time to-night by contributing a few rough notes on this very interesting and important branch of the photographic art.

At the present day, by far the most popular process is the gelatino-bromide; although the collodion, both wet and dry, and other processes give more latitude as regards the production of a good slide from an indifferent negative. First of all, it is necessary to consider what constitutes a good slide—one in which the highest lights are represented by clear glass, and the deepest shadows are of such a density as to be easily penetrated by a fair average light in the lantern. A good slide need not be composed of, say, equal proportions of clear glass and opaque deposit, like more than one make of commercial slides in the market; so long as we have a trace of clear glass to add brilliance to the picture on the screen, it may be with advantage as seen *out of the lantern* to appear a trifle thin.

To produce this *good* slide, having the characteristics which I have mentioned above, a negative is required showing considerable contrast. Personally, I prefer one of the type which yields a brilliant or plucky silver print. Whilst on the one hand a negative of the most extreme density will make a passable slide, thinness and want of contrast of the character which is suitable for bromide printing is for slide work absolutely hopeless.

Coming to the actual working we have two methods: we may reduce in the camera or print by contact from small negatives. To the latter method I confine myself almost entirely, as nearly all my negatives are quarter-plates. The first point to be considered is naturally exposure, which may be made to a paraffin lamp, gas burner, or magnesium wire; daylight, of course, being too strong and uncertain. Gaslight is, generally speaking, most useful, and exposures with the printing frame two feet from an average burner may run from thirty seconds to ten minutes, varying according to the density of the negative. For very dense negatives, exposure to magnesium wire is to be decidedly recommended. With a negative verging on thinness, the exposure must be fairly exact, but with a dense negative and certain brands of lantern plates the latitude is simply enormous, and much greater than is usally supposed. With such a negative the exposure may be ten times the normal, and a perfect slide result from it; of course, varying in tone according to the extent of exposure. I have observed that the general tendency of beginners is to under-expose, which is fatal, as the image either develops up patchy, or veils over before density is obtained. A lantern plate can *not* be forced in development.

As to development, we have the choice of four reducing agents: ferrous oxalate, pyro, hydroquinone, and eikonogen. Each and all of these are capable of producing equally good results in the hands of careful workers. The easiest, by reason of the latitude it permits, is hydroquinone, the tone being dependent partly upon the negative, partly upon the exposure, and in no small degree upon whether the development is rapid or gradual, a remark which will be found to apply to any developing agent. It is not my intention to recommend any one formula, believing as I do that there is nothing magical in

any prescribed combination of chemicals. My advice would therefore be to choose a well-tried and reliable formula and stand by it.

For warmth of tone pyro is, without doubt, the best developer, and as the tendency is now in that direction, it merits our attention. There is no difficulty in its use if we remember its staining properties, to counteract which it is always employed with a much larger proportion of preservative.

The image when fully developed has an over-done, sunk-in appearance, and unless this point is arrived at, the slide when taken from the fixing bath will be found much too thin.

After fixing in a perfectly clean hypo bath and a thorough washing, the slide will in all cases be the better for a short immersion in an alum and citric acid bath, which clears up the picture and improves its brilliance. If too dense or fogged beyond the capacity of the acid bath to reduce, the ferricyanide of potash and hypo reducer (made distinctly alkaline with ammonia) should be resorted to.

Intensification at its best (which best may be represented by mercury and cyanide of silver) is but an unsatisfactory proceeding, and much the better alternative is to make another slide. Intensifying by mercury, followed by various alkalies, yields warm tones, varying with the agent used, many of them very fine, but all of doubtful permanency.

After fixing and washing, slides may be toned in a gold and sulphocyanide bath through a long range of bluish tones, useful for moonlight effects.

Mounting calls for no particular mention, but I cannot refrain from adding a vigorous protest against the continued use of masks of circular and other eccentric shapes. Broadly speaking, the oblong form suits most subjects and produces the best effect. A safe rule for guidance is to fit the subject to the mask when taking the negative, and not to fit the mask to the subject at the last moment before binding the slide. EDGAR G. LEE.

PHOTOGRAPHIC ILLUSION ON THE STAGE.

A VERY curious illusion has been produced by Mr. Van der Weyde, the eminent photographic artist of Regent-street. It consists in so placing a photograph as to give the effect of a piece of statuary when seen on the stage. In the course of an interview with a representative of the *Sunday Times*, Mr. Weyde gave the following details. After showing the interviewer a representation of Mary Anderson as Galatea, which appeared, in its red-coated alcove, to be an exquisite statue, he continued:—"It is well known in theatrical circles, and I hope to secure an equal success with my new venture, which will be seen in a new piece which is to be produced at a leading theatre early in the year. A group of statuary is required. No leading sculptor could be induced to undertake the task of producing it within the time available, and it was felt that mere modelling in plaster of Paris would probably be unsatisfactory, so I was asked if I could carry out another similar work, to include a classic male and female figure. I at once agreed to do so, and am now at work upon it. You see, unless you go within a few inches of the Galatea the illusion is perfect, so that did the group not come up to that standard of fine finish, it would be seen from a greater distance. I really venture to predict that people will refuse to believe that they are looking at anything but solid stone."

"I could tell you some very funny things about the photograph," continued Mr. Van der Weyde. "At my private view, two of the academicians who came to see it discussed it learnedly for a time, and at last turned to me and praised my photographs generally, but said they did not know what object I could have in placing so fine a statue there *apropos de rein*. I explained to them what it really was—that it had been an ambition of my life to produce such a photograph, and I assure you that they literally turned and went away in a rage, so deeply did they resent my artistic illusion. Not long ago, too, a beautiful girl, the daughter of a Member of Parliament, was married, and, as she very much resembled Mary Anderson, it was suggested that my photo-statue should be displayed at the wedding reception. I had to devise, or rather to construct, a room to hold it; but it was a capital idea, and I believe to this day many of the guests are wondering who produced the statue of the bride. In America, Dr. Talmage pronounced it, in all good faith, to be the first statue he had ever seen which gave the idea of the human hair, and one man made quite a heavy bet that he could put his arms round it. He jumped the cords before it, and threw out his arms so vigorously that the background needed a little repair afterwards.

—*Invention.*

A RENUNCIATION.

[Dr. Emerson sends us the following.]

TO ALL PHOTOGRAPHERS.

LOVING Brethren that were, I salute you. I owe you one apology oh! my friends, for in the earnestness of my heart I *partly* misled you. You, who stuck by me in storm and stress I shall never forget—if any of you, after this renunciation, seek advice, ask and you shall receive of my best. You, enemies, who will now rub your hands with small-souled glee, rub on, till it all ends in imaginary soft-soap. You, whom I have in mistaken zeal attacked, pray forgive and forget.

And now list. I, saner than ever, renounce and abjure all theories teachings, and views on art written, and first promulgated by me in sundry works, articles, &c., and finally collected in a volume, entitled *Naturalistic Photography*. I cast them upon the dust-heap.

I am for the present and future neither idealist, realist, naturalist, nor impressionist—*photographic impressionist*,* indeed!—as though *all* graphic artists were not impressionists, and as if the photographic process could give aught but transcripts more or less literal. Shall I forsooth explain this burning of books?

List, you who have ears to hear and eyes to see.

In the fulness of my heart I dreamed a dream. I thought art might be taught by writing. I was wrong, I confess. I, even I, "the lover of nature"—every one is that now—preached that all art that did not conform to "truth to nature" principle was bad; that was a fatal sermon to many. From this followed again the idea—mistaken, alas!—that photography *pure* (not impure, on rough papers, touched up by clumsy hands) was an art surpassing all black and white methods. *Eheu!* That this was ever believed! However, I was sincere, enthusiastic, but mistaken, and I was and am no amateur. I have by the sweat of my brow learned, under a master, something of this thing they call art. Being no amateur, I have therefore left the Camera Club, the home of the "amateur." But ye reasonable ones in photography—some of you *are that*, true and worthy sons of the goddess Science, who has little to do with the goddess Art—you will ask, and with right, Why this thusness? I respect you true workers in science—ye Abneys, Dallmeyers, Hurters, Driffields, Vogels, Jones, Harrisons, Bolas, Waterhouses, Eders, and others. I will tell you, for the vulgar mob of pseudo-scientists have done naught but prove their ignorance and show signs of the itch—the itch for publicity and venom.

To you, then, who seek an explanation for my conduct, Art—as Whistler said—*is not* nature, is not necessarily the reproduction or translation of it; much, so very much, that is good art, some of the very best, is not nature at all, nor even based upon it—*vide* Donatello and Hokusai.

The limitations of photography are so great that, though the results may and sometimes do give a certain æsthetic pleasure, the medium must always rank the lowest of all arts, *lower than* any graphic art, for the individuality of the artist is cramped; in short, it can scarcely show itself. Control of the picture is possible to a *slight* degree, by varied focussing, by varying the exposure (but this is working in the dark), by development, I doubt (I agree with Hurter and Driffield, after three-and-a-half months' careful study of the subject), and, lastly, by a certain choice in printing methods.

But the all-vital powers of selection and rejection are *fatally* limited, bound in by fixed and narrow barriers. No differential analysis can be made, no subduing of parts, save by dodging—no emphasis, save by dodging—and that is not pure photography; impure photography is merely a confession of limitations. A friend once said to me, "I feel like taking nearly every photograph and analysing it." Compare a pen and ink drawing by Rico or Vierge, in Pennel's book. I thought once (Hurter and Driffield have taught me differently) that true values could be obtained and that values could be *altered at will* by *development*. They cannot; therefore, to talk of getting the values in any subject whatever as you wish, and of getting them true to nature, is to talk nonsense.

It is impossible, in most subjects, to alter your values *as you wish*, and to talk of such things now is mere emptiness and puffed-up humbug.

Some amateurs, following Colonel Noverre's *revival* of rough printing papers *last year* (1889), have thought that salvation lay in rough surfaces. Colonel Noverre's dust-heap was ransacked, and we have heard of a "new departure"—a newer "school," and all the bleat of the overweeningly vain "amateur."

If there can be no scientific basis for an art, as some have asserted, Meissonier can claim to be as artistic as Monet, and Monet

* "A term consecrate to Charlatans," and especially to photographic impostors, pickpockets, parasites, and vanity intoxicated amateurs.

s Meissonier. The sharp photographer can assert his artistic rights longside of the veriest "blottist." So all opinions and writings upon rt are as the crackling of thorns beneath the pot. In short, I throw ıy lot in with those who say that photography is a very limited art. regret deeply that I have to come to this conclusion. Photoraphy is first of all the *hand-maiden of art and science*. It has and ill register new facts of light, form, and texture. Pure photography s a scientific method of drawing, and scientists should work on until true and literal scientific transcript of nature can be made—this y orthochromatics, &c.

It will interest some to hear what I think of some points that ave been vexed questions in a war I have, I regret to say, stirred p. Composition, as understood by Burnet and others, I hold to be utility itself, though I can appreciate the attempts to meet the ifficulties in this matter. The eternal principles of art I have eard so much of are mere catchwords.

Sharpness versus *Diffusion*.—If the work is for scientific purposes, ork sharply; if for amusement, please yourself; if for business, do hat will pay.

I have, I regret it deeply, compared photographs to great works of rt, and photographers to great artists. It was rash and thoughtless, nd my punishment is in having to acknowledge this now. Think of ıe marvellous dexterity of the man who with pencil, pen and ink, or aint and brush, produces a masterpiece, the drawing equal to that of ıe lens, the tones in harmony, the colour delicate and marvellously eautiful. Read Rood's *Chromatics* for a hint of the manifold diffiulties surrounding this subject. Then think of the amateur hotographer, who, if clever, can *in a few weeks*, turn out good echnical work.

It may be asked then what theories on art I have? I answer, t present *none*. What artists I admire? I answer, all good rtists and all good art. To what school do I now belong? one. What do I think of writings upon art and art criticisms? istakes.

A final word. Suggestions have been made that I get some of my leas from a book, called *Naturalistic Painting*. I have a letter in my ossession from an artist, wherein is stated clearly and exactly that Mr. ate* had read a paper of mine on *Naturalistic Photography before* his rst article appeared in the *Artist*. At the Society of Arts, the other ay, a paper was read by Mr. Davison * * * * in which my d ideas were freely and impudently handed about and no credit ven me. It was whispered about by my enemies that this erson had originated some of the ideas of *Naturalistic Photoraphy*. To enlighten the public, I append a quotation from is letter to me on this point. * * * * He is now welcome o my cast-off clothes if he likes—he or anybody else. It is ith deep regret I do this thing, and it is only as a duty to yself. I justify myself by stating that I wrote privately to Ir. Davison, expostulating with him for freely appropriating my leas, and telling him that if he did not give me full credit t the Society of Arts I should publish a history of the matter. Ie never replied. He can publish my letter in full if he likes. his was Mr. Davidson's reply to a letter I wrote to him and others sking them if they minded me thanking them in public for their upport. His reply is dated from the Camera Club, December 16, 889, *only a year ago*. It is, "I AM GLAD AND PROUD TO BE IDENIFIED IN ANY WAY WITH NATURALISTIC PHOTOGRAPHY, BECAUSE BELIEVE IN WHAT I UNDERSTAND IT MORE AND MORE CLEARLY O BE, BUT I DOUBT VERY MUCH WHETHER ANYTHING I HAVE ONE DESERVES RECOGNITION."

I sent a copy of *Naturalistic Photography* some time ago for eview to the Editor of the journal of the Society of Arts, and it got bad notice. All the ideas offered the other night were thus offered o the Society *previously*. Lastly, a special speech, read from a aper by a friend of mine, especially pointing out how I had riginated these ideas, was not reported as it was read, the printed eport giving altogether a different impression from what the speaker aid. Those who heard the original can refer to the speech, as eported in the *Journal of the Society of Arts*—not *Artists*, as Mr. J. ennell has aptly described it. This sort of treatment, which is othing new to me, may excuse some of my bitterly written ıvectives.

Finally. Some of my friends to whom I have recently privately ommunicated my renunciation have wished to know how it came bout. Misgivings seized me after conversations with a great artist fter the Paris Exhibition; these were strengthened by the appearance f certain recent researches in psychology, and Hurter and Driffield's apers; and, finally, the exhibition of Hokusai's work and a study of the National Gallery pictures after three-and-a-half months' solitary study of nature in my house-boat did for me.

P.S.—Will every Secretary of every Photographic Society take four wafers and a sheet of black paper and hide for ever the words "To the Student" in pictures of East Anglian life?

L'ENVOI.

Having taken some earnest photographers a little way into the Art world, I feel it my duty to say that, when I have *fully* reconsidered the limited art possiblities of photography and the general philosophy of art, I will write another book; in the meantime, let students avoid all spurious imitations.

EPITAPH.

In Memory of
NATURALISTIC PHOTOGRAPHY,
WHICH RAN A SHORT BUT ACTIVE LIFE,
UPSET MANY CONVENTIONS,
HELPED TO FURTHER MONOCHROME PHOTOGRAPHY TO THE
UTMOST OF ITS LIMITED ART BOUNDARIES,
STIRRED MEN TO THINK AND ACT FOR THEMSELVES,
PRODUCED MANY PRIGS AND BUBBLE REPUTATIONS,
EXPOSED THE IGNORANCE OF THE MULTITUDE,
BROUGHT OUT THE LOW MORALITY OF CERTAIN PERSONS IN THE
PHOTOGRAPHIC WORLD,
BROKE DOWN THE PREJUDICE OF THE OUTSIDE PUBLIC AGAINST
PHOTOGRAPHY'S VERY SLENDER ART CLAIMS,
ENCOURAGED MANY AMATEURS TO BABBLE AND MAKE THE WORDS
"ART," "TRUTH," AND "NATURE," STINK IN THE
NOSTRILS OF SERIOUS ARTISTS,
ENDING BY GIVING A FEW A BRUTAL SORT OF APPREHENSION OF ART,
AND DYING WHEN ITS
ALLOTTED TASK WAS DONE WITH A GIBE ON ITS LIPS,
FOR THE "AMATEUR," THE "PLAGIARIST,"
THE "PRATING TRUE-TO-NATURE MAN,"
THE "IMPRESSIONIST," THE "NATURALIST," THE "IDEALIST,"
AND THE HUMBUG.

P. H. EMERSON.

[We have indicated with asterisks certain sentences that we do not reprint for obvious reasons.—ED.]

* This does not imply that Mr. Bate took any ideas from my paper; on the ontrary, I feel sure that his ideas were his own, as were mine.

DEVELOPMENT.

[A Communication to the Dundee and East of Scotland Photographic Association.]

HAD it not been for the fact that you are already in possession of my opinions upon almost every other photographic topic, and that sheer dearth has driven me, I certainly should not have tackled this, probably the most difficult subject in photography. If there be any one here who imagines that a few experiments with, say, half a dozen different formulæ is all that is needed to clear up the whole subject of development, I hope I may, before I am finished, cause him at least to reconsider the subject. I have read much on development, and have been again and again disappointed to find that the sum and substance of an elaborate inquiry resulted in the construction of a formula. After wading through columns of closely printed matter, it is the "heaving of a mountain and the birth of a mouse" to find the gist of the whole to be in some infallible formula, or, at least, what is supposed to be that.

The question of development is a very wide one, and, in fact, the compounding of a developer is the very simplest part of the whole. It is not to be denied that even in the purely chemical part there is a wide field for interesting experiment, and I have wiled away many an hour contrasting soda with potash, and this again with ammonia. There is room and need for such work, but I say it is not enough to confine one's attention solely to this aspect of the question, and it is my contention to-night, while not neglecting this side, to dwell also upon other considerations that are unfortunately too often lost sight of. In this way the subject comes naturally to be divided into two heads: first, what do we wish to develop? and, secondly, how and by what special means are we to attain development? First, then, what do we wish to develop? This seems almost a nonsensical question; we wish to develop a picture, of course. This is undoubtedly so, but all pictures are not alike, and here steps in a very common error. It is assumed by almost every one that perfect development means getting the last particle of detail out with pluck and roundness of image. This is not always the object of the true photographic artist. Scarcely in two pictures does he aim at the same amount of light and shade or of detail. If he has thought out the effect he wishes to produce, he must be prepared to sacrifice detail sometimes, or pluck, or even roundness. Every effect

should not be the same, or his results, however perfect from a photographic point of view, will be tame and often inartistic. In looking over the works of a friend not long ago, he whipped a picture from my hand, saying that he had taken the plate from the developer before the detail was out on a distant hill, but that he had taken it again; here it was. On comparing the two there could be no doubt that the first effect was immeasurably the better; but you must all have seen in your own experience how sometimes absolutely *bad* photography (from one point of view) gave, accidentally, effects you might have striven in vain for intentionally unless you recognise upon what the artistic success of a picture depends. I saw in the hands of a beginner the other day a splendid view of the river, with a dark, lowering outline of the Tay Bridge. He was in great grief over his failure, having, as he thought, either under-exposed or under-developed, or played havoc otherwise with it. I make bold to say he will not make a picture like it again for years.

But not to lose sight of the point, I wish to insist upon it that grand effects may be produced, showing the utmost variety of light and shade, detail, and every other photographic quality which is, according to some, always a fixed amount—namely, as much as you can get into every plate. Suppose, for instance, that the painter was to get such an absurd notion into his head, he would be obliged often to put in detail into his shadows when in point of fact his eye had seen none. Yet this is just what a great many photographic men do. They pick up a photographic picture, and after generously allowing its great artistic merit, will sagely add, "Pity there had not been a little more detail in the shadows," oblivious of the fact that this may be the very reason of its artistic excellence. There is no standard quality of detail, or light and shade either, for that matter, and it certainly is very absurd to count the success of a photograph by reference to such quality as the amount of detail in the shadows or any other part of the picture. If a picture is an artistic success this is enough, without a moment's consideration of it from either an optical or chemical point of view. Yet almost the one point spoken of in relation to developers is this power of giving detail in the shadows, as if this were a *sine quâ non* in every photographic experiment. I quite grant that a man may desire to produce a picture free of detail in the shadows, or all over even, but this is a very different thing from insisting that every successful photograph shall be crowded with detail, and that successful development always means this and nothing else. This is a huge point in my estimation—to grasp the fact that successful development *may* mean anything from almost clear glass to very near opacity, and that whatever method be adopted results as widely different as these shall be within the power of the operator. If, then, we are to be allowed this full range of liberty, before considering development proper it would be well to consider how we are practically to know just when we have the precise effect on the plate which we wish to produce on paper—in other words, supposing we have made up our mind that only a certain amount of detail is desirable in a certain instance, how are we to know when it is out and no more, so as to stop development? This, to myself, was at one time a very difficult matter; the result was generally *almost* the thing, but never quite. There are manifestly two ways by which to determine when the plate is ready, either by looking down upon the surface and noting the detail as it comes out, or by looking through the plate. In the ordinary course it is necessary to look through the plate to determine the density, and this is the general method whereby the detail is also judged. In order to do this, under all conditions I think it almost a necessity to adopt artificial light in the dark room. How is it possible to hit the thing to a nicety when the sun may be streaming in upon your dark-room window the one moment, and scarcely light enough to see the dish the next? If it is not an utter impossibility, it is at least a needless difficulty. I have a small gas lamp enclosed in white glass covered with yellow paper. I have the same light every time, for I have what they call a rat-tail flame, which I turn up till it touches a wire exactly two and a half inches above the burner. This is a very constant power of light, and adds much to the ease and certainty of judging the density. But I have another aid, and as this introduces other considerations, I must seem for a moment to go off at a tangent.

It must have occurred to you that it is an unfortunate thing that the production of detail and the acquiring of density are processes going on at the same time, but not much dependent the one upon the other. Sometimes, when the exact amount of detail desired is just there, the plate will be too thin, and to get it thicker one has to develop on with a certainty of losing the effect he had aimed at. At other times the plate will be quite opaque in parts before enough detail has had time to come up. In order to be master of the situation and have an easy mind, one must be able to say he will have more detail but no more density, or *vice versâ*, just as he thinks fit. And so he can, but not by the ordinary method; he must separate the two processes. He must, first, develop a thin image with just that detail he wants; and, secondly, he must add to its density afterwards. Of course, this is nothing new; it has been proposed often, but somehow people seem to prefer to stumble on in the bad old way rather than be troubled to learn a newer and better method. Since I have adopted this plan, photography has new charms for me. I am not now a creature of circumstances, but feel that if a picture is not up to the mark, it is my ideal that is at fault, not a mere accident of manipulation. This is an immense gain. And now to revert a moment to where we were. Do you see that while developing this *thin* image the plate is always beautifully transparent, and by looking through it to a light of constant strength, one soon learns enough to make the process a certainty as to the amount of detail.

When I speak upon the purely chemical part of development, I will say how I have myself been working for some time. Meantime, let me just say that by this method one has all the advantages of both slow and rapid development with the drawbacks of neither, and it has as well solved for me at least the other vexed question of strong *versus* weak developers, much restrained or little restrained. Having now discussed the first part of the question of development, let us proceed to the more purely technical or manipulative part.

I may say that I do not attach any very great importance to the compounding of a developer. It is a very interesting study, no doubt, when one is in the mood for it, to discover minute advantages or disadvantages in this developer or that; but, after all, for my own part the precise formula of the developer troubles me but little. I have tried, I think, almost every combination devised, and, with the exception of two formulæ—one containing alum, the other a large quantity of nitric acid—have got good results from all. I have seen others work and swear by certain combinations, but a critical examination of their work displayed nothing in particular. When soda was first introduced I tried it very critically, and got it into my head that there was something very particularly fine in the working of it. I imagined that a soda-developed negative gave a better range of tones and all what not. The lapse of time, however, brought calm reflection, and then I had to admit that, however pleasant to work, my ammonia-developed pictures were every whit as good. The same thing happened with potash. I read all I could about this alkali, and had potash on the brain for a certain time. The negatives which I got with potash and sulphite of soda were some of them exquisitely beautiful, but as printers they turned out failures.

J. K. Tulloch, M.D.

(To be continued.)

PHOTOGRAPHY IN THE COLOURS OF NATURE.

[A Lecture delivered before the Franklin Institute.]

I have already made two communications to the Franklin Institute on the subject of photography in colours. My object in lecturing upon it at this time is to go further into its history, to give such accurate knowledge of the subject as will make the force of my criticisms more readily apparent than heretofore, and to better demonstrate my own method. The substance of my lecture might have been more appropriately presented in the form of a paper to be read at a stated meeting of the Institute; but a satisfactory presentation of a subject so complex and difficult could not be made in the brief space of time allowed for the reading of such papers, and I offer this excuse for presenting it as a lecture.

Heliochromy—meaning sun-colouring—has been settled upon as a name for processes of photography in natural colours, or in the colours of nature. There are two kinds of heliochromic processes. In one, the light itself produces the colours by direct action upon the sensitive plate; in the other, light does not produce colours, but is made to regulate their distribution and combination. Some of the colours of the spectrum were imperfectly reproduced by a process of the first kind nearly thirty years before the discovery of the Daguerreotype process. Seebeck, of Jena, in 1810, found that chloride of silver, after preliminary exposure to white light, is coloured a brick-red by prolonged exposure to the red light of the spectrum, and a metallic blue by the blue light. After the discovery of the Daguerreotype process, several experimentalists tried so to modify the preparation of the chloride of silver plates as to make them capable of reproducing all the colours of nature. In a photographic text-book published so long ago as 1853, I find the following statement:—"Even the long-debated question of the reproduction of the natural colours by the agency of light seems on the point of solution. . . . M. Niépce de St. Victor, from whose well-known character as an experimental philosopher much might be expected, has forwarded to London, as we understand, specimens of proofs in which every colour is reproduced with a vigour and richness

truly wonderful." Similar announcements have been made since that time, but the best results ever actually shown were nothing more than interesting curiosities. Dr. H. W. Vogel,* who recently had an opportunity to compare some of the latest and most talked-about of these "photographs in natural colours" with the original coloured pictures from which they were printed (by contact), says :—

"The original is one of those transparent window pictures in bright colours, brought into market by Grimme and Hembel, in Leipsic, as a substitute for glass painting. It reprents a Cupid with yellowish-brown hair and wings, and a small blue scarf around the waist, whose ends wave in the wind. He carries an arrow piercing two hearts of ruby colour; between the knees he holds a quiver with yellow ornamented opening, and in his left hand the upper part of a large brown cross-bow, with blue and yellow mountings, the lower part of which rests, with the figure, upon an idealistic thistle blossom of red leaves. The stem is of the same colour, and the plant shows fresh green leaves. The picture has a pale blue background, and red, green, and yellow ornamentation around the border in very pronounced colours. This border ornamentation affords an excellent means of comparison with the print. The latter, in opposition to the bright original, shows a greenish-grey, partly dark, ground. At first look, one recognises readily that of all the colours only the red of the original has been distinctly reproduced. But it is not true to nature; it has a copper-red colour, and differs decidedly from the vermilion and carmine red of the original. Besides this copper-red, only the blue of the scarf and the mountings of the cross-bow and quiver come out as a very pale light blue, with no natural resemblance. The black lines of the border decoration appear alongside of this as a violet-black. These are the tones which, to some extent, have a similarity of colour, but with the other colours it is not so favourable. The yellow squares and green trapezoids of the border decoration appear neither yellow nor green, but have a greyish-red tone. The blue fields are not blue, but greenish-grey, like the ground. It is most singular that several parts are reproduced in red which actually are not red, but brown-yellow, as, for instance, the hair, the wings, the cross-bow, the thistle, &c. The green leaves in the print show no fresh colour, and the red leaves of the blossom and the body of Cupid show only a pale flesh colour. . . . The resemblance of the new photographic pictures to natural colours is, therefore, not very favourable. Only two colours can be recognised distinctly in the copy, of which the red is the best; in a less degree the blue, which is weaker as far as the picture is concerned. The blue in the ornamentation around the border, and all other colours, either have not been reproduced at all, or are entirely unlike the original. . . . If I compare the sample before me with the pictures I have seen in 1867 of Niépce de St. Victor, Becquerel, and Dr. Zenker, I must confess that those much older productions were richer in colour, although the tones deviated likewise considerably from the natural ones." F. E. Ives.

(To be continued.)

PHOTOGRAPHY IN ANILINE COLOURS.

[Abstract of a Communication to the Society of Arts.]

We shall confine ourselves to processes based upon the aniline or coal-tar colours, since we find them completely typical of photographic processes generally.

The simplest method of producing a picture in any of these colours is based upon the familiar observation that these colours—dyed upon fabrics—all fade more or less on exposure to sunlight. This destruction is a complicated action, and therefore we shall not attempt to examine it in detail. We shall content ourselves with exhibiting prints obtained by exposure to sunlight paper coated with two dye-stuffs, which we select as specially fugitive, viz., eosine and methylene blue, under glass positives, as in any of the ordinary and familiar printing methods.

In these prints the gradations of shade are exactly reproduced; those portions which transmitted most light are the most bleached, whereas the shadows of the object have protected the portions of paper beneath them, and by the preservation of the colour the depth of shadow of the original is reproduced. We need scarcely point out that such a method of photography has no practical value; not only is a prolonged exposure necessary, but the prints, in addition to being somewhat unsatisfactory in themselves, have this disadvantage—that, under the ordinary conditions of exposure, the colour will continue to fade over the whole surface, with the gradual obliteration of the picture.

What we want to make such a process practically available is a compound possessing (1), a high degree of sensitiveness; and (2), the property of entering into combination with some other compounds giving a product which will resist the further action of the light.

In the diazotype process, which is the main subject of this paper, we have as the actual photographic agent not only a highly-sensitive compound—highly sensitive, that is, to the action of light—but one which can be readily converted into a variety of colouring matters. The process consists of three stages:—(1), Drying, or coating the surface upon which it is required to photograph with a particular compound, which is then, (2), converted into a photo-sensitive derivative, and, (3), exposed to the light under the usual conditions for giving the picture; (4), converting the sensitive compound wherever it survives, through having been protected by the shadows of the object photographed, into colouring matters, and thus the picture is developed from the weakly-coloured sensitive compound into well-marked shades of red, orange, brown, purple, or blue; and these shades being formed in stable colouring matters, the picture is at the same time fixed.

For the better understanding of the process it is necessary that we should acquaint ourselves with the properties of these substances apart from any reference to photographic action.

The compound we start with is a yellow-coloured body, to which the "trivial" name of primuline has been given. This compound is obtained by the action of sulphur upon toluidine, a coal-tar base closely allied to aniline. In this action not only is there combination with sulphur, but several molecules of the toluidine are built up into one complex molecule.

Then to express the matter in our modern formulæ, we start with C_6H_5, Cu_3, NH_2 toluidine, and obtain—

$$CH_3, C_6H_2{<}\overset{S}{\underset{N}{>}}C, C_6H_3{<}\overset{S}{\underset{N}{>}}C, C_6H_3{<}\overset{S}{\underset{N}{>}}C, C_6H_4Nu_2$$

primuline base—a very formidable-looking compound. Now the important part of this formula to us is not the unwieldy body, but the head, the small group NH_2. We can consider primuline in its simplified form, XNH_2, and we see that this differs from ammonia, HNH_2, in having one H replaced by a complete group. Corresponding to this general resemblance, there is a similarity in their distinguishing property; both are basic or alkaline substances, and combine with all acids to form salts. One only of these we have to consider, that very combination with which the stable primuline—highly resistant to all agencies which destroy the more fugitive colouring matters—is converted into a photo-sensitive derivative. This acid is nitrous acid, HNO_2. Nitrous acid and ammonia combine to form ammonium tritrite. When this tritrite is heated, it is resolved spontaneously into nitrogen gas—the inert constituent of atmospheric air—and water. A. G. Green, C. F. Cross, and E. J. Bevan.

(To be continued.)

PARIS GOSSIP—CRYSTALLOS FILMS AND OTHER MATTERS.

The last event on the French photographic market is undoubtedly the apparition of the long looked-for crystallos films. Specimens of this film had been presented for the first time about three years ago to the Photographic Society in December, 1887, and it was very curious to see the members of this Society examine them. I think it was the first roll of this kind ever made, excepting, of course, the Eastman papers. On both sides of the rather spacious room members were holding both ends of the band, which seemed endless, and forty-eight different pictures passed before the eyes of the assistants on the same row. New specimens were presented again about a year later, and everybody interested in the question has been waiting anxiously for their appearance in the market, but to every inquiry the manufacturers answered that the crystallos film would be sold "next month." Finally, some weeks ago, Mr. Jumeaux showed me a very fine specimen of a negative, saying that this was the result of three years' work and study, and as many times 100,000 francs. "Oh, Mr. Jumeaux! for this price you are entitled to expect something perfect," was my reply. I think it may be interesting for your readers to have a few historical notes of the crystallos films, so that any idea of what could be considered as plagiarism of the Eastman films or other fabrics might be done away with.

The manufacturer of the crystallos films is Mr. Jumeaux, whose dolls are now exciting the admiration of our little girls in the fashionable toy shops in Regent-street and Piccadilly. The "Bébé Jumeaux" have obtained a first prize at last year's Universal Exhibition. Let us hope that Mr. Jumeaux will treat photographers as fairly and consciously as our babies. Now, as for the name or the matter, crystallos: what is it? It is not xylonite, nor collodion, nor gelatine, nor rubber. It is crystallos; that is to say, a quite new material. The word means everything that is bright, pure, transparent, inextensible, splendid, and—perfect. It is about one-fiftieth of the weight of glass plates, as thin as tissue paper, and in the meantime as flat as the surface of a lake in summer time. It is sold in sheets and in rolls of every size and every length, and every

** Anthony's Bulletin*, 1890, p. 325.

dealer undertakes to get it to fit on Eastman or other roll holders. Its rapidity is said to be superior to Lumière's "Blue Label," which is considered here as the most rapid ever made. The price is moderate: 4*s.* a dozen half-plates. But I think this is more than you want to know; still, it may be a comfort that these films are now manufactured on this side of the Atlantic.

Photographic journalism has marked its progress and degree of fashionability by the publication of a new monthly called the *Photographic Gazette*. It presents its readers with a fine collotype print or photo-engraving every month. The cover shows a series of photographic funs. In the first place, Mephistopheles introducing Marguerite's portrait to Dr. Faustus by means of a photographic lantern; and this suggests the idea that if Dr. Faust had not fallen in love at first sight with Marguerite's picture, Mephisto might possibly have found some other lantern slide in the pockets of his spacious mantle to submit to his victim. The manager of the *Photographic Gazette* is Mr. G. Mareschal, who has acquired a great authority in photographic matters by the very interesting paragraphs he used to give in *La Nature*. The character of this new periodical seems to be in the meantime scientific and *mondain*. Let us give a hearty welcome to our new *confrère*.

These last six weeks have been more favourable to skating than to photography. Three times influential members of the "Cercle des Patineurs" have tried to offer a great skating *fête* in Bois de Boulogne for benevolent purposes, but every time when the date was fixed milder weather set in and destroyed the project. On New Year's Day a bright sun and fine weather has greeted the Parisians on their visit to the *Foire aux étiennes* (New Year's fair). May this be the happy omen for 1891. This is the best New Year's wish I can address to the readers of The British Journal of Photography.

Morris.

NOTES FROM NEWCASTLE.

Mr. Sawyer's Camera Club exhibit has been, and is, on view at the Art Gallery here, and is an attraction in itself, but visitors should not fail to inspect and study some of the many fine paintings hung there just now, a few *Sketches on the Coast of Cornwall* by Tom M. Henry, and studies by G. B. Sticks, being particularly noticeable.

The local Society's annual meeting is a tame affair now. When is the annual dinner to be revived, and why not with such a large membership go in for a ball or *conversazione?* Many of the members are, to my knowledge, enthusiastic exponents of the "terpsichorean art." As for *lantern* displays, I think we get rather too much of a good thing.

Mr. Galloway, our oldest amateur (I believe), retires from the Council. Mr. Galloway took a medal at one of the earlier exhibitions for some very good work, quite Sutcliffean in character, and he is as ardent a worker as ever.

In *Vestiges of Old Newcastle and Gateshead*, Messrs. W. H. Knowles and J. R. Boyle have produced a most interesting volume; all the fine old buildings, remains of ditto, are faithfully depicted here. The sketches, all original, are by Mr. Knowles, a local architect, but I should imagine he has found photography a great assistance in many of them. No Tyneside amateur or professional should be without the above-mentioned work, and that valuable *Guide to Northumberland* by Mr. Tomlinson.

The *coterie* of amateur and professional painters denominated the "Bewicke Club" are actively preparing for their annual exhibition, and there is, I am glad to hear, every prospect of a really good show.

D. D.

Foreign Notes and News.

We learn from the *Beretninger fraan Danska Fotografen Forening* that photography is being persistently carried out from a captive balloon in Copenhagen. A captive balloon until recently made daily ascents from the Tivoli Park, and advantage was taken of them to secure a number of bird's-eye views of the city.

Messrs. Lenard & Wolf have, according to the *Revue Général des Sciences*, been examining certain phenomena described by Hertz & Nodon, and find that ultra-violet light has the power of pulverising certain bodies, and that electricity is carried off by particles torn from their surface. Copper appears to be especially sensitive to the action in question, and is very decidedly comminated under the action of the ultra-violet rays.

The *Progrès Photographique* gives us an amusing account of the difficulties with which photographers in China have to contend. It is almost impossible to prevail upon a Chinaman to allow himself to be "taken." The reason of this reluctance is the universal prevalence of the opinion that in being photographed the subject is liable to lose a portion of his soul, which becomes fixed in the photograph and withdrawn for ever from its original possessor. It is evident that professional photography stands on a much higher level in China than is the case in this country, for *soul* is just the very thing that so many of our portraits do *not* succeed in fixing.

Automatic photography seems to have entered upon a new phase of development in America. One of the main difficulties formerly was occasioned by the variability of the light, so a device is now added by which, as soon as he victim has inserted his coin, a dose of blitz-pulver is poured out and ignites electrically. The public has thus the advantage of running a chance of being blown up as well as photographed (if we may judge from recent experiences with blitz-pulver across the Atlantic) all for the same money.

We learn that Herr Anschütz has recently been perfecting and simplifying his celebrated tachyscope. It is now to be had in a very convenient, portable, and compact form, and sufficiently moderate in price to lead to the hope that it will ere long become as indispensable an adjunct of every well-regulated school as the lantern now is.

A discovery of very considerable importance from a scientific point of view has, we are informed by the *Kölnische Zeitung*, recently been made by Herr Dobrzynski, of Lemberg, and communicated by him to the Academy of Sciences of Vienna. Herr Dobrzynski has, in fact, succeeded in obtaining photographic effects from the electro-magnetic waves, the existence of which was comparatively recently established by Professor Hertz, of Heidelberg.

Herr Dobrzynski arranged a number of gelatine plates, some parallel, and some at right angles to the direction of propagation of the waves in question. After an exposure of some three hours the plates were developed and fixed, and a number of alternately dark and light strips were then observed in the direction of the movement of the waves. The opinion of Herr Dobrzynski is that the electro-magnetic waves must differ very considerably from one another in length, and that only those of from 6–200 mm. produce any effect upon the plates.

An American photographer, Mr. B. Hains, of New Albany, has undertaken to photograph the interiors of all the caves in Indiana by means of the magnesium light. He has recently succeeded in obtaining a magnificent view of "Rothrocks Cathedral," a portion of the Wyandotte Cave. As the portion in question measures 1000 feet in circumference and 185 feet in height, the triumph obtained in this respect by the magnesium light hardly needs to be pointed out.

The existence of one more claimant to the discovery of photography in natural colours is announced in the Paris *Figaro*. This time it is a Japanese *savant* for whom the claim is made, and he would almost seem to have desired to add to the celebrity of his discovery by the choice of a somewhat unusual name, viz., Azurizawa Ryochi Nichome Sanjukanboz Kiobashiku!

NOTES FROM SCOTLAND.

The anxiously looked-for, the wearily waited-for report of the decision of the jurors on the exhibits at the Edinburgh Exhibition has at length arrived and been published. The Scotch exhibitors, professional and amateur, have little need to be ashamed of the position they occupy or of the proportion of honours which have fallen to them, when it is noted that the professional exhibitors have received five silver medals, fifteen bronze medals, and two honourable mentions. One of the latter, however, is credited to "G. Bruce, Dunstable," on page 11; it should be Duns, Berwickshire. The amateurs have secured four silver and four bronze—in this I include Dr. C. P. Smyth, who, although now in England, was so long with us as President and member of the Society, Astronomer Royal, Professor in the University, &c., that we claim him as Scotch.

This is a creditable proportion of the whole number awarded, where the general average was so high that no one picture could be picked out so outstandingly superior as to claim or be awarded the gold medal for the best picture of any size or subject in the exhibition.

One of the great difficulties incident to this, as to most exhibitions, was the distribution of the various classes in a most erratic fashion all over the galleries, rendering comparison difficult. This in the case of the larger examples did not matter so much—indeed, the mere fact of great size in any one or in any set of pictures at once secures an attention in a large hall or gallery which the quality of the work may not demand,

or even deserve, while the smaller-sized examples, not being of a character to be useful to the Hanging Committee as centres, or fitted to make prominent line pictures, have to be content to be put wherever they may fit. This raises the general question which arises in the case of all exhibitions such as this has been, embracing the infinitely little as well as the larger and comparatively great: How can they all be best displayed, in presence of large direct pictures and of still bigger enlargements? There is not a doubt that the smaller examples, say those from half-plate and downwards, suffer, however fine they may be, from the indiscriminate juxtaposition, and this prevents proper judgment in the competitions, and the public, which, after all, is the ultimate judge, is the greatest sufferer.

The arrangement of the lantern slides, which was as perfect as such things can be, suggests a method of treatment by which all the smaller pictures could be shown as perfectly as *they* were. Let the display of such small-sized pictures be arranged, not upon the walls at all, but on such tables or screens as the slides were shown upon, in two or more rows, at the proper visual angle, and so that no one should be above the convenient line of sight. This would only necessitate a restriction in the external height of the frames, without interfering with the design or material, the different-sized pictures being made to fit with varied margins of the mounts, while for the number of pictures in one frame it would not matter whether there was one only or half a dozen. By this method the works of each exhibitor in the smaller sizes could be kept better together, and in company with those of other exhibitors of the like sizes and in the like classes, which is a decided advantage in competitive examinations.

A similar thing in this same direction I have done repeatedly with much advantage to all at other exhibitions with those pictures which cannot be placed upon the line, and it is by running a light table or framework all round the walls of the room at a proper angle, and with a simple ledge to prevent the pictures slipping. By this method of arrangement all examples within the width of the slope are simply placed thereon without screwing or fixing of any kind, and in a tithe of the time. These suggestions, it will be seen, only render necessary the fixing the height of the outside size of the frames, but not of the length or the number of pictures included.

It may be of some interest and in relation to your remarks on the *Athenæum's* article as to copying books and MSS. in the Bodleian Library, to mention that we have here one of the four great libraries (called the Advocates') which are entitled to a copy of every work entered at Stationers' Hall, and that as showing the jealousy and red tape which once existed, if it does not yet, in the custody of those treasures, to give shortly an experience which is photographic and historic, and which the new proposals if carried out here will sweep away.

The late Mr. Hunt, of Pittencrieff, had laid claim to and held that old historic monument, the Abbey of Dunfermline, as his private property. This necessitated a famous law case which came before the High Court of Session upwards of thirty years ago, and I believe it was only finally settled in the House of Lords. It was entitled the Queen *versus* Hunt, and as one of the principal pieces of evidence relied on by the Crown was one of the books in the Advocates' Library, of which they had only one copy, and it was necessary to have a number of copies, this had to be got over some way or other. I was accordingly entrusted by the Court with the reproduction in *facsimile* of five of the folio-sized leaves of the book, which were deemed necessary in the case. The first was the title page of *Theatrum Scotia*, which is a series of copperplate views of all the most famous buildings in Scotland of the period, say, two hundred years ago, the privilege of executing this being granted to the artist, Jacob Plizer (who was one of William of Orange's artillery officers), in lieu of certain arrears of pay and emoluments. The title of the book was printed in black and red; and the others were the dedication to their Majesties William and Mary, and three views of Dunfermline Abbey in black only. These were all copied in *facsimile* by the then little-known process of photo-lithography, and while the book itself was detained in Court, each interested party was supplied with a set of the *facsimile* copies.

In the process of doing them, as the library had no convenient place for such a purpose, the book was brought to our place by one of the officers, who remained there with it in his custody all day and every day I needed it, taking it back to its resting-place each afternoon and bringing it again whenever it was wanted either for copying or collation till the work was entirely finished, and in those days that was not so easy a thing to do as it is to-day. I believe, also, that the same officer had to see the proofs pulled off, but am not so certain of that at this distance of time. In court the copies had to be scrupulously compared and sworn to, and I was complimented by the Court on the strict verisimilitude. The lithographers who did the work, but who knew nothing of the process at that time, were Messrs. Schenck & McFarlane, of Edinburgh, but they entered into the thing, and succeeded by doing exactly as they were told.

I notice in Mr. Richmond's article on *Blisters* (pages 10, 11), that in speaking of the coagulation of double albumenised paper he thinks this is effected by floating the first coat on boiling water. If he turns to one of the back numbers of this JOURNAL of, I think, 1865 (but have not a file at hand to verify), he will find in a paper I read before the Edinburgh Society full information on the subject, and the first ever published. The method of doing it is by steaming the albumenised paper at a low pressure after it has got the first coat, as there described, but he will not find what afterwards happened—viz., that Mr. Skinner, who formed the Albion Albumenising Company, came to me and saw the thing done, and got all other information he asked for and more, and then—applied for a patent and got it, and so first introduced it as a trade matter: for the same thing which was fully published, but not invented, by me—that honour belonged to Mr. Wood, to whom was given the full credit in the paper. Mr. Wood and I worked together in the friendliest way, and the process was made public with his full approbation. He, not being a member of the Society, could not bring it forward himself, and I, who had worked all through with him till success was gained, being a member, was entrusted with the task of giving it publicity. Such is sometimes the reward of ingenuity and merit.

While you in the southern metropolis have been hardly treated in the matter of weather—fog, snow, frost, and slush—for the last month or so, we in the northern capital have been enjoying exceptionally fine weather, although 400 miles north of you, and it still continues.

W. H. DAVIES.

Our Editorial Table.

THOMAS'S "PALL MALL" LANTERN PLATES.

A SAMPLE of these plates has been received from the well-known house of R. W. Thomas & Co., Limited, Pall Mall. A peculiarity we found when trying them was the intensely glossy surface of the picture after being dried. We used the hydroquinone developer. The tone was a neutral black, but from the formulæ for developing, both with hydroquinone and pyrogallic acid, which accompanied the plates, we find that by adhering to the directions very lucidly given they can be developed in either black, brown, purple, or red tones. We have been much pleased with them so far as we have tried them.

OPTICAL PROJECTION.

By LEWIS WRIGHT. London: Longmans, Green, & Co.

IT is no reflection upon other works devoted to optical projection when we say that Mr. Lewis Wright's treatise is more comprehensive in its scope than any that have yet been issued, at least such as we are aware of. He has for so many years been recognised as a scientific expert in all such subjects that we naturally expect to find the subject in his hands treated in a masterly manner; nor are we disappointed.

After devoting a few chapters to the construction of the lantern, the lenticular part being treated at less length than we think it was in the author's power to do, Mr. Wright gives a good practical dissertation upon the making and using of oxygen, dwelling upon compressed gas, regulator, ether generators, burners, dissolving taps, and the numerous things that conduce towards obtaining the best possible light.

But it is when Mr. Wright leaves the lantern pure and simple and occupies the higher ground of its scientific applications that he speaks with a power peculiarly his own, and we are pleased to find rather more than one-half of his book so devoted. In this department he opens the ball with the microscopic attachment to the lantern, describing its construction and uses, giving, a little farther on, an account of his own projection microscope, in which the drawbacks incident to some others are claimed to be eliminated. With the use of the lantern microscope he utters the caution "*Never to forget* the alum trough in the ordinary slide stage. Without this, ordinary balsam-mounted slides will be melted, and living objects rapidly killed by a heat nearly boiling." While on this topic, we may express wonder that the beautiful and philosophic method enunciated by the late Rev. J. B. Reade, F.R.S. (in our ALMANAC for 1868), for effecting the separation of the rays of heat from the rays of light in solar and gas microscopes is seemingly lost sight of by scientific writers and lanternists of the present period. Mr. Reade there says, "I find that it is possible 'with burning glasses' to form bright points of light without any sensible heat," and he goes on to describe how, by a combination of lenses, he effects this. Mr. Wright does not appear to take kindly to the mechanical stage for the projection microscope. He declares it to be "simply a nuisance for ordinary projections," and useful to only two classes of persons, the one being the photo-micrographer, the other the biological demonstrator. It is really astonishing how opinions vary as to this matter, for we lately voted our own projection lantern to be somewhat of a nuisance for *want* of this mechanical stage; and as far as our mechanical abilities and our spare time permit we are actually having the want supplied. The rack and pinion forms a delightful factor in placing an object "just so" on the screen.

With the chapters devoted to demonstrations in physics, physiology, chemistry, sound, and light, in its reflections and colours, we are greatly pleased, and we would specially recommend the chapters devoted to the polarisation of light and the appliances by which it is effected and demonstrated to those who desire to make acquaintance with this fascinating department of optics.

The work contains 232 illustrations.

The Photographer's Diary and Desk-book for 1891.

This really useful table diary is issued by the proprietors of the *Camera*, 55 and 56, Chancery-lane, W.C. It is quarto size, and contains three days to the page, the advertisements being mainly printed on interleaved blotting-paper. Several pages prefacing the diary portion are devoted to that useful information to be found more handily than elsewhere in diaries and almanacs. We hope to keep it before us, even on our editorial table, all this year; and a capital likeness of Mr. C. H. Bothamley, of Leeds, which it has as a frontispiece, will tend to keep down "the blues" when we gaze upon his genial countenance.

The Edinburgh Society's Presentation Print.

This print is so excellent as to merit special notice. It is a photogravure beautifully engraved by Mr. Balmain, of Edinburgh, from a negative by Mr. R. Keene, of Derby. The subject is a view in Dovedale, Derbyshire.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 585.—"Improvements in Photographic Cameras." Complete specification. Communicated by T. Ardern. S. Calvert.—*Dated January* 12, 1891.

No. 664.—"Improvements in or appertaining to Machines for Automatically Taking, Developing, Fixing, and Delivering Photographs." Complete specification. Communicated by The Fisher Speciality Manufacturing Company. W. P. Thompson.—*Dated January* 13, 1891.

No. 685.—"Improvements in Apparatus for the Production of the Magnesium Light for Photographic and other Purposes." E. J. Passingham.—*Dated January* 14, 1891.

No. 699.—"Improvements in and relating to Automatic Photographing Machines." J. M. M. Munro and J. McFarlane.—*Dated January* 14, 1891.

No. 760.—"Viewing Lantern Slides by means of an Instrument termed a 'Lanternscope.'" J. Dugdale.—*Dated January* 15, 1891.

No. 874.—"Improvements in Photographing." A. G. Adamson.—*Dated January* 17, 1891.

No. 880.—"A Process of Photography by which, from a Single Negative, Permanent Prints are Produced in the Natural Colours of all Objects." V. Mathieu.—*Dated January* 17, 1891.

PATENT COMPLETED.

New or Improved Method of and Apparatus for Ascertaining the Requisite Time of Exposure in Photography.

No. 669. Edward George Ballard, 1, Eversley-park, Chester.—*December* 27, 1890.

A ready method of measuring the amount of actinic rays proceeding from any landscape or object has for a long time been a thing much desired by photographers, both amateur and professional. Many instruments with this view have been from time to time brought out, but none of them have proved very satisfactory. The same may be said of tables, which, although of great assistance in open landscape, have this drawback, that, wherever the quality of the light is interfered with, that is, in forest scenery, deep glens with overhanging trees, where the very air appears to be green, interiors of churches, &c., where the light which enters perhaps passes through coloured glass, and so forth, you are compelled to guess at the exposure after all.

The apparatus about to be described purposes not only to measure the intensity of the rays of light proceeding from any object, but also the quality of the same.

The principle upon which the instrument is constructed is based upon (1) that luminous calcium sulphide, or Balmain's luminous paint, is only excited by those rays of light which usually act upon the photographic plate; (2) that when luminous paint is excited by exposure to light, either daylight or other white light, such as a burning piece of magnesium wire, and the source of light is suddenly removed, it will be observed that the bluish light emitted from the luminous paint gradually fades. The rate and manner in which this fading occurs are employed by me in this invention as a means for ascertaining the intensity of the light proceeding from any object, landscape, or sea view.

This is arrived at by noting the time required for the luminous paint to acquire the same degree of intensity as a portion of the light proceeding from the object, landscape, or sea view in question, and referring to a table specially constructed for that purpose.

In carrying out my invention into practice, one form of apparatus which I have found very successful is as follows, and is given by way of illustration only.

A wooden, or other opaque tube, coloured dull black inside and open at both ends, and of convenient size and shape at one end to adjust to the eye, is provided at the other end with a second and similar but shorter tube hinged to it so as to form a lid. This lid is glazed next the tube with blue glass, capable of cutting off all rays except those corresponding with those which proceed from the luminous paint. A second glass is slipped into this, coated as regards about half its area with an opaque layer of calcium sulphide paint (Balmain's luminous paint), above this a number of layers of tissue paper or other uniform translucent material is placed, and a covering is added of ordinary, or cobalt blue glass. The number of sheets of tissue paper to be inserted is found by experiment for each variety of dry plates. Their use is to lessen the intensity of light passing through to the degree requisite to give correct results with the instrument; this, once found, is constant for that variety of plate.

To use the instrument, allow the hinged portion to fall, and so get the side with the luminous paint fully exposed to daylight for thirty seconds.

Place the eye at the end, then quickly close the hinged portion. A blue luminous ground and a dark ground will be seen side by side.

Count the number of seconds it takes for the blue luminous side to acquire the same tint as the dark side, that is, note when the difference in blue disappears. Refer to the table mentioned, and opposite the number of seconds required for the two halves to appear alike will be found the correct exposure to be given to the photographic plate to which the instrument is adjusted.

The instrument I have constructed is adjusted to a plate of about eighteen Warnerke sensitometer value, working with a stop or diaphragm in the lens of one-sixteenth of the focus of the same.

The actinometer can easily be adjusted to a plate of any degree of speed by removing or adding to the layers of tissue paper behind the glass carrying the luminous paint.

In adjusting the actinometer any of the published tables of exposure may be employed, or, better still, that excellent little calculating machine for photographic exposures called the "actinograph," invented, after much labour and study, by Dr. Ferdinand Hurter and Mr. Driffield, of Widnes; or in very perfect instruments a clockwork, or its equivalent, can be set in action by closing the hinged portion, and arrested by opening it; this can be arranged with a scale to show the requisite exposure in seconds.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 26	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 27	Great Britain (Technical)	5A, Pall Mall East.
,, 28	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 28	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 28	Burnley	Bank Chambers, Hargreaves-street.
,, 29	Halifax Photographic Club	Mechanics' Hall.
,, 29	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 29	Oldham	The Lyceum, Union-st., Oldham.
,, 29	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 15,—Mr. Leon Warnerke in the chair.

A commencement of the library collection was made by the presentation of Hunt's *Photography*, and a hope was expressed that by the acquisition of works of historical interest and standard classical value, the usefulness of the Society and convenience of the members would be further promoted.

A letter was received from Mr. Willis, of the Platinotype Company, in which a demonstration or paper later in the season was promised.

The Chairman then referred to the International Congress to be held at Brussels next August, and said that the Congress at Paris had been very little international in character. It has passed certain measures that could scarcely be called universal. Brussels being a place that was politically neutral, something more truly international might be expected. He thought there was now a good opportunity of serious work being done. It would be very desirable that, if representatives from English societies were sent there, they should be in accord as to what to propose, what to defend, and what to yield. The first question now was, whether this Society would decide to take part in the proceedings of the Congress.

The members then voted *nem. con.* that it would do so.

It was proposed that at the next meetings of the Society a small committee should be appointed to consider what questions should be put, and the treatment of them.

The Chairman then referred to the standards for light that had been proposed. The unit of glowing platinum that had at one time been recommended was not a practicable one. There was only one apparatus in the world for producing it, and that one was inaccessible. He had endeavoured to obtain access to it, but had failed. A unit to be practical should be one that could be in everybody's hands; that is to say, it must be cheap and it must be invariable. The acetate of amyl lamp had been recommended by the late Congress at Paris; but in several points it was not practical. The price was high, and the lamp itself soon got out of order. The smell, too, although at first not unpleasant, became exceedingly so when it had to be endured for a length of time. He showed one of these lamps which he had had for six or seven weeks, and, to his astonishment, he had found that it would still work. His first experience of an acetate of amyl lamp was very disastrous. The acetate of amyl quickly corrodes copper, and the acetate of copper formed is highly hydroscopic. The wick was, therefore, quickly made useless.

Mr. W. E. Debenham inquired whether benzoline, or some standard paraffin, could not be made to serve in a lamp of that form.

The Chairman thought that it could, and would be better than acetate of amyl. The question that occurred to him was whether it would not be best to have as a standard a lamp burning a regulated quantity in a given time. Other objections to acetate of amyl were that it is not invariable itself, that the price is so high, and that it is not generally obtainable. Six shillings a pound was the ordinary price, but there was another quality for which twice that price was asked, showing that the quality was not invariable. There were also probably not more than two or three houses in London where it could be obtained. Pentane was another substance that had been recommended, but it was not usually to be got. Amongst the hydro-carbons a substance could surely be found that would be just as good as those which had been advised, without their drawbacks. Mr. Bothamley had found that even coined silver was not pure enough for the metal of an acetate of amyl lamp; it must be pure silver.

Mr. A. Haddon said that a fortnight since he had stated that pyro, when mixed with acid sulphite, yielded a yellow liquid, and other members had said that the liquid thus formed was pink. His own view was that the pink colour when formed was due to some impurity, and he proceeded to mix a solution, which proved to be yellow. Mr. Cowan also had stated that sulphurous acid was not a good preservative of pyro. He (Mr. Haddon) held that it was a good preservation, and he mixed a solution, which was to be kept at the rooms of the Association, and tested at such a future time as might be thought desirable for proving its qualities. It had further been stated by Mr. Hart that a compound was formed between pyro and sulphurous acid, and that consequently the mixture did not possess so strong an odour as that belonging to a solution of sulphurous acid alone. He therefore now mixed two solutions containing an equal proportion of sulphurous acid, but one of them also containing pyro. On being handed to the members no difference in pungency of smell could be detected.

The Chairman suggested now taking up another developer, eikonogen. The last that he had obtained was in the form of beautiful white crystals, and the solution kept very well. He found, however, that it kept better with caustic potash than with the carbonate. His first experience with the developer was at the time of the Paris Exhibition. He there visited M. Marcy, who was engaged in work requiring extremely rapid exposures, sometimes of only the one three-hundredth of a second. He was using hydroquinone, but found that the eikonogen brought out the image which hydroquinone would altogether fail in doing.

The Chairman was asked for his development formula, and he promised to bring it to the next meeting.

It was announced that on the 29th the subject would be *Photo-micrography*, introduced by Mr. T. E. Freshwater.

THE LANTERN SOCIETY.

January 12.—E. M. Nelson, F.R.M.S., on *The Lantern in its Relation to Photography and the Microscope*. Speaking of the fittings of a lantern, the lecturer observed that no matter what kind of jet is used, at a certain pressure they will always hiss, and this cannot possibly be avoided. As regards limes, the conventional ones with a hole through them appeared specially constructed with the view of making them easy to crack, and he advocated the use of a disc of lime, the jet playing on a point near the circumference, and the disc being revolved as it got pitted. He strongly objected to the use of many taps as likely to lead to confusion, and explained a simple arrangement of taps of his own. Concerning condensers he described various forms, pointing out that for oil lamps having a large luminant a condenser of long focus was required, also explaining that the effective diameter of the back lens was very much less than the diameter of the lens itself. Some very interesting experiments were carried out with condensers of different forms, the best shown being a triple one, which showed a remarkable superiority in the brilliancy of the picture over all the others. With regard to the lantern in its relation to the microscope, he referred to Abbe's researches with apochromatic lenses, and pointed out the superiority of the photographic lantern slide of microscopic objects over the projecting microscope for exhibiting results to an audience.

The lecture was illustrated with microscopic and other slides. The discussion afterwards turned mainly on the experiments which had been shown with condensers, which appeared to have excited general interest.

HOLBORN CAMERA CLUB.

January 16,—Mr. Golding in the chair.

The Secretary read a paper by Mr. E. J. Wall on *Notes on the Early History of Photography prior to* 1800.

To-day (Friday), *Intensification* (Mr. F. Brocas).

EALING PHOTOGRAPHIC SOCIETY.

January 15,—The President (H. W. Peal) in the chair.

After the admission of two new members, the following question from the question box, "How to strip a film from a cracked glass and transfer it to another glass?" was spoken to and answered by Mr. C. Whiting and the President. The former treated the question at some length, and in his remarks directed attention to the article to be found on this subject in this year's British Journal Photographic Almanac by Mr. W. T. Wilkinson.

The series of views, *In and Around Columbus*, kindly lent by the Columbus Camera Club, were then passed through the optical lantern by Mr. C. N. Peal, and much appreciated by the members and their friends, the Hon. Secretary reading the interesting description which accompanied the views.

Several slides by members were also passed through the lantern; and after a hearty vote of thanks to the Columbus Camera Club had been passed by the members, the President announced that the next meeting would be a Technical evening on the 5th of February.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

January 16,—Mr. Edwards in the chair.

Mr. Leon Warnerke gave a demonstration of collotype printing. Having shown how to sensitise the support, and giving formulæ and instructions for drying, printing, and making ready for the press, he initiated the members into the mystery of inking, which he said required careful manipulation finally producing a number of excellent prints. Mr. Warnerke used, and drew particular attention to, a piece of apparatus made by the Autocopyist Company of London-wall, E.C., specially for use by collotypists, it being an ingeniously constructed printing frame for use in an ordinary copying press and fully equal to the work required of it.

The demonstration was much appreciated by the fifty members present.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

January 16.—Lantern night, when a good selection of over two hundred slides by members were passed through the lantern during the evening.

The next ordinary meeting will take place on February 6, and lantern night on February 20.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

At the last meeting of this Society (January 10) the following gentlemen were elected upon the Council for 1891:—*President:* The Hon. Baron Pollock.—*Vice-Presidents:* Mr. T. Gilbert and Rev. L. Macdona.—*Council:* Messrs. Chas. Ballard (Hon. Sec.), E. V. Barrett, W. H. Congreve, Dr. J. F. Farrar, Messrs. W. F. Gorin, J. C. Leman, and M. G. E. Manifold.

The meetings of this Society are held fortnightly, on the second Wednesday and last Saturday in each month.

Ladies and gentlemen desirous of joining are invited to communicate with the Hon. Secretary, 46, Erpingham-road, Putney.

Society fixture, January 31, Ilford Special Lantern Plate Demonstration.

DERBY PHOTOGRAPHIC SOCIETY.

January 13.—Mr. Keene occupied the chair, and introduced Mr. Pickering, the hon. secretary of the Leicester Society.

This gentleman gave a very interesting and instructive paper on *The Art of Emulsion Making and the Preparing of Dry Plates*. He first showed by practical demonstration how the sensitive silver compounds were formed in a solution of gelatine by double decomposition, and afterwards purified and rendered of various degrees of sensibility to light by a process of ripening. Instruction for spreading plates was given, and afterwards the emulsion prepared in the room was distributed amongst the members (with the formula for same) for private trial. Some excellent lantern slides made on plates coated with this emulsion were exhibited. He strongly advised amateurs to coat their own plates, on account of the additional interest and pleasure it would give, also on economical grounds.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

January 15,—Mr. S. S. Partridge (President) in the chair. The election of officers for the ensuing year was proceeded with, with the following result:—*President:* Mr. J. T. Cook.—*Vice-President:* Mr. F. G. Pierpoint.—*Committee:* Messrs. Poiritt, Joliffe, Bankart, Partridge, and Weatherhead.—*Treasurer:* Mr. Wilson.—*Secretary:* Mr. Pickering.

Mr. Wilson (Treasurer) then presented his accounts for the past year, showing a substantial balance in favour of the Society.

It was resolved that the usual gratuity be paid to Mr. Bayley (Hall-keeper), with thanks for his services.

January 16.—An interesting and instructive evening was passed on Friday at the large room of the Co-operative Hall, under the auspices of the above Society, when Mr. E. Howard Jaques, of the Birmingham Photographic Society, kindly came, at the invitation of Mr. George Bankart, ex-President, to lecture before the Society on *A Trip through Western Norway*. The subject being considered a most interesting one, the Committee decided on making it an invitation evening, with the result that one more successful meeting was held, between three hundred and four hundred persons being present. Mr. Jaques gave a lucid description of the various slides passed through the lantern, which, numbering over two hundred, and for the greater part accompanied with suitable and descriptive music by Mr. C. E. Birch, afforded a treat which was much appreciated.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

Mr. George E. Thompson on Thursday evening signalised his election to the presidency of the Birkenhead Photographic Association by holding a reception of members and friends in the Young Men's Christian Association Institute, Grange-road. The guests invited numbered about 250, and the greater portion of these attended, and on arrival were received in the library by Mr. and Miss Thompson. In this room the medals of the Association—gained in December last by various members—were exhibited, and also a large number of effective

transparencies taken by several members, and showing very different views of scenery in and about Liverpool and Wirral. Mr. Frank N. Eaton's exhibits proved him a thorough connoisseur of Wirral scenery. Some very fine cloud studies, taken from the Mersey, were shown by A. F. Stanistreet, and Mr. Paul Lange was to the fore with several wood scenes which caused general admiration. Other exhibitors were Messrs. G. E. Thompson, W. Tomkinson, Charles B. Reader, and T. W. Briggs. Several photographic volumes were also in the room, and were inspected.

In the lecture room adjoining, two capital concerts, arranged by Dr. W. H. Hunt, were given. Limelight demonstrations were also given concurrently in the upper and lower rooms. Tea, coffee, and light refreshments were supplied in the reading room.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of the above Association was held on Tuesday the 13th, Mr. J. P. Gibson in the chair, and there was a large attendance of members.

The Secretary's and Treasurer's reports were deferred till next month's meeting, but it may be mentioned that the past year has been a very prosperous one for the Association.

The officers elected for the current year are as follows:—*President:* Mr. A. S. Steavenson, J.P.—*Vice-Presidents:* Messrs. J. P. Gibson and H. R. Proctor.—*Council:* Messrs. M. Auty, J. Brown, J. E. Goold, T. O. Mawson, F. Park, W. Parry, H. G. Ridgway, J. H. Robinson, H. Shand, and L. Williamson.—*Treasurer:* Mr. John W. Robson.—*Secretary:* Mr. Edgar G. Lee.

Mr. EDGAR G. LEE then read a paper *On Lantern Slide Making*, in which he treated upon the manipulation of gelatino-bromide plates, and recommended vigorous negatives and full exposures for the production of good slides.

Messrs. LEE and BROWN then demonstrated the development of lantern plates, the former using Thomas's hydroquinone formula, and the latter Warnerke's eikonogen formula, diluted and restrained with bromide of potassium two grains to the ounce. Successful slides resulted in each case.

The lantern was afterwards brought into requisition, and about a hundred and fifty slides put through.

EDINBURGH PHOTOGRAPHIC SOCIETY.

JANUARY 14.—The chair was occupied by the President, Mr. H. J. Blane.

Several new members were admitted and other routine business disposed of.

The CHAIRMAN then stated that in consequence of the closing evening of the Society's Exhibition and the ordinary meeting night happening to fall on the same evening, it had been deemed advisable in the circumstances to delay that meeting till this evening. He then stated that the next business was Dr. James Hunter's lecture on *The Spectrum, with Special Reference to Photography.* As they would have observed from the great care and time taken to make the demonstrations as perfect as possible, they might depend upon a great success.

The DOCTOR then proceeded with his lecture and illustrations, which we trust to give at length in another issue.

At the close of the lecture the CHAIRMAN, after thanking the Doctor for the able, lucid, and extremely interesting character of his exposition and the remarkably successful way in which the demonstrations had been shown, said he thought, in view of the fact that the subject had occupied the whole of the available time of this evening, that it would be well to delay any remarks by the members till next meeting.

This met with the general approval of the Society, and those present received each a copy of the photogravure presentation print, which is from a negative by Mr. Keene, of Derby, and which was undoubtedly one of the finest of its class in the recent exhibition. The photo-engraving work has been executed in a very perfect way by Mr. J. C. H. Balmain, and it is to the credit of both gentlemen that neither have made any charge for either work or copyright to the Society. This having been got through satisfactorily, the meeting thereafter adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

JANUARY 15.—General meeting.

Dr. J. K. TULLOCH read a paper on *Development* [see page 55].

Mr. ANDREW STEWART, editor of the *People's Friend*, &c., read a paper entitled, *Hypnotism* versus *the Camera* [which will appear in a future number].

Mr. Berry exhibited a two-wick sciopticon, which illuminated a small screen very fairly. The lantern was placed in front of and facing the audience, the screen used being a sheet of ground glass, the pictures appearing through the screen very soft and bright.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

JANUARY 15,—Mr. Wm. Lang, jun., F.C.S. (President), in the chair.

The following gentlemen were unanimously elected members — Professor J. G. M'Kendrick, M.D., F.R.S., Arthur Robinson, David Johnston, Matthew Edwards.

A resolution expressing regret at the death of Mr. A. Schulze, F.R.M.S., and the loss the Society had sustained, was unanimously agreed to.

Mr. J. ADAMSON, jun., Rothesay, gave a practical demonstration of a method for taking instantaneous pictures indoors by means of Slingsby's magnesium flash lamp. Two plates were successfully exposed and developed during the meeting.

Mr. ADAMSON, in answering questions with reference to the demonstration, said that the most rapid plate he could obtain was the "Nameless" of Mr. Wood, St. Enoch's-square, Glasgow.

A letter of Sir David Brewster's, referring to the albumen process, and written in 1850, was shown to members, and prints on Fry's naturalistic bromide paper were handed round.

UNION OF PHOTOGRAPHIC ASSISTANTS.

A WELL-ATTENDED meeting was held at the Polytechnic, Regent-street, on Wednesday evening last,—Mr. T. Bolas in the chair.

The Secretary (Mr. Arthur Field) read a letter from Mr. Snowden Ward, of Bradford, expressing sympathy, promising help, and regretting his inability to attend, but emphasising the need of some organization among photographic assistants, but on defensive—not defiant—lines. The worst class of employers were those who, knowing nothing of the business, trust entirely to the skill of those whom they employ. These are the employers who tend most to look upon their assistants as machines; often, under the plea of bad times, they continually reduce the wages and increase the hours of the assistant. He also touched on the evil of obtaining cheap assistants under the guise of apprentices, the detention of specimens, and other abuses, dealing with which might come under the province of the proposed union. The union should consist of qualified men, so that every employer should feel confidence in the Society and its members. In London, he said, seven men were willing to organize branches of a photographic assistants' union, and excellent support had been promised from the provinces.

Mr. W. B. MOORE, of the Amalgamated Society of Lithographic Artists, referred to the desirability of union among the workers in the more skilled occupations, as evidenced by the important work of the Society which he represented.

Mr. W. PARNELL, as representing the Cabinetmakers' Alliance, next spoke in support.

Mr. R. WALLACE, of the Clerks' Union, referred to progress recently made by unionism in occupations rather tending towards the "professional" side.

Mr. L. BROWN spoke on behalf of a young Society, that of the Photographic Cabinetmakers, and exhorted those present to stand together and form a solid union.

The names of those who were willing to join the union were then taken down by the Secretary.

Correspondence.

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

GAS PRESSURE GAUGES.

To the EDITOR.

SIR,—I have read with much interest the article upon gas pressure gauges, and also Mr. Baker's upon gauging contents of cylinders by weight; it is a plan which I have always successfully adopted.

In my practice I find that the weight of a cubic foot of compressed oxygen is 1½ ozs., my 20-feet cylinder weighs when empty 21 lbs. 3 ozs., when full 23 lbs. 1 oz., a difference of 30 ozs. Mr. Baker is not correct when he says that the hydrogen cylinder cannot also be gauged by weighing, as for all practical purposes it can.

My 20-feet hydrogen cylinder weighs 17 lbs. 13 ozs. empty, when full 18 lbs. 7 ozs., a difference of 10 ozs., from which we see that the weight of a cubic foot of compressed coal gas is half an ounce. I am quite well aware that this may not be correct for lower pressures, but for practical work it may be accepted. I have never any hesitation in commencing an hour's exhibition if certain that there are 2 ozs. of coal gas and 5 ozs. of oxygen at my disposal.

If any one possessing a 20-feet hydrogen cylinder and a pressure gauge would test the contents by gauge and weight after each exhibition, and publish the results, it would be of great interest to many besides—

Yours, &c., RICHARD HORTON.

46, *Royal-avenue, Chelsea, S.W., January* 19, 1891.

GENEALOGY OF A PHOTOGRAPH.

To the EDITOR.

SIR,—Adverting to your leader on the above subject, we would, with your permission, correct, to some extent, the general conclusions that your remarks would lead readers to form.

As regards plates, we may say that we use English glass only, and that we find it superior to foreign glass, although dearer. The inferior glass you mention may be cheap, but it is useless if a high-class plate is to be produced. The same remarks apply to nitrate of silver, and all the other constituents of the emulsion. All we use are English made, excepting gelatine. Of this article we draw our supplies equally from English and Continental sources. We cannot say that either, on the average, is superior to the other; actual tests of each batch alone determine our choice in this respect.

So much for plates. As regards paper as a support, we have to own the full force of your remarks, and consider the facts a decided stigma on the English paper makers. The trade has fallen into the hands of the Continental manufacturers simply from want of enterprise on the part of

the home firms; a large and remunerative trade could be guaranteed to any home firm who would supply the proper article.

Your reproach that all but one of the emulsion papers are of foreign origin will be removed in the course of a few weeks, for we are now laying down plant for the production of a chloride printing-out paper, of a quality and at a price which will enable us to show our foreign friends that England can hold her own in this article, as she does in all other photographic goods, at least such as come within the scope of our manufacture. —We are, yours, &c., THE BRITANNIA WORKS COMPANY.

Ilford, London, E., January 17, 1891.

SHUTTER SPEED FOR MOVING OBJECTS.

To the EDITOR.

SIR,—I shall be glad to explain, if I may, why my results differ, though slightly, from those of Mr. Groves.

(1) I have allowed for the increase of focal length caused by the nearness of the object. This Mr. Groves very rightly, for practical purposes, neglected.

(2) A velocity of three miles per hour is not exactly four and a half feet per second, but 4·4.

These corrections being made, the results are exactly the same. Curiously enough, in (3) these corrections neutralise one another, and the results agree. A little calculation would show that this must be so.—I am, yours, &c., CLIFFORD E. F. NASH.

ANOTHER CAUTION.

To the EDITOR.

SIR,—A few months back I was on the point of purchasing a high-class business, had inspected the books, and so far everything was considered satisfactory. Patronage was of the swell order. The printing room was in full swing. On my wishing to have a week in the business I was flatly denied any such consideration; consequently my banker holds my money still.

The person who did purchase has recently offered me the same affair for 400*l.* less than he gave. I am very thankful I was not caught.

Let this little piece of advice be remembered by all intending purchasers: insist on having a week in the business before giving away your money. This alone saved me. No honest person would object to such a course. As for the law courts dealing with cases, one might find this a costly business. I am confident there is too much working of high-class trades, too much is made of old negatives which bring in few old orders, &c. The ventilation of such a subject as faked-up photographic businesses can only have one end, "a caution" to all intending purchasers. Many lose their all, that has taken years to save, in a few months by such rotten transactions.—I am, yours, &c.,

LEONI.

"SUN ARTISTS."

To the EDITOR.

SIR,—Mr. Boord's letter in answer to mine published in the paper of November 28 escaped my notice at the time of publication; I only saw it a few days ago, and as I thought the controversy was forgotten, did not reply to it. After the letter in yesterday's paper I think it is but right for me to express my regret that Mr. Boord should have for a moment thought that my criticisms applied to the manner in which he had reproduced Mrs. Cameron's pictures in *Sun Artists*. I am perfectly satisfied that the photogravure plates are quite untouched, and faithfully reproduce the negatives. They are equal in excellence to the plates that preceded them, and which have given such unqualified pleasure to all lovers of art photography. My criticism was meant for the negatives, and was meant to be good-natured. We have heard so much lately about the *immorality* of retouching that I could not help calling attention to the publication of photographs from what seemed to be very much retouched negatives, under the patronage of Dr. Emerson, and these photographs held up as the very acme of artistic excellence.

The moment Dr. Emerson or Mr. Cameron says the negatives were untouched I shall express my regret at having made an error of judgment. —I am, yours, &c., GEORGE MANSFIELD.

Morristown Lattin, Naas, January 17, 1891.

To the EDITOR.

SIR,—The whole, or almost the whole, of your footnote to my letter of the 8th inst. is beside the mark, and (however unintentional on your part) simply has the effect of throwing dust in the eyes of your readers. I must therefore inflict you and them with a further communication. As, in doing this, I do not wish to convey the impression that I have received a satisfactory answer to my two previous letters, I will ask you to kindly understand that what follows is merely a commentary on the above-mentioned footnote. I take the points *seriatim*.

1. In saying that you had "hit below the belt," I was not referring to your review of our fifth number (which, as you remark, appeared some time ago), but to an "editorial paragraph" in your issue of December 26, 1890. My letter of November 28 was at that time, as now, still standing uncontroverted in your columns, and in spite of the statements therein contained, you saw fit to describe our reproduction of the head of Sir John Herschel as a "stippled-up copy."

I beg to submit that your reply is no answer to this complaint.

2. In referring to the "great body of educated critical opinion," I had no intention of excluding your reviewer from the ranks of educated critical opinion, and the words used are incapable of such construction. Your criticism appeared to me at the time to be perfectly fair. Dr. Emerson spoke out boldly in his own name, and you took exception to some of his statements.

As we are "unassociated with any particular phase of photographic endeavour" (*vide* our preface), you must excuse me if I decline to give any personal opinion on Dr. Emerson's expressions, and more particularly so as their introduction into this controversy is entirely unnecessary.

3. The question whether the original copyrights have died a natural death or not is really of the nature of a quibble. In my letter of the 8th inst. I refer to Mr. Cameron as the "fountain head." He certainly was the holder of the original copyrights, and we went to him as the source, *above all others*, where we should find the genuine article. A gentleman who has once held the original copyrights, and who is a blood relative of the artist, would not be likely to give us a spurious imitation, even if the original copyrights had expired.

4. Mr. Mansfield is quite welcome to preserve his cheerful silence. Your readers will know how to draw their own conclusions from it.

I am sorry that even the semblance of personal feeling has been brought into this correspondence. I can assure you I entered the lists most reluctantly, and only, in the words of my first letter, "to dissipate an unfounded impression so far as it affects the reputation of this Association."—I am, yours, &c., W. A. BOORD, *Hon. Sec.*

[We quite fail to discover what Mr. Boord really wants.—ED.]

Exchange Column.

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

Wanted, half-plate set; will exchange fine four-guinea banjo.—Address, PHOTO, 335, Albany-road, Camberwell.

Will exchange background (outdoor), eight feet by eight feet, cost 35*s.*, good as new, for collection of old foreign postage stamps in book or loose.—Address, HARRY JENKINS, Alpha Studio, Tunbridge Wells.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—

J. R. G. Stroud, 59, New-street, Jersey.—*Photograph of two children.*

"49."—The ashes, of course, require no treatment with chloride. They are simply mixed with the dried chloride of silver, and with the sulphide of silver when that is dried.

CARLEOL.—We thank you much. We had no idea of what was advertised. The advertisement will appear no more, and we have forwarded the enclosures to the police authorities.

P. CHARLTON.—We presume that only the ordinary embossing presses are necessary if the prints are backed with cotton-wool. If you send us a sample print of what you require we may possibly be able to supply the desired information.

C. B. asks: "Will you inform me if alum has been or can be used to prevent the blistering of silver prints? Can you also oblige by saying how starch is best made so as not to turn acid either before or after mounting?"—Alum has before now been suggested as a remedy for blisters, though few, we believe, found it efficacious. If starch—good starch—be made with boiling water in the usual way, and used at once, it will not be acid, nor is it likely to turn acid on the print. Starch should always be used freshly made.

R. Huntley.—The slides are too much veiled; they would look opaque and muddy on the screen. Try developing with either hydroquinone or eikonogen, and use plates specially sold for lantern slides.

Retoucher inquires: "Could you give me any idea of the best kind of light to use for retouching by night, or arrangement of light for that purpose?"—As a source of illumination nothing is better than a good paraffin lamp. The light should be softened and diffused by one or more thicknesses of finely ground glass.

Artist.—If you attempt to sell pictures such as those sent, you will certainly render yourself liable to prosecution under Lord Campbell's Act. To call such photographs "artists' studies" would be ridiculous; they are coarse and vulgar in the extreme. Some are decidedly indecent within the meaning of the Act.

W. Butler.—If you send the plates to a professional photographer to be developed and then printed from, can you honestly show them as your own work? This is, however, what thousands of so-called "amateur photographers" of the present day do, and you would be in the same category as others who compete for and obtain prizes in petty exhibitions.

W. T. S. says: "Please inform me in 'Answers to Correspondents' the cause of these yellowish patches on the enclosed print, which I noticed after final washing, and many similar in the same batch. My mode of working is as usual, and have never experienced them before."—The spots are apparently due to air-bells adhering to the prints when they are first immersed in the fixing bath.

A. Durrant says: "I have some old manuscripts to copy, and the paper is very yellow. I propose to use plates orthochromatised according to the formula of Drs. Mallmann and Scolik on page 745 of the Almanac. Will you please say if any advantage would arise from using a yellow screen? From what I have read on the subject I judge there would not."—For such subjects a yellow screen is of no advantage.

D. D.—There are two kinds of "smoother pot opal" glass in the market, namely, hand ground and "sand blast." The latter is that most used, and is the cheapest. The hand ground is very liable to be scratched in the grinding, though it has the sharpest "tooth," and when perfect is generally preferred. Any dealer in photographic glass will supply both kinds. Better get a sample of each and see which you can work on best.

R. J.—We cannot see that you have any *legitimate* ground for complaint. You sent, according to your own account, a large mass of unburnt paper and jars of wet chloride and sulphide of silver, without having the remotest idea as to the proportion of silver they contained. How, then, can you, we, or any one else form any opinion as to what the refiner should remit? We advise you to read the article on this subject in our issue for the 16th inst., and act upon it in the future when sending residues to refiners. It would, on the face of it, be unjust to publish your letter; and, moreover, if we gave the names, we might subject ourselves to an action for libel.

S. Bedwell.—Clearly you are labouring under a misapprehension when you say that the old wet collodion process is never practised now. It is almost exclusively used for all "process work"—that is, most of the photo-mechanical processes. If you are not practically acquainted with that process, we fear you will not be a successful candidate for an operator's berth in any photo-mechanical establishment. Don't run away with the idea that there is nothing to learn in the collodion proeess. If your experience as an operator is confined only to the use of dry plates, you will find the conditions very different when you touch wet collodion photography.

F. R. S. writes: "1. I have mixed some negative retouching varnish from the Almanac, page 753, and it sticks to the paper. What can I do to improve?—2. From the same page I mixed some ground-glass varnish, but cannot get the ground-glass appearanee.—3. Can you please name a varnish that will do for blocking out machinery and leaving white paper background? also a good ground-glass varnish for the negative that would give a good bite to the lead pencil?"—In reply: 1. If the varnish were compounded according to the formula it should not stick to the paper. If it does, either the materials were at fault or the formula was not adhered to.—2. Here again our correspondent has been singularly unfortunate. This formula gives an excellent matt surface.—3. Bates's black is excellent for blocking out backgrounds. Any commercial ground-glass varnish—which is probably prepared by the formula referred to—will answer.

A. E. D. writes: "I am a professional photographer and have shortly to photograph a museum with some distinguished visitors inspecting the same. The rooms are small, and I shall have to use a wide-angle lens. The lens I have used for interiors has been Darlot's combination, and it has given every satisfaction—12 × 10 size without figures—but it is very slow and requires to be well stopped down to give general sharpness, that I look upon it as an impossibility. I do not wish to take larger than whole-plate. Would you kindly say what lens you would use for a whole-plate interior with figures that would give sharpness and speed with extra rapid plates?"—All wide-angle lenses are necessarily slow, inasmuch as they have a small angular aperture. If a wide angle has to be included some of the lenses of our best makers might have their aperture somewhat increased, so that, while sacrificing extreme sharpness by introducing spherical aberration, greater rapidity is obtained. We should advise our correspondent to make some preliminary experiments at the rooms, as he doubtless can, with different lenses. If a lens of the rapid type of ten or eleven inches focus will include a sufficient angle that will be a good one for the purpose.

Photographic Club.—Wednesday, January 28, annual lantern and musical entertainment. February 4, *The Tone of Lantern Slides.*

London and Provincial Photographic Association.—Subject, January 29, *Photo-micrography.*

Photographic Society of Great Britain.—The next monthly technical meeting will be held at the Society's Rooms, 50, Great Russell-street, Bloomsbury, on Tuesday, January 27, at eight p.m.

Camera Club Photographic Conference.—The 1891 Conference will be held in the Theatre of the Society of Arts on Tuesday and Wednesday, April 7 and 8, under the presidency of Captain W. de W. Abney, C.B. On Monday, April 6, at half-past eight p.m., there will be a special smoking concert at the new Club House, Charing-cross-road, and the members' annual exhibition of photographs will be opened. On Tuesday, April 7, at two p.m., the President will open the Conference at the Society of Arts, and papers will be read from two to half-past five p.m. In the evening a lantern-slide exhibition will be given in the Theatre of the Society of Arts, for which special tickets may be obtained. On Wednesday, April 8, at two p.m., the conference will be renewed. At half-past seven the annual dinner for members and friends will be held. A complete programme will be issued later and distributed. All photographers are cordially invited to attend and take part in the discussions at the Society of Arts.

Pastel Portraits.—Our correspondent telegraphs: A case which, from the statements made in court, would appear to be of great interest to a very large number of people, came before his Honour Judge Martineau, at Worthing County Court, to-day (Monday). The plaintiff was Mr. W. H. Harker, of Shoreham, and he sought to recover from the defendants, Messrs. Carr & Co., 37, Warwick-street, Worthing, two guineas, the value of a pastel portrait they promised to supply. Mr. F. T. Pearson, West Brighton, appeared for the plaintiff. The defendants neither appeared nor were represented. Mr. Pearson said the plaintiff received a circular from the defendants offering, if he would send them a photograph of himself, to make him a life-size portrait, value two guineas, in consideration of his introducing their work to his friends. He sent his photograph, and signed the following order: "Please make and forward me one life-size portrait, as stated above, in consideration of which I promise to show your work to my friends, and inform them of your address." His Honour: A very funny business. They never asked me for my portrait. Mr. Pearson: You are not a public man. His Honour: Oh, yes; I think I am. What are you out of pocket? Mr. Pearson: I submit with regard to damages—— His Honour: What have you done? Mr. Pearson: Sent photograph by post. His Honour: What did it cost you? Mr. Pearson: Well, there is the postage and the inconvenience of being without our photograph. We made this promise to show this work, which we were prepared to do. His Honour: You have never showed it? Mr. Pearson replied that the act of defendants had deprived them of being able to do so; but with regard to the measure of damages, Leake on *Contracts* sets it out quite clearly that the party suffering from breach of contract was, so far as money could effect it, to be placed in the same situation as if the contract had been performed. His Honour: What would be the value of his own portrait to himself? Mr. Pearson: They put the value at two guineas, and plaintiff was minus this enlargement of the photograph which they promised, although he performed his part of the contract. His Honour: Two guineas is their estimate of their own work? Mr. Pearson: I have experts here who will state that a pastel portrait 18 × 22 would be worth about that sum. I submit we are entitled to be put in the same position as we should have been in had the contract been carried out. This company has been reproved in the leading papers. His Honour: I decline to hear what the papers say. Mr. Pearson: They have been carrying on this business for some time. His Honour: Has anybody been caught by them? Mr. Pearson: I hear that as much as 800*l.* in postal orders has been traced through the post-office here in one day. His Honour: Has the plaintiff been caught? (To plaintiff:) They put your pastel portrait down at two guineas. What do you put it at? You take a more modest view, perhaps? We are without that portrait, and they absolutely refused to send it. His Honour: Did they give any reason? Mr. Pearson read the following extract from one of defendants' letters: "We beg to acknowledge the receipt of your photograph, and thank you for your order. We will have pleasure in making you a free portrait from it, as promised in our first circular. It will, of course, be to our mutual interest to have it framed by a first-class house, and we therefore beg to enclose you our pattern-sheet of very choice French frames, which are all of the latest and prettiest designs." The circular proceeded to ask plaintiff to make a selection from the patterns, and to send a remittance, so that they could finish and forward the portrait. His Honour: Now I understand the case. Judgment for plaintiff for the amount claimed, with costs. His Honour, on the application of Mr. Pearson, certified costs on Scale B, as he considered the case of public and general interest. A similar action was brought by Mr. Arthur George Pain, solicitor, of Bridgewater and Weston-super-Mare, who said he had travelled down to Worthing on the previous day to be in time for the Court. His Honour gave judgment for the plaintiff, with costs in this case also, and allowed 2*l.* 4*s.* expenses, remarking that he hoped the company would go into another county.—*Daily Telegraph.*

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TRADE UNIONISM IN PHOTOGRAPHY.

It is a somewhat curious circumstance that until photography had passed its jubilee no attempt was made to form any kind of combination amongst photographers, with the view of furthering or protecting their trade interests. Then, within a few months, several projects with these objects in view are set on foot. First, we have a photographic section added to the London Chamber of Commerce. Then we have a Photographic Manufacturers' and Dealers' Association started; next, a National Society of Professional Photographers, though this, we believe, is still more or less in embryo; lastly, a proposed Union of Photographic Assistants is projected. There is no question that all the different sections of the trade would be benefited by the proposed combinations, but neither of them must attempt too much, or they may stultify themselves at the start.

In an article in our issue for the 5th ult. we called particular attention to this point in connexion with the proposed Professional Photographers' Association, and what was said there applies equally well here. That a union among photographers' assistants would prove to their mutual advantage is, we think undeniable, and the promotors of the scheme will do well to separate the "ideal"—what is desirable—from the "practical"—what it is possible to accomplish.

A combination of assistants could do much in checking many abuses that exist. For example, the retention of operators' and retouchers' specimens. A society could prosecute the delinquents, and a very few convictions would effectually put a stop to this method of obtaining specimens for the showcases, and also make those who do not return them, through neglect, more careful in the future. Neither class would care for the publicity given by legal proceedings. We may *en passant* mention that since we started our register or "black list" of defaulters, it has put a very material check upon this disreputable practice. Also it has in the majority of instances secured the return of the pictures to their owners.

From letters we have occasionally received it would appear that some employers systematically make agreements with assistants for a term at a certain salary, but at the end of the season some reason is found for dismissing them or offering lower wages. In some instances legal proceedings would undoubtedly hold the employer to the agreement, but these the assistant is not always able to institute. Here a union or society would prove invaluable, as it would put a check upon the abuse, either by taking proceedings or keeping its members apprised of those who act so disreputably. There is also the question of the hours of employment. Though this is a somewhat difficult one to deal with in a business depending upon light and weather, no doubt some satisfactory arrangement might be come to, at least in some departments, by combination.

There is one thing that a Trade Union of Photographic Assistants must not think of accomplishing, namely, the regulation of wages. It must be borne in mind that photography is not a mechanical trade. The value of an assistant, say an operator or a retoucher, depends upon individual ability chiefly of an artistic character. In many crafts a man, by virtue of serving a certain apprenticement, is considered a skilled workman, and his trade union will not allow him to accept below a certain wage, and it does not expect—or even, we think, permit—him to receive more. Such a system would not do in photography—at least, at present. Experience shows that an intelligent person of refined taste may, with only a few months' experience, be able to produce far better photographs and more artistic pictures than others who have been years in the profession. Employers care nothing as to whether an apprenticeship has been served: all they require is the requisite ability. Photography is not like some trades, in which coercion can be brought to bear on the question of wages. As a rule, one assistant in each department is as many—indeed more—than is employed by the majority of photographers. Therefore the coercion which has proved so successful in many crafts, where hundreds may be employed in one establishment, would not avail in photography.

Our advertising columns show that some operators offer their services for thirty shillings a-week, or even less, while we know that some are paid from three to four hundred a-year. Again, with retouchers, some tender their services for as low as a pound a-week, while others receive from four to five times this sum. Further, with regard to reception-room attendants; their remuneration depends upon personal ability. A clever business man or woman who is a good correspondent and speaks several different languages can always command a much higher salary than others without these accomplishments. Would the man who can command the highest salary in any department of photography submit to have it reduced by the Union, or would the third or fourth-rate man obtain employment if he were prohibited from working for less than a certain sum, and which his abilities would not command?

In our comments on the proposed combination amongst professional photographers we expressed a doubt if there was sufficient unanimity amongst the trade to have any material influence on the regulation or adjustment of prices. Competition for a living is now very keen, and non-members are not in any way to be bound by the Society.

The same, we fear, applies to photographic assistants. There is but a limited *esprit de corps* amongst them. In this idea we are to an extent confirmed from the fact that a very deserving institution—the Photographers' Benevolent Association—receives very little support from those for whose benefit in time of need it was specially established.

The foregoing remarks, be it clearly understood, are made in no carping spirit. They are merely to suggest to the promoters of the new Union the desirability of confining their efforts to what it is possible to accomplish, and not to attempt that which is impracticable under the existing condition of things. We, as we are sure all our readers do, heartily wish the new venture all the success it deserves.

NATURALISM OR IMPRESSIONISM.

II.

To find the central idea of Dr. Emerson's naturalism, we may go back to his first publication (a paper which he read before the Camera Club in March of 1886). Here, after a brief allusion to the growth of pictorial art, our author touches upon the views of Professor Helmholtz as to relative luminosity in its bearing on the work of the painter—views which are substantially unassailed by recent investigations. Helmholtz points out that to reproduce pictorially the luminous intensities of nature in the most complete manner, it would be required that each part of the canvas should yield to the eye of the spectator an amount of light exactly equal to that yielded by the corresponding part of the original scene, but a little consideration will show this to be quite impossible in all ordinary cases. Take a sunlight scene, for example, where the brightest part is the glint of the sunlight as reflected from water, and this may give to the eye a luminous intensity which is, let us assume, one hundred times that of the lightest pigment the artist can use in painting such glint, supposing this pigment to be illuminated by the best light of an exhibition room. In the case of the scene and also of the canvas, the deepest shades may be approximately the same, so that the range of tone with which the artist can work is, in the assumed instance, only a one-hundredth of that which exists in nature. The question now comes, How is the artist to plot out this range of tone so as to produce the truest result? He should, according to Helmholtz, preserve a strict homology or proportion between all tones, which would involve so reducing the scale of light and shade that the difference in luminous intensity between any two points in the picture shall be less than that of the corresponding points in the scene, and less in the same proportion as the whole range in the picture is less than the whole range in the scene; in the assumed case, the reduction will be to a one-hundredth all through.

There may, occasionally, be very dull and sombre scenes—such, for example, as twilight—where the artist can represent on his canvas and with his pigments the absolute luminosities of the original; but what we here suggest is rather a possibility to be hinted at than a state of things actually existing. Well then, as a matter of fact, all ordinary pictures are and must be constructed with a much shorter scale than that of nature, but if the due ratio is given to every interval of tone, the effect produced may approximate very much nearer to nature than might at first sight be supposed. The reason of this is that in the brightness of nature the senses of vision become fatigued, while in the subdued light to which they are subject in looking at a picture they are comparatively rested, a condition favoured by making the immediate surroundings of a picture rather dark than light.

Here, then, we have the basis of naturalism in photography, and Dr. Emerson's teaching is in the main as follows, although we do not use his words, but rather endeavour to summarise their sense. The student in photography should not measure his work by the standard of other photographs, but should go direct to nature, and in this manner. Whenever he can distinguish in nature a difference in tone (*i.e.*, intensity of shading or gradation), he should look for a proportionate difference of tone in his work, and he should consider that work imperfect when he fails to find all such grades of tone, or when he judges that any such grades of tone are out of proportion with those of nature. To do this, he must endeavour to train himself to estimate ratio or proportion—the power of judging proportion being one of the most notable qualities of the cultured mind, and its absence one of the most prominent characteristics of the careless speaker or the hasty generaliser. Portraits in which some parts of the face were as white as the shirt collar, and landscapes in which the whole or great part of the sky was one white blank, were more commonly seen in our exhibition rooms when Dr. Emerson first wrote than is the case now, and such photographs, if carefully examined, must invariably be found wanting as regards all fainter gradations in the higher lights, every tint below a certain standard being represented by one degree, viz., the colour of the paper upon which the print is made. This condition of things—a main factor in the production of the much-belauded "sparkle"—has another side, and this is the exaggeration of the deeper tones and the loss of the fainter gradations in such tones, a condition of things often spoken of among photographers as "vigour," but what an artist-painter would call "hardness" or "sharpness;" at the same time, a false proportion must run all through the scale of tones.

Occasional protests were made against this losing of the lighter tints, and these protests sometimes took the form of tinting the paper by a short general exposure to light after the printing, and sometimes it took the form of printing in a sky, a proceeding which generally served to make more emphatic than ever the blankness of such white patches in the body of the picture as corresponded with the lighter tones of the original scene. Those who rather studied the photographs in the exhibitions than nature naturally hesitated to photograph on a hazy day, nor would they direct the lens towards the sun, as in such cases they would not get results like the gallery photographs; moreover, the text-books told them not to do such things. They avoided methods which often lead to the most striking and truest representations of nature.

Now Dr. Emerson's advice to the student is to consider the just relative tone value (*i.e.*, depth of shading, not colour) of all parts of the picture as the first essential; indeed, one may say as the only *essential* to the production of a picture. The realisation of this must be the result of the close unbiassed observation of nature by the individual, rather than of convention or discussion on the one hand, or of scientific measurement on the other. Then, and only then, will the result be absolutely personal to the artist—his own interpretation of what *he* sees in nature. The photograph should index what the individual sees in nature, and as all persons do not see the same, an absolutely true convention in art becomes impossible. He says, *Naturalistic Photography*, second edition, page 247:—"Let the honest student choose some district with which he is in sympathy . . . . let him day and night study the effects of nature, and try at any rate to produce one—*one picture* of his own, one picture which shall show an honest attempt to probe the mysteries of nature and art, one picture which shall show the author has something to say and knows how to say it, as

perhaps no other living person can say it; that is something to have accomplished. Remember that your photograph is as true an index of the mind as if you had written out a confession of faith on paper."

In art, then, Dr. Emerson is an individualist of the most emphatic and pronounced type. It is not what nature *is*—as determined in the laboratory of the scientist, or by the common consent of sections of mankind—which the true and faithful artist must represent; he must, on the other hand, depict what nature *seems* to him. In this way, and in this way only, can a work become an index of the mind of the producer, and in relation to this view there is absolutely no place for many of the contentions of those who have so voluminously criticised Dr. Emerson's writings from an optical or physical standpoint.

The absolute individualism of all true art (fine art) was very emphatically set forth by that great thinker, Immanuel Kant, who pointed out how utilitarianism, or any outside factor, such as bending to the views or researches of others, have no part in it; and some half century afterwards we find the great poet, dramatist, and philosopher, Schiller, in his comprehensive *Letters on the Æsthetic Training of Mankind*, also setting forth that "Art is a daugher of freedom and of spiritual needs."

The matter is somewhat obscured in the popular mind by the fact that art exists in two phases—fine art and useful art. In the useful arts, conventions are of the very first necessity, and all progress in the useful arts is largely dependent upon the universality of the conventions. Let us take the case of, in our day, a man who is constructing a machine. He does not start in the matter by only considering himself the purpose and nature of the machine, but he determines most things so that they shall accord with conventions. He will use shafts and bolts of standard diameter, screw rates of conventional pitch, and so forth, not because his unfettered impulses would have led him exactly to these, but because by using them his work is not only rendered very much easier, but the machine when made will be more valuable than it would otherwise be, owing to the greater facility of doing repairs or alterations. In works of fine art the convention has no analogous function, but when powerful conventions envelop the fine arts, the general effect is to enable industrious but incompetent persons to attain popularity and renown in such arts. They study the conventions: they are copyists, not artists. Moreover, the conventions in fine art tend to grow and to become strong, because so many persons who have no definite views or opinions of their own find it convenient to appear as if they had "good taste," so they affect to admire what is generally admired. In the graphic, or representative arts—as far as these arts are useful arts, rather than fine arts—convention may advantageously step in, and, as an instance, we may refer to the way trees are represented on the Ordnance Survey Map. We refer now to the larger scale maps, and have before us a sheet of the map in which a fraction over twenty-five inches corresponds to a mile. No attempt is made to represent each tree as it is in nature, but the larger trees are represented by one out of a series of five or six stamps, while an equally conventional scroll serves for a smaller tree or bush. Similarly, an outline sketch in *Punch* is intended mainly to assist in recalling to the mind some situation or incident, and is an outline having only a very remote resemblance to nature. Perhaps the first great step against the old conventions of outline in wood engraving and towards "naturalism" was made by Bewick, who massed his black and white so as rather to suggest than absolutely to define the outline—a principle much developed recently by the American wood engravers.

A heavy blow at the older conventions of the painters was struck by the pre-Raphaelite brethren, but in doing this they fell into a perhaps worse convention, that of realism—trying to paint things rather as they are than as they seem; but pre-Raphaelism as a working system is practically dead, and in its birth and death it has done excellent work—it has very largely given place to naturalism in painting.

Dr. Emerson also tells us, in his recent pamphlet (*see* BRITISH JOURNAL OF PHOTOGRAPHY, last week, p. 54), that "Naturalistic Photography," but not naturalism, "is dead;" but what is of the nature of truth will perhaps live rather in the minds of the few than of the many, and tend to lead photography to the nearest possible approximation towards naturalism; even if absolute naturalistic photography be unrealisable. In art—whether useful art or fine art—there is no hope of arriving absolutely and completely at the goal striven for. The best and utmost the earnest worker can do is, as Malebranche so emphatically advised, to constantly strive after perfection, but never to profess having arrived there.

PREPARING FOR THE COMING SEASON—DARK-ROOM ARRANGEMENTS.

NEXT to the lighting of the developing room in importance comes the question of water supply, and so far as convenience is concerned the later will perhaps in many minds occupy the foremost place. But it has to be borne in mind that a proper light is an absolute necessity, the question of luxury or convenience being a secondary consideration. In our water arrangements, fortunately, our "absolute necessity"—pure water—is looked after for us by others, and we have therefore only to study convenience and as much luxury as we can import into the work.

Every traveller knows what can be done with the conveniences obtainable and when luxury is out of the question. A dark cellar and a jug of water, with a tallow candle gleaming faintly in the distance, have seen the birth of many of the finest landscape negatives of bygone days, when comfort was less studied than it is now. The best equipped of landscape workers in the wet plate times had to turn out negatives that cannot well be excelled nowadays under circumstances that would frighten the present day dry plate man; and Bedford, Wilson, England, and a host of others, would tell you that something to shut out the daylight and a supply of water was the height to which their ideas of luxury rose. To have to walk a mile or two to fill the water-bag when engaged in outdoor work was nothing uncommon, but even that was nothing to what Frith and Good had to contend against in the Egyptian deserts, or Bisson Frères who worked 15×12 plates on the summit of Mount Blanc.

However, we have to do with modern requirements and home arrangements, where the water supply is ready to hand, and the only question is how to enjoy the greatest comfort in using it. Circumstances here, as in the case of the illumination, will in nearly every case rule the matter. Where no better or more permanent arrangements can be made, a jug of water, a toilet ewer, and a pail will enable the careful worker to produce as good negatives as if he had the most perfectly fitted laboratory at his disposal, but truly the labour will be greater. Under all circumstances, therefore, it is preferable to have a properly established developing sink.

We may start with the sink itself first. These are of various kinds, and a popular form at the present day, amongst amateurs at any rate, is the solid Doulton ware kind. These have the advantage of being practically everlasting, easily cleaned, and comparatively cheap; but they are heavy, cumbersome things, and must necessarily be permanently fixed, and moreover are very likely to cause breakages of bottles and measures. The wooden sink, lined with lead, is far superior, being less cumbersome and not liable to damage the developing vessels, and is to all intents and purposes everlasting, but if constructed by the ordinary plumber will be a comparatively costly job. If such a sink be selected, it should be of fair size, especially if enlarging is undertaken, as it is nearly impossible to work in a cleanly manner with a large developing dish and a small sink, while cleanliness of all things is requisite in connexion with enlargements. The depth should be as great as possible, in order to avoid splashing, though this is of less importance than area. Under no circumstances should the dimensions be less than twenty inches square, with a depth of at least seven inches. A sink resembling in form a developing dish is a constant nuisance, as any one who has been forced to use one will acknowledge.

The ordinary leaden sinks, especially if of considerable depth, say ten inches, are lined with sheet lead, cut and folded and soldered at the joints, but for less depths, say up to seven or eight inches, it is preferable to have the lining made without soldered joints. This is done by cutting the lead to size and gradually beating it into shape with a pair of curiously formed mallets or beaters made specially for the purpose, the result being, in the hands of a competent workman, a solid leaden dish or shell every whit as neat as the soldered lining, as well as more durable.

Either form of lead-lined sink will, in the great majority of instances, require the aid of the professional plumber, for very few photographers add amateur plumbing to their acquirements, though it is not an unknown circumstance. The amateur may, however, execute his own woodwork or case, and get the lining made to fit it; in doing so we advise him to stipulate for the thinnest lead he can get his plumber to put into it, and see that the price is charged accordingly; otherwise, the tradesman is pretty certain to use as much lead as he can, that is to say, to employ it unnecessarily thick for the purpose of adding to the price.

Zinc as a lining is inferior to lead, but much cheaper, and will answer every purpose of a developing sink pure and simple, but is to be avoided if ordinary chemical work is to be done, as it will not stand mineral acids. It is not so durable, though lighter than lead, and where portability and economy have to be studied may be used.

But there are other forms of sink which the amateur mechanic may easily construct for himself. The basis of all is necessarily a wooden casing, and the choice rests in the method of lining it. Upon the lining will depend the character of the casing, or, to put it in another way, a light and comparatively makeshift contrivance may be constructed, or a thoroughly strong and durable one. For instance, we have seen a sink made from the lid of an old trunk, lined with Willesden paper, and another in which the lining was very thin tinfoil; but such contrivances are of very little permanent use, and are almost always subject to leakage from the commencement.

If, however, a really substantial wooden casing be provided to start with, it is immaterial how it is lined, or, under some circumstances, if it is lined at all. A well dovetailed casing of three-quarter inch or inch pine, with the joints "primed" with white lead, shellac varnish, or Brunswick black, will form a perfectly water-tight receptacle, so long, at least, as it is kept in constant use; for if it be allowed to get dry it is liable to crack or give at the joints. Such a case—if painted inside with two or three coats of Brunswick black, each coat being allowed to dry before applying the next—will be quite serviceable for several years. Or thick shellac varnish may be applied in the same manner, though we prefer the former. Paraffin wax is often recommended for such purposes; and on a small scale, where the wax can be thoroughly soaked into the wood by heat, it answers as well as any, but for a sink of the dimensions we have mentioned, it is extremely difficult to ensure a thorough saturation in every part and the complete filling up of any defects in the joints. However, for the benefit of those who choose to try it, we may describe a simple method of applying the wax. Break up the paraffin into small pieces or shavings and sprinkle pretty evenly over the bottom of the case, then —having ready a hot flatiron—go over the whole surface repeatedly, adding more wax as that first used is absorbed. Then turn the case over and treat each of its sides in the same manner, taking special care that a good share of the wax goes into the corners and angles; indeed, it is a good plan to pour melted wax along the joints and to mould it with the fingers while still plastic, so as to form a rounded instead of an angular joint when it is tolerably certain that all defects are stopped. If properly applied, that is, if the woodwork is thoroughly heated by means of the iron before pouring the wax, it will adhere firmly, and show no tendency to come away afterwards.

Dovetailing in its best style may be beyond the capabilities of some of our amateur joiners, but, though desirable, it is not essential. The joints may be fitted together with a rebate or with a tongue and groove, or the edges of the wood be truly square before bringing together, in all cases screws being employed. In such cases, and also in joining two boards to form the bottom, and in attaching the latter to the sides, the edges should be spread with a mixture of white lead with a little red lead reduced to a very thin paste with turps. When tightly screwed up, the excess that exudes may be worked into the corners in the same way as the melted wax, and in a day or two will become perfectly hard and form a thoroughly water-tight and durable joint. The lining may then be performed by any of the methods already described.

One of the best, if not the best, plan we have seen of lining has been mentioned in these columns on a previous occasion, but may be repeated here, as it affords the security of the lead-lined sink with the ease of construction of the home-made article. It consists in preparing the casing—which in this case may be simply screwed or nailed together—with a good coating of Brunswick black, and when this is nearly dry, but still sticky or "tacky," laying on thin leadfoil, smoothing it down with a hot iron to aid the adhesion. The foil is obtainable in sheets of about 30 × 15, and weighs about a pound the sheet. The best plan for laying it on is to cut strips about an inch and a half wide, and to smooth these well into the angles, leaving half the width on each side; then to cover the remainder of the sides and bottom, remembering to cover the strips first laid with Brunswick black, in order that the overlap may adhere. The whole may then have another coat of black and be allowed to dry.

Nothing has as yet been said with regard to an outlet pipe, which is an obvious necessity, even if it be only to lead the waste into a bucket or other receptacle for convenience of re-

moval. The ordinary brass flange and plug may be employed, but a simpler, and in some respects more efficient, substitute is the following, which has also been previously described :—Procure a short length, say ten or twelve inches, of lead pipe about an inch internal diameter, and a piece of stout sheet lead about four inches square. With a centrebit cut a circular aperture in the square the size of the outside of the pipe, insert the latter and solder, or get them soldered together at about two inches from one end of the pipe. Next, with a centrebit of an inch and a half or two inches diameter, form a recess on the inside of the bottom of the sink where the pipe is to be inserted, about a quarter of an inch deep, and from the same centre cut a hole the exact size of the pipe, and with a gouge, "dish" or bevel the recess gradually from its circumference to the aperture. Insert the shorter end of the pipe from the outside and tack the flange to the sink, leaving a short piece of the pipe standing up inside. Next, with a hammer gently and gradually beat the projecting portion of pipe first into a funnel shape, and then gradually lay it down into the recess, cutting or scraping away any superfluous metal, to make a neat job of it. A plentiful coating of Brunswick black should first be applied to the recess, and a final coat or two after laying down the pipe will make it water-tight, and the outer projecting end will then be ready for use, as may be afterwards determined.

It is no use whipping a dead horse; still, though we have on many occasions pointed out the fallacy of the very commonly held idea that melted snow and ice form an exceedingly pure form of water, equal to that distilled in the chemist's laboratory, we may draw attention to a letter from the Worcester County Analyst in last week's *English Mechanic* treating upon this subject. Mr. Sweet, so far from dealing with snow as pure water, terms it the "scavenger of the air," and gives data of an analysis he made of snow skimmed from the surface of a two-inch fall. It contained enough ammonia and organic matter to perceptibly reduce its specific gravity, the combined amount of ammonia, organic matter, and organic ammonia being 14·17 parts per 100,000. After this we trust we may not again hear of water pure, as distilled, obtained from snow.

The present will not be an inopportune time for those of our readers who have been registering their thermometer minima during the recent frost to undertake an examination of their non-mercurial instruments. It is not by any means an uncommon event for a portion of the alcohol to become volatilised and lodge in the upper portion of the tube, and if the liquid, as is usually the case in all but the highest class of instruments, be coloured, there will be all the more chance of such a lodgment being unnoticed, unless specially sought for. An instance is on record in which the observations of a certain gentleman, who periodically and regularly sent his readings to the Meteorological Office, were upwards of ten degrees too low from this cause!

The Royal Meteorological Society propose holding from March 17 to 20 an exhibition of various instruments connected with their science, and they invite co-operation. They will be glad to show, *inter alia*, any photograph possessing special meteorological interest.

A correspondent of *Nature* writes to that journal an account of an examination by the stereoscope that he has made of certain photographs of Jupiter, which he speaks of as an exquisite test of the delicacy to which astronomical photography has attained. He finds that in Admiral Monchez's *Photographie Astronomique*, a cheap little book, are some photographs of that planet taken at intervals of only three minutes of time. When the earlier and later pictures are suitably placed in a stereoscope, there is quite enough difference to make them sensibly stereoscopic. The earlier picture is to be placed under the right, and the later under the left lens of the instrument.

The fifth fasciculus of the *Permanent International Committee for the Execution of Photographs of the Map of the Sky* is just published, and shows that the time is fast approaching when the real work of photography will begin. Although a distinct scheme of working was at the outset decided upon, modifications are suggested to improve results and lighten the labour. Some of the Committee urge that the original plan should be adhered to, but others join Admiral Monchez's. Infallibility, he remarks, does not obtain in science, and he advises the Permanent Committee to retain in its own hands any process of modification and correction which may assist the onward progress of the work. The combined theoretical minimum number of plates required to be exposed by the various observers over the globe is 20,802; if the recommendations of the Permanent Committee be strictly adhered to, the number will be 22,474; but if the alternative scheme of the Sectional Committee be adopted, 22,054 will suffice. These figures give some idea of the magnitude of the undertaking. Unfortunately the details, stated to be ready some months ago, of Dr. Eder's experiments as to the mode of emulsion making and plate coating for the purpose are for some reason not included in this publication.

An account of some of the most novel and remarkable experiments ever recorded in connexion with photography and electricity was read by Professor Minchin at the meeting of the Physical Society, held on the 16th inst. He prepared a variety of sensitive surfaces—ordinary "Liverpool emulsion," gelatine with eosine and other "aniline dyes" [more correctly, "coal-tar dyes"—Ed.], and finally with metallic plates, prepared in a manner quite new to photography, and which need not here be particularised. By coupling various pairs of these plates together and passing the electric current through them, he obtained distinct photographic effects capable of development by pyrogallic acid in the usual manner. Other pairs of plates he put together in a suitable liquid, and when light was allowed to play upon the cell, a distinct production of electric current took place. One battery of fifty such cells in series with an electrometer was exhibited, whereby the electromotive force generated by light falling on the cells could be caused to ring a bell, light or extinguish electric lights, &c. &c. A discussion on the paper is to take place on February 15, and, at the request of the President, Professor Minchin promised to show the experiments the same night.

ON THINGS IN GENERAL.

Though it is but a mental step from burst water pipes to exploding pressure gauges, yet the respective consequences may be very different. The Editor lately reminded us of a very simple expedient to adopt when the former *contretemps* had happened, and the thanks of the lantern-using community are due to Mr. W. Morton Jackson, of the Manchester Oxygen Company, for the cogent reasoning, followed by successful experimenting, which enabled him to discover the cause for and devise a remedy against such a catastrophe as the bursting of a gauge might easily lead to. It might be expected that the simple remedy suggested for the former accident, namely, the flattening up of the supply pipe at a point nearer the outside main than the spot where the burst happened, would occur to any one; but to my own knowledge it is not so. The day I read the editorial paragraph referred to, I met a gentleman who informed me of a recent experience of his own in this direction. On arriving home late one evening, he found every available receptacle in his studio and house requisitioned in the endeavour to catch the water, which was coming from the upper stories in a cataract. He soon found the burst, and equally soon stopped it—with a hammer. But why do people wait for a thaw before remedying a burst water pipe? It rarely happens when a pipe is frozen that one or other of the water taps on the premises does not cease to act, and so call attention to the "freeze;" equally rare is it, when a pipe is frozen, that it is not at the same time ruptured. Then is the time to look for future evil, and ascertain if a burst has taken place; the plumber can put it right in a short time, without any water being spilled, and he is also usually idle, and readily available during a severe frost. It is unfortunately true, however, that the

British householder is usually ignorant of the fact that frost, and not thaw, causes the rupture of the pipes. All that the thaw does is to melt the ice, and let the water out at the wrong place as soon as it melts.

It needs, however, more than average knowledge and logical power to apply kinetic theory so successfully as Mr. Jackson has done in regard to pressure gauge disasters. It is no use attempting to make a brief of his article, it is to be found on page 23 *et seq.* of this JOURNAL (the number for the 9th inst). I would, however, as the matter is strictly scientific in its logical sequence, suggest to the writer that he recasts the sentences on the expansion of gas—"more heat is absorbed when the gas is allowed to expand than when it is forcibly prevented from doing so. This proves that when a gas expands a certain amount of heat disappears or becomes latent." Now the only way in which gas could "freely" expand would be if the expansion took place into a space free from gas; in other words, into a vacuum. Gas when so expanding does not absorb any heat whatever; it has done no work, and consequently the gas suffers no reduction of temperature, such as happens when compressed gas expands into the atmosphere. No doubt Mr. Jackson is aware of this, and wrote in a popular manner. Still, his words might, if re-published, be so altered without danger to their lucidity.

Some interest attaches to the paper by Mr. Albert W. Scott on a new system for producing colour effects in the lantern, but it is very difficult to understand the exact *rationale* of his process. At the outset some scepticism is naturally aroused at the possibility of an experimenter discovering a new system, when from his introductory remarks it might be supposed he was till very recently quite ignorant of modern colour theories. It is a great many years since any one with even an elementary acquaintance with physical optics believed that red, yellow, and blue were "the three primary colours.'

The editorial comments upon the possible substitution by fraudulent photographers of bromide prints for platinotype are by no means ill-timed. By nature I am of a most confiding disposition, by experience I am getting warped in a contrary direction, and I wish I could believe that such frauds do not occur. In this particular direction I have no knowledge, but I do very well remember an incident bearing upon the subject that happened considerably more than a score of years ago, and human nature has not much changed since then. Sitting round the hospitable dinner table of Mr. Thomas Ross, one of the company related his own practice regarding what was then the excitement of the day—the Wothlytype process. (It may be remembered that the Wothly *carte-de-visite* pictures were printed in ovals on white ground.) "Yes," said the photographer, "it is a good thing, and I am going to run a new studio and turn out Wothlytypes by the thousand—common silver prints, but done with the oval, and there you are, just as good, and a deal less bother!" As with Wothlytype in one generation, so I am afraid it may be with platinotype in another.

"But, please your Majesty, I never was a Wilkesite," is the reply said to have been uttered to the King by John Wilkes himself, at the very height of the firebrand agitation by his followers, who were named after him. And so I am inclined to think will be the spirit of any answer that may be made to Mr. Emerson's last and most surprising contribution to photographic literature. His works, photographic and literary, have been a decided power, and have had an influence for great good, in that they have in breaking fresh ground caused photographers to think, instead of blindly following in an old groove, in which they were apt to lose any possible originality of thought in the desire to be good technical executionists. Every one of proper feeling will respect the manliness of Mr. Emerson's renunciation of what he now believes to be false principles. Many will, with me, deplore that it was not couched in a less militant strain, a strain that suggests throughout bitterness of heart and infirmity of temper, and will only give those whom he endeavours to flout the opportunity of saying, "Let the galled jade wince." FREE LANCE.

A REPLY TO DR. EMERSON'S "RENUNCIATION."

THERE are one or two matters of public interest in Dr. Emerson's eccentric "Renunciation," and one or two requiring personal reply, which I should like to refer to briefly. It would be waste of time to take this undignified production too seriously, for it is evidently only the outcome of violent egotism and offended vanity.

First, do not let photographers suppose that Dr. Emerson has the right to claim any originality in regard to naturalistic art. He has merely adapted to photographic methods ideas current amongst certain artists. He is, therefore, neither entitled to claim further recognition than this, nor has he the slightest right or power to order the funeral of naturalism in photography. Secondly, the limitations of photography are not so great as he now, for vindictive purposes, wishes to make out, for the individuality of the worker is freer than he asserts, and he has allowed himself to be misled by an absurd confusion about Messrs. Hurter & Driffield's experimental results. The power to alter relative values by exposure, development, and other purely photographic means is infinite. Thirdly, if "all writings and opinions upon art are as the crackling of thorns," why does Dr. Emerson return to his vomit in this pamphlet and re-discuss certain art matters? and why, in the name of all that is consistent, does he threaten photographers with another book on art later on? Fourthly, what on earth has "the dexterity" of the man with paint and brush to do with the matter? The photographer's dexterity as an artist is *not* a matter of a few weeks; it takes as long as the artists to cultivate. It is a mental training, and the handicraft follows the brain. Fifthly, Dr. Emerson is wise to give up every "school" title and to take to admiring "all good artists and all good art." It is what every sensible person has always wished to do, and after passing from one violent extreme to another we may hope he will in time reach a reasonable medium. Sixthly, I believe it to be false that any one has claimed novelty in the use of rough papers. All the same, these pictures have spoken and will speak for themselves to those who are less amateurs than Dr. Emerson, who has, "by the sweat of his brow, learned under a master!" Long before Colonel Noverre's excellent specimens were exhibited, I, and probably many besides, had spoken to Mr. Willis and others about the necessity for such rough-surfaced papers. Seventhly, the fact that Dr. Emerson should have left the Camera Club cannot fail to make that institution more attractive and comfortable to all reasonable and social people. Eighthly, Dr. Emerson's repudiation of the claims of photography as a means of capable artistic expression is perhaps only natural. In my opinion there is something sadly wanting in most of his photographs, and he himself is probably now finding this out. I trust he is devoting himself to some other pursuit more suited to his abilities—a humorous friend of mine suggests fretwork.

In regard to the personal matter, and what Dr. Emerson calls my "superficial knowledge," I shall be well pleased to let my photographic pictures speak for themselves, and stand side by side with his, before any competent and unbiased judge. The quotation used from my private letter seems to me to read in refreshing contrast to the rest of the pamphlet. Dr. Emerson was anxious *at that time* to recognise what I had done for naturalistic photography. I was not, however, particularly anxious to be very closely identified with Dr. Emerson and his violent aggressiveness. A little of the same appearance of modesty would not injure him. The whole of this business appears to have arisen, first, in that I dared in a very appreciative criticism to point out Dr. Emerson's weakness in respect to treating figures in photographic pictures. In reply to that he wrote: "You are wrong about my figures; they are as yet alone"—a sweet bit of Emersonian modesty. From that time, although treating with me to write for a journal he proposed to start which was to knock everything else endways, he seems to have begun to say hard things about me to others. That I should have ventured to differ from him in respect of the qualities of diffractive photographs caused him further attacks of spleen, and, finally, the fact of my being invited to read a paper at the Society of Arts appears to have upset the whole of his years of study on naturalistic photography, and wrought him up to the pitch of fulminating this mad pamphlet. The letter which he calls an "expostulation," and to which I sent no reply, was one long violent insult, alternating between threats and wheedling. I simply allowed Dr. Emerson to stew in his own bile. I was too busy to disturb myself with bandying insults.

As to the unfairness he complains of at the Society of Arts, he does not mention the name of the friend whose speech was misreported. It can hardly have been Mr. Maskell or Mr. Newman, and they were the only speakers who *read* their speeches. All the reports seem to me to be fairly accurate so far as they go.

Finally, I do not wish it to be supposed that I do not sympathise with Dr. Emerson in his affliction. There are some grains of sense in the pamphlet, more, indeed, than could be expected from any one even with a good liver after three and a half months' solitary study in a house-boat during the recent weather. But every reader ought to be cautioned against paying much heed to the outbursts of one who is blown about by every wind of doctrine—now a well-expressed word of a "great painter," now the influence of a common every-day artist,

and now a misunderstanding of a scientific experiment. Give such a one three and a half months' further confinement in a house-boat, and a fresh quarrel and a new crop of theories or burning thereof may be expected. It is certainly to be hoped that no photographer who is working out his own salvation by serious study and practice will be deluded by such cheap trash as this pamphlet contains. Let Dr. Emerson cast all the copies of *Naturalistic Photography* upon the dust-heap; let him, as I think, wisely, succeed in covering up the crude and absurd directions "To the Student" in every one of the volumes of *East Anglian Life*, which, with his genius for advertising himself expensively, Dr. Emerson sowed broadcast over the country—let him do all this and go on "renouncing" to the crack of doom, and he will only publish his own vanity, and will not be able to stem the tide of advancing culture amongst photographers. GEORGE DAVISON.

PHOTOGRAPHY IN ANILINE COLOURS.*

Now primuline, in common with all coal-tar bases, combines with nitrous acid to form a species of nitrite, which is termed a diazo compound. All that we need note about these diazo compounds is that they correspond to the intermediate stage in the transition of the ammonium nitrate to the condition of nitrogen (and water) thus:—

NH_3, HNO_2	H, N N OH	N_2
Ammonium nitrite.	$(-H_2O)$	$(-2H_2O)$
	X, N=N, OH	
	Diazo-primuline.	

These diazo-derivatives are, as a class, sensitive to light undergoing decomposition with evolution of nitrogen gas. But what concerns us for the moment is their avidity for construction or synthetic reaction with two large groups of coal for compounds—the bases, and phenols. With these they combine very much, as the original bases combine with nitrous acid to form these active diazo compounds, and the products are the azo-colouring matters. We cite the more important of these, obtained from primuline. In the case of the several phenols, their alkaline solutions are employed; while in the case of the bases and solutions are used—

Primuline and nitrous acid gives *Diazo-primuline.*

β Naphthol. *Red.*	Phenol. *Yellow.*	Resorcin. *Orange.*	Pyrogallol. *Brown.*	α Naphthylamine. Hydrochlorinde. *Purple.*	Amido. β Naphthol. Sulphuric Acid. *Blue.*	

These relations we demonstrate with diazo-primuline and the several reagents above mentioned.

We now come to the photographic application of these reactions. The essential condition of primuline photography is—(1) that these reactions take place with primuline after its application to any surface or material, such as wool, silk, &c., as a dye, without in the least affecting its union with the material; and (2) that the diazo-derivative produced, in combination with these materials, by treating the primuline-dyed surface with nitrous acid, is photo-sensitive in the highest degree; far more so, in fact, than the drivative itself, when free or uncombined.

Having thus prepared the way, we proceed to a complete experimental demonstration of the process. We first show the building up of the colouring matters upon the cotton and silk fabrics, showing that the reactions take place in silk without disturbing the union between the colouring matter and fabric; and that the azo-colouring matters so built up withstand the action of boiling soap.

We have now to demonstrate the sensitiveness to light of a surface dyed with primuline, and sensitised by treatment with nitrous acid, and we shall show that the action of the light is to destroy the diazo-derivative, that this destruction is due to the splitting off of its two characteristic nitrogen atoms in the gaseous form. We are enabled to show this to an audience owing to the curious fact that in a gelatine medium the nitrogen, though liberated from combination, is not evolved until the gelatine is softened by contact with water. We expose a primuline-gelatine plate to photographic action, and on plunging into a transparent bath of water an image of which is thrown on the screen, we see the form of the print instantly developed in minute bubbles of gas. On then treating the plate with one of our developers, we see that when the gas has formed—the evidence, *i.e.*, of the destruction of the diazo-primuline—then no development of colour takes place.

We now develop a number of prints which have been exposed in the daylight, and brought here in the condition in which they left the printing frame. In these developed pictures the high lights are represented by the neutral tint—varying from buff to cream—of the product of destruction of the diazo-derivative, the absence of development in these portions being due to the chemical mixtures of this product.

The development of colours corresponding to the shadows and half tones of the object is exactly proportionate to their depth, to the degree of protective action which they have exerted on the sensitive surface beneath—in other words, to the quantity of diazo-primuline which survives.

Reverting to the considerations which we advanced in the earlier portion of this paper, we should explain the action of the light on an addition of energy or atomic motion to the molecule of the diazo-primuline, whereby the split or cleavage of the molecule at the point occupied by the two nitrogen atoms is determined, just as by adding heat to ammonium nitrate its molecule is resolved into nitrogen and a residue, which in this case is not a complex compound, but water.

We have already alluded to the fact that the rays which attack the diazo-primuline are by no means confined to the blue and violet constituents of the spectrum, but extend well through the yellow to the orange red. In other words, a primuline print is more nearly a measure of the visual intensity of the sun's rays than the sensitive substances used in the ordinary methods of photography, in relation to which it is well-known that the photographic intensity of sunlight is a very different thing from visual intensity, owing to the enormously greater activity of the blue and violet rays—*i.e.*, those of least visual intensity—in decomposing the compounds which they employ.

It will be convenient here to point out another contrast of this method with those more commonly employed. The prints obtained with it are positives, the light and shadow in the object being exactly produced in the coloured picture. Natural objects, therefore, of convenient form, such as leaves, may be photographed directly; reproductions from camera pictures require glass positives, or positive paper prints made transparent in the usual way with vaseline.

In view, perhaps, of the chemistry of the method, it would perhaps be more correctly termed a negative method, since the action of the light is destructive, and when it acts, the construction or development of the colour is rendered impossible. In the ordinary methods, on the other hand, the light is an agent, as it were, in the synthesis of colour—when there is most action the deepest tones are developed—and the photographic action would in this case perhaps be more correctly termed positive. The point, however, is not a very important one.

There now remains to be noticed a second photographic process, based upon the peculiar properties of the diazo-derivatives of the coal-tar bases; a method which, to use the ordinary term, is a negative one, *i.e.*, the light plays a constructive part in the development of a coloured picture.

When the diazo compounds are treated with an alkaline bisulphite, they are converted into the diazo sulphonates. These compounds are sensitive to light, the action of which is to set free the diazo group from its combination, but they do not react with phenols and amines, as do the diazo compounds. The mixture of a diazo sulphonate with the latter is unattended by any colour reaction, but, on exposure to light, the diazo group being set free in presence of a phenol, the development of an azo-colour takes place *pari passu*. This reaction is the basis of the process invented and patented by A. Fear. The photographic surface is a mixture of a diazo sulphonate with the alkali compound of a phenol applied to any suitable material. On exposure to light under a transparency, development of colour takes place in proportion to the quantity of light transmitted, giving, therefore, a reversed reproduction, or negative picture. When printed, the unattacked mixture is dissolved away by copious washing, leaving the picture, already developed in the azo-colour, permanently fixed upon the fabric or material.

This process is not rapid enough to admit of being conveniently demonstrated by means of the artificial light at our disposal. We must therefore content ourselves with this brief description, referring those who wish for further information to the specification of the original German patent, No. 53,455 ga.

In concluding our brief sketch of this new departure in the application of the coal-tar colours, we need not, perhaps, apologise for its brevity. We learn that our friend, Professor Meldola, is to give a course of Cantor Lectures on "Photographic Methods;" and his survey of the field will be wide and complete. We have not attempted to give a general account of photographic methods partly on this account, and partly also because these diazotype processes are entirely typical of all printing processes, and, as subjects of lecture or educational demonstration, have the great advantage of involving the very simplest reaction possible; whereas, the changes which take place in

* Concluded from page 57.

silver compounds are very complicated, and as yet but imperfectly understood.

The primuline process is simplicity itself. It can be practised with the minimum of apparatus, and requires no technical training. The results are striking and pleasing, as we hope to have been able to show. A. G. Green, C. F. Cross, & E. J. Bevan.

THE USE OF BLACK GLASS MIRRORS FOR CLOUD PHOTOGRAPHY.

[A Communication to the Croydon Microscopic and Natural History Club.]

It has of course long been known that the light of the blue sky is partly polarised, while that reflected from a cloud is not; hence various proposals have been made to utilise this fact for the observation and even the photography of clouds. One of the most recent suggestions on this point is contained in a paper by Dr. A. Riggenbach, which was read before the Royal Meteorological Society, November 21, 1888 (*Quarterly Journal of the Royal Meteorological Society*, vol. xv., page 16).

In this paper he proposes to place a dark mirror or plate of obsidian before the lens of a camera so that the normal to the reflecting surface makes the polarising angle with the principal axis of the lens. Dr. A. Riggenbach said nothing about any practical trial of the method which he described theoretically, but exhibited in illustration of his paper a photograph taken by Dr. Burckhart, in which the still waters of the lake of Sarnen served as the reflector.

Early last year I determined to test the method thoroughly. I therefore constructed a small quarter-plate camera so that it could easily be rotated in either a horizontal or vertical plane, and could be clamped securely in any position.

A rectangular block of wood was then adjusted so that it fitted on to the lens just behind the hood, and could be turned with moderate friction around the lens. To this block of wood the mirror was attached by some brass arms so that its surface made an angle of thirty-three degrees with the optic axis of the lens. At first I tried a piece of thin patent plate blackened with dead black varnish on the reverse side. This I found gave a double image, which was plain enough in a photograph, although scarcely noticeable to the eye. I then substituted a small sheet of black glass with one surface cut to a true plane. With my lens, which is an Optimus 5×4 rapid rectilinear, I found a mirror measuring $3\frac{1}{4} \times 4\frac{1}{4}$ inches would just cover the field of view, but it had to be attached so near to the lens that exposure could only be made by means of a compact sliding shutter.

Now, according to Dr. A. Riggenbach's paper, which is physically correct, this reflector ought to be of great use under certain conditions, and of hardly any advantage under certain others. The best effect should be got by turning the camera so that the axis of the lens is at right angles to the sun's rays, and the mirror presents one of its longer edges to those rays. Experience shows that the best effect is certainly to be obtained under those conditions. But, as a matter of fact, the mirror does two things. It not only extinguishes the polarised part of the blue light from the sky, but it also reduces the brilliancy of the general illumination very greatly. Practical trial of the apparatus showed that although the best possible effect is to be obtained under those conditions which are theoretically best, almost equally satisfactory results may be obtained under all sorts of conditions. A cloud, to be shown to the best advantage, ought to be situated about ninety degrees away from the sun, but I have found it is quite easy to get good photographs of the most delicate clouds in whatever part of the sky they may be. Many of my best photographs represent clouds which were so near the sun that it was only just outside the field of view.

I have generally used a stop *f*-11, with an exposure varying from about one-tenth of a second to one second, and seldom find that the Ilford ordinary plates which I use fail to give a satisfactory image, although my attention has been directed almost exclusively to the very thinnest and most delicate forms of cirrus clouds.

When using a black mirror one cannot help being greatly struck with the way in which it reveals the most minute and beautiful structure in clouds, which are so dazzling that the unassisted eye can see none of it. It is far better for such a purpose than coloured or smoked glass. Thus I have often watched the glowing colours of a solar halo which was absolutely invisible to the naked eye, and I shall shortly show a photograph of such a halo taken when there was no indication of its existence, or of the presence of any halo-producing cloud except an unusual brightness of the sky near the sun.

I am encouraged to make these results public and to show you a number of lantern slides made from my negatives in order to indicate the value of the method when carried out, as I have employed it, under the smoke-defiled skies of a London suburb.

I hope that other photographers who live in a purer atmosphere will be induced to try their hands in a field of meteorological research which is so promising, and to lend their valuable assistance to the British Association Committee on Meteorological Photography.

A. W. Clayden.

DEVELOPMENT.*

I have many good negatives developed with all the usual alkalines, alone and in combination; yet I cannot say that after all my labour to discover the best, I yet know which is best. I have abandoned everything but ammonia and pyro, and am getting on certainly as well, if not better, than when I used the others. By way of justifying my present position, I will give a few conclusions which, in the meantime at least, seem to me to be warranted. Using in every case pyro, I find that potash gives a beautifully delicate image, full of detail, and of exquisite gradation, but not sufficiently obstructive of light to make a good printer. Even when made very dense, much of the half-tone is lost by being not opaque enough to impress its strength on paper. For this reason there is to my eye a peculiar oily softness (so to speak) about a potash-developed picture, fascinating to begin with, but soon getting distasteful. Soda gives a different effect; it gives an image with more pluck and obstructiveness to light, but in the process it buries up detail. I am quite convinced of this. I have examined microscopically the image produced by soda as against that produced by ammonia, and find this to be the case. Rule a number of fine lines upon a sheet of white paper, photograph this, cut the plate into two pieces, and develop *to the same density* one in soda and one in ammonia. My experience is—and I have tried this several times—that the ammonia-developed plate will show the lines much clearer and sharper than the soda. I cannot explain why this should be. There is less risk of fog with soda than with ammonia, and yet somehow the deposit seems not to be confined by the same keen edge. Many of my best pictures have been produced by a soda developer, and I dare say that for large work it is probably the most reliable alkali; still it has that drawback where the picture must be delicate and fine, as for lantern slides.

One very good point about soda is its great power of giving density with over-exposure. Indeed, there is great latitude of exposure when using soda. To come now to the ammonia pyro developer, which, in spite of many rivals, has no superior. Perhaps the first point to consider is the question, Why should the various formulæ differ so completely the one from the other? Without taking into account extraneous ingredients, such as soda, sulphite, citric acid, &c., you will find that the three *necessary* ingredients differ very widely in their proportions. An unprejudiced person would be apt to say that it can surely matter very little with such a host of different opinions on the subject. When one considers the matter for a little it becomes quite evident that there must be many opinions. To begin with, there are many different makes of plates in the market, each one working better with one composition of developer than any other. In the second place, one man works chiefly landscape, another portraiture. A developer safe enough for studio work would be eternally getting the landscape man into trouble from over-exposure; therefore he gradually alters his developer to suit the risk of over-exposure rather than under-exposure, and by-and-by cries up a weak developer as being what everybody should use. I have gone through this myself, and know it to be the case.

When he begins to attempt parlour portraiture he finds his weak developer not suitable, and forthwith alters his developer again, and when getting into more suitable proportions he begins to get successful negatives. He wishes he had known the virtues of a strong developer long ago, and looks back upon the time when he used a weak developer as being more or less lost time and money.

But there are not only different makes of plates and different kinds of work, but different men prefer different kinds of negatives, even in the same branch of photography. One man likes a thin, delicate negative, rich in detail, but soft in its gradations of light and shade. He uses a certain brand of sensitised paper, we shall say, and finds he gets better prints from a somewhat thin negative. Another develops till his negatives take half a day to print, even in good light. The same developer will not equally well produce both kinds, hence here again we have difference of opinion: one man likes to see the image coming up quick, another likes to spend about a quarter of an hour over it, so as to give him time to think how to make the most of it. In fact, there is no end to the story, and every man has his own pet formula, which, of course, is better than anything he ever sees any other body use. This is the

* Continued from page 56.

happiest condition, and a man in this state of beatitude should not really be disturbed. If you give him a formula, of course he will try it, and also, of course, half hoping that it will not turn out to be so good as his own. Being new to him he does not get the results he would like; in point of fact, that particular developer may not be very suitable for giving the class of negative he likes. The consequence is that he either thinks that you don't know what a good negative is, or else you have not really given him your formula. Long ago, when I was silly enough to persuade people to try this developer or that, I suffered from both accusations oftener than once. The real difficulty in development is not got over by getting a so-called *grand* developer. The difficulty is first to know when your picture is there before you, neither more nor less, and the only other item—and this only a small matter—to hit upon a good working plan suiting your plates, and over which you have the necessary control. Having said so much, you will be prepared to hear that I have no developer in particular to recommend. I think, however, I can say something to the point, especially to beginners. First, analyse any formula you may want to try, and see that it is not just your own proportions differently stated. Secondly, don't imagine that by changing the proportion of bromide some minute fraction of a grain you are to notice a sudden and wonderful improvement in your work. A little longer exposure or a little longer in the developer will bring you just where you were again, perhaps quite unintentionally on your part. And thirdly, recognise that if you know precisely *when* the picture which you are aiming at is before you there is not much difficulty in bringing it there.

As I stated in the early part of my paper, my plan is to develop a thin image by means of a weak developer of no special formula, and after this is well out I pour it off, rinse the plate, and apply a more concentrated solution. Whether under-exposed or over-exposed this is equally the best treatment, and leaves the operation thoroughly under control.

I have been asked, sometimes, why not just continue with the weak developer till sufficient density be obtained? My answer is that this does not attain the same object, for if you try it you will find that in applying a strong developer to a weak image it will thicken up so rapidly that no more detail will have time to come out, while if you continue with a weak developer you will find that by the time you have density enough the detail is by far too much, and the image flat, perhaps.

I have only two other points which I should like to mention. The first is that, after hundreds of experiments, I find none of the substitutes better than pyro. The second is, that in cases of under-exposure, if after soaking the plate in developers it be taken out before the solution begins to get brown, and washed gently under water, put into an empty dish and covered over with a sheet of glass to prevent evaporation, you will find, as a rule, a beautiful though thin image in a few hours, which will thicken up to any amount by a stronger developer applied then.

J. K. Tulloch, M.D.

Foreign Notes and News.

We learn that Dr. Hugo Schroeder, of London, is to contribute to Dr. Vogel's forthcoming second volume on the *Optics of Photography*, the chapter dealing with lenses and objectives.

Gaedicke's new grainless plates appear on the whole to be very successful, as they do not, even with the strongest lens, show the slightest trace of granularity. It is only with a power of 500 that it becomes at all apparent. The sensitiveness is not high, but the latitude permissible in exposure is simply astounding—forty times the normal by no means injuring the result!

M. E. Demole has been making some experiments with the bromide of cadmium-ammonia intensifier. A thin negative was cut into three pieces; one of these pieces was left unaltered, the other two being immersed for half an hour in ammonia and then washed. One was then exposed to the action for five minutes of an alcoholic bath containing 1 in 1000 of bromide of cadmium, the other being placed in alcohol only. Both were then cooled with pure alcohol and dried. They appeared of exactly *equal* density, showing that the bromide of cadmium had no influence whatever. The increase in density was, however, not very noticeable, being entirely due to the alcohol.

The exploded absurdity about making a non-actinic white light by means of differently coloured filters has formed a subject of attack for M. Wallon in a recent number of the *Photographic Gazette*. M. Wallon points out that the nickel-cobalt filter ought not really to let through any light at all unless it is dilute, when, of course, the light that it does permit to pass is white and actinic. He also shows that colour filters superposed act subtractively, and only mixtures of light additively. We cordially agree with M. Wallon, but it seems as if we had heard all this before "many a time," and we are haunted by a suspicion that M. Wallon has expended much time and trouble in scotching a dead snake.

According to Dr. Eder in the *Photographische Correspondenz*, a tincture of iodine consisting of one gramme of iodine in fifty c.c. of alcohol and diluted with fifty c.c. of water produces an extraordinary effect when added to the hydroquinone developer. Three to six drops in forty c.c. of developer causes the image to appear almost instantaneously. The contrasts appeared much softened, and a weak image often results when the exposure has been instantaneous. We believe this. Four drops in the eikonogen developer produced less forcing effect, the resulting image being clearer.

Professor A. Wouvermann, of Vienna, has been examining the permanence of water colours. He finds the most unalterable to be yellow ochre, terra sienna, sepia, and various blues. Carmine lakes and the carmines generally bleach almost into unrecognisability.

Our Editorial Table.

Photography as a Business. By H. P. Robinson.

Bradford and London: Percy Lund & Co.

Mr. Robinson's name has for so long been associated with art writings that one is scarcely prepared for his entering the arena of business. Although from his having for a long course of years been at the head of a business, no one is better qualified than he to discourse thereon.

In this little volume Mr. Robinson, as he states in the preface, has endeavoured to show the systematic commencement and conduct of a middle-class photographic business, treating it neither as an art nor a science, but simply as a means of obtaining an honest living. Having treated of the qualifications of a professional photographer, Mr. Robinson speaks respectively of the studio, workrooms, reception rooms, treats of re-sittings, book-keeping, and prices, and imparts much useful, practical information on the subject of the business of photography.

Mr. Otto Schölzig sends us specimens of Dr. Jacoby's new chloride of silver emulsion paper, and prints produced on the same. A great range of tone is obtainable, from warm brown to deep black. We have tried it, and find it to bear out Mr. Schölzig in all he says in its favour.

HYPNOTISM *VERSUS* THE CAMERA.

At the last meeting of the Dundee and East Scotland Photographic Association, Mr. A Stewart, editor of the *People's Friend*, read a paper entitled "Hypnotism *versus* the Camera," in which he exposed completely an American hoax which has had a very wide circulation in this country, and has "taken in" not a few newspapers and journals by the air of truth with which it was narrated. The hoax originated in the *Chicago Tribune* where, in an elaborate article, it was declared that a young gentleman of that city, by means of a Kodak camera, had proved that the feats of Indian jugglers were due to hypnotism. The article in the *Tribune* had a number of illustrations said to have been taken from Kodak negatives, along with alleged pencil sketches of the same objects, and by a comparison of the Kodak picture with its pencil duplicate it was sought to show that the growth of a mango tree from a bowl of sand, the marvellous appearance of a baby from beneath the juggler's mat spread upon the ground, and the climbing of a boy up a string thrown into the air by the juggler, were illusions induced upon the spectators by means of hypnotism, as the Kodak pictures showed neither tree, baby, nor boy. Mr. Stewart, who, besides being an amateur photographer and the possessor of a Kodak camera, is also an adept in hypnotism, showed up the technical absurdities of the *Tribune's* paper—apparent to any one acquainted with the working of a Kodak and having a knowledge of hypnotism, and clinched the matter by reading the following letter he had received

from the author of the original article, in reply to a request for further information on the subject:—

'The Chicago Tribune,' December 14th, 1890.

"My Dear Sir,—Your letter of November 29 has been referred to me as the writer of the article on hypnotism you mention. The story was a bit of fiction dressed up to give it a semblance of fact, and was intended to present in an attractive form a theory I have had for some time. I see no reason why the skilled jugglers of the East might not have developed the hypnotic science to an extent unknown to the students of the West, and why they could not, with that advanced knowledge, employ hypnotism to assist them in their tricks. It occurred to me that an effective way to test the matter would be to have a pencil sketch and a photograph of the performance made simultaneously, and that then, if the eye had been deceived, the camera would prove it. So the sketch was written, but as I made the name of the experimenter S. Ellmore (sell more), I imagined that the careful reader might see something in the name of the young man to suggest the idea that it was not, perhaps, 'gospel truth.' I am led to believe, however, judging from the number of letters the *Tribune* has had from various parts of the globe, that the little story attracted more attention than I dreamed it could, and that many of the readers accepted it as perfectly true. I am sorry that any one should have been deluded, but feel that if the story results in a test of the theory, the end may justify the means.—Sincerely yours, John E. Wilkie."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 998.—"A New and Improved Metal Photographic Printing Frame." C. Hoddle.—*Dated January* 20, 1891.

No. 1055.—"Improved Means and Devices for Obtaining Optical Projections of Photographs in Natural Colours." T. R. Dallmeyer.—*Dated January* 21, 1891.

No. 1080.—"Improvements in Photographic Changing Boxes." R. Schreiner.—*Dated January* 21, 1891.

No. 1130.—"An Improved Hand Camera." J. H. Nestler.—*Dated January* 21, 1891.

No. 1187.—"Improvements in or connected with Photographic Cameras." C. Beck.—*Dated January* 22, 1891.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 3	North London	Wellington Hall, Islington, N.
,, 3	Holmfirth	
,, 3	Sutton	Sutton Scientific Society's Rooms.
,, 3	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 4	Coventry and Midland	The Dispensary, Coventry.
,, 4	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 4	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 5	Bolton Photographic Society	The Baths, Bridgman-street.
,, 5	Leeds	Leeds Mechanics' Institute.
,, 5	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 5	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 5	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 6	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 6	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

January 27.—Technical meeting.—Mr. Chapman Jones in the chair.

The Chairman showed a lens for detective cameras by Wray fitted with Iris diaphragm and index. The new Jena glass had been used in the construction.

Mr. A. Cowan considered it an advantage to have clicks showing when the diaphragm was at the numbers indicating the exposure.

Mr. G. L. Addenbrooke inquired the experience of other members as to the working of combination sets of lenses. He had such a set, which was not, however, very successful, but possibly other makes might prove more so. The illumination in some of the combinations was unequal.

Mr. Cowan said that Darlot's combination sets worked very well, but large stops must not be used. No. 16 was, he thought, the proper limit of size with those lenses.

Mr. Addenbrooke said that there was an objection with small lenses fitting into large mounts that there was such a weight of metal.

The Chairman suggested that aluminium should be used, as it was now cheaper.

Mr. Addenbrooke said that the metal had come down to 8*s*. a pound, and a good solder had come into use. An article might be soldered and the metal beaten out to twice its original size without giving way.

The Chairman had noticed that in combination sets of lenses the longer-focussed ones were made to cover larger plates than those intended to be used with the lenses of shorter focus.

Mr. W. Bedford used a combination set of lenses by Darlot of somewhat more extensive range than the older sets, and considered them very satisfactory. The range of focus was from three and a half to twenty-nine inches. As for the use of lenses of different focus to make a combination, he did not find any disadvantage from using even those of extreme length and shortness together.

Mr. Addenbrooke remarked that the set of three doublets gave five double combinations.

The Chairman inquired why, when taking a camera for lantern-slide negatives, it was so customary to use quarter-plates, seeing that they always had to be masked down in printing. The small camera which he used for plates of half the quarter size gave all that would be included in a lantern slide of oblong shape.

Mr. W. E. Debenham said that with the larger plates there was opportunity for selecting a part of what was included at more leisure than was practicable with hand-camera subjects.

The Chairman replied that with a good finder he had never been more than an eighth of an inch out. Finders as sold were often out.

Mr. W. H. Harrison inquired whether triple or double lantern condensers were best for slides of ordinary size.

Mr. T. E. Freshwater said that if it were required to illuminate a small surface the triple had an advantage, but not when the whole of the slide of ordinary size was to be used.

Mr. Addenbrooke inquired whether any one had had experience in using the incandescent lamp recently made for lantern purposes.

Mr. Freshwater thought that when electric current was obtainable it was better to use the arc, but with the arc a long-focus condenser was necessary on account of the danger of heating.

The Chairman said that there was an idea that lantern slides should be very sharply defined. Mr. George Smith had told him that if the slide appeared sharp to the eye that was sufficient. He would like to hear what Mr. Debenham had to say on the point.

Mr. Debenham said that if a three-inch slide were examined at a distance of nine inches from the eye, and then thrown on a six-feet screen and looked at from a distance of eighteen feet, the angle subtended would be the same. For his own part he would like the slide as finely defined as possible, so that if he wished to go nearer the screen to examine detail he could do so.

It was mentioned that at the next technical meeting Mr. Addenbrooke would show some views of Australian and American scenery.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 22,—Mr. W. Bedford in the chair.

Presentations to the Library of Ganot's *Physics*, by Mr. A. Haddon, and Lewis Wright's *Lantern Projection*, by Mr. T. E. Freshwater, were received, and the thanks of the Association recorded.

Mr. Leon Warnerke then gave a demonstration of a simplified system of collography adapted to the use of those who did not desire to set up elaborate and expensive plant. Mechanical printing, he said, was not sufficiently carried out by photographers themselves, but there is no department of photography that offers such a wide field for work. There is a general impression that all such processes require special appliances not easily installed. As for the quality of the results, he held that they should be esteemed by what could be done when carefully worked in a manner that at present could only be accomplished by hand work. We were accustomed to see work turned out in a wholesale way, by machines printing 1000 or more per hour. This does not permit of the highest excellence of which the process is capable. When worked by hand, and with a little attention given to it, very fine results can be obtained. With the platinum, carbon, or silver process, we obtain good results, but there is very little power of alteration of the range of tone. Not so with collographic printing. There was here unlimited range of tone and unlimited range of intensity. Platinum printing is fashionable just now, but with some of the paper as soon as kept for some time there is a flat image. The whole paraphernalia necessary for collography was not very extensive. No special press is necessary. The ordinary copying press that he was about to use that evening answered the purpose very well. When at Nice he saw a process worked for letter-copying—the black autocopyist process, and it occurred to him that it should answer for collographic work; and in Paris he got the simple apparatus and found it succeed very well. Some little modifications had since been introduced for photographic work. The frame for stretching the printing surface is made stronger and the gelatinised parchment is a little different, but that used for letter-copying would answer the purpose. This particular kind of collotype printing, Mr. Warnerke proceeded to explain, is produced by using a surface of gelatine spread on vegetable parchment. The sheet is sensitised on a solution of bichromatic of potash of three per cent., though the strength might vary with the temperature. A little ammonia should be added. With collography on a glass plate the temperature of drying is of the utmost importance; but this is not the case to the same extent with the process he was describing. The sheet, when sensitised, is dried upon a glass plate which has been previously rubbed with talc and all excess dusted off. The surface is not sensitive whilst wet, and therefore the preparation might be made in daylight, but the drying must take place in darkness. About six to ten hours is a good average time for drying. The sheet might be used as soon as dry, but he found the best results got after it had been kept for two or three days, or even a week. In winter time he had kept it as long as three weeks. If it is important that the picture should be non-reversed, the negative must be reversed or a stripped film negative used. The light for printing on to the gelatine surface should be diffused. The exposure could be judged by inspection, as the image is a visible one. If either, a little over-exposure would be better than the reverse course. He generally exposed till he could see the details in the deepest parts. After exposure, the back of the film negative is exposed to the light for five or ten minutes to harden the film, and to diminish the swelling or relief of the gelatine where not acted upon by light. This relief would help to prevent the ink from getting at the exposed parts. The next stage is to immerse the sheet in ordinary cold water until the bichromate is removed. Certainly not less than two hours should be given. There is no harm in leaving it to soak all night. After thoroughly washing, the sheet is drained, blotted, and dried. After drying, the sheet is laid face

upwards in a dish, the bottom of which is a little smaller than the sheet, and a solution poured on, consisting of seventy parts of glycerine, thirty of water, and three of strong ammonia. This is left for an hour to thoroughly penetrate the sheet. It is then taken out and the excess wiped off, when it is stretched on the frame of the autocopyist, with a piece of felt and blotting paper underneath, and is then ready for inking. The ink used, the kind of roller, and the method of rolling are very important. The ink may be either that which is used for lithographic or for letterpress work: either will do if stiff enough. The surface of the collographic plate has the peculiar property of taking stiff ink only where the image has been deeply impressed, whilst a thinner ink will be taken by the rest of the image. We have thus in our own hands, by printing with inks of two degrees of stiffness, the means of reinforcing the shadows to any extent that we may desire, whilst the half-tones will not suffer, but be brought out by the thinner ink used after rolling in the stiffer one. For the thick ink a leather roller is best, whilst for the thinner ink a gelatine or composition roller answers better. Mr. Warnerke then proceeded to roll up a sheet, and explained that the first rolling always took a considerable time, and that the first few prints were always rejected. After about ten pulls had been taken off, the film would be in working order, and would continue so for about fifty pulls, when it would require to be sponged over with the same glycerine mixture as that in which it had originally been soaked; but this time the prints would come off right at once, and might be pulled till another fifty had been made, and so on. For thinning the ink some recommended varnish, and others various things, including tallow and oil. He had found varnish best for mixing the first or thick ink, and for a thinner and second ink he used lard. As an inking slab a sheet of glass answered very well, and was used at the demonstration. Ink could be of any tint desired, the simplest was plain black, and that was what was used in this instance. Several prints were now made, and the improving quality as the surface got into working order noted. In one instance, in order to show strong contrasts, the first ink was left rather heavily on the film, and but little of the thinner ink used. In another case the reverse proceeding was gone through to produce a specially soft image. As an illustration of the varied effect that could be produced by different treatment, a print was shown in which everything appeared blurred—as much, the demonstrator remarked, as ought to please those who desired what had up to last week been sought for as naturalistic effect. This was got by omitting the glycerine treatment, and printing for a time from the simply wet film. The paper to be used must be dry, and might be either specially prepared with enamel or used plain. With rough paper, however, greater pressure was required, and least with the enamel paper. He had printed 300 impressions from a film without noticing any deterioration.

The conclusion of the demonstration was warmly applauded, and Mr. T. Bolas said that he very much admired the way in which Mr. Warnerke had described the inking. He would like to know whether Mr. Warnerke considered the average work of the parchment process was fairly equal to that from glass.

Mr. Warnerke replied that if there were bad examples from the parchment process, it should be remembered that it was not fifteen years old, like that of printing from glass plates.

Mr. Bolas said that he had shown some results from parchment many years since. Suppose that gelatinised plates could be bought ready for sensitising, and only requiring to be put on the mantelpiece to dry, he thought that that would be better than using parchment. It was very much better to start with a rigid surface. He had compared the advantages of glass and vegetable parchment in some papers published some years ago in The British Journal of Photography, and came to the conclusion that glass was decidedly better. He had made the suggestion that some dealer should prepare glasses ready gelatinised, and only requiring sensitising.

Mr. Warnerke replied that such plates were not in the market, and he thought that glass could not be printed from in a press such as he had been showing. He wanted to show what could be done with appliances such as were generally accessible, and he considered that with proper attention and hand printing, excellent work could be done. Obernetter's finest work was all done in hand presses.

Mr. Bolas agreed that with an ordinary copying press without a plane bed, the glass would almost certainly break, and there was the distinct advantage with the vegetable parchment process that that material was already on the market. With care it was quite possible that results might be produced equal to the average of glass work.

Mr. A. Haddon said that Mr. Warnerke had explained and put the matter so clearly and simply, that he intended to try it as soon as he had a little time disengaged.

Mr. Warnerke was thanked for his demonstration and explanation, and after it had been announced that Mr. T. Illingworth and Mr. F. Parsons had been elected members of the Association, the meeting was adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Meeting held January 23,—Mr. W. Bedford, Chairman.

Three applications for assistance considered and granted.

Messrs. Gray and Davies elected as subscribers.

HOLBORN CAMERA CLUB.

January 23.—Mr. E. Clifton gave a demonstration on *Intensifying and Reducing.*

To-day (Friday), lantern night.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

January 20,—General Meeting.

This being a lantern night, a number of excellent slides, by Messrs. Grover, Illingworth, and the Secretary, were passed through the lantern. Those by Mr. Illingworth were made by the wet collodion process from negatives by a late member of the Council, and were all that could be desired for tone, clearness, and transparency in the shadows. Those by Mr. Grover were mostly from hand-camera negatives, toned in the sulphocyanide bath. Most of those shown by the Secretary were reduced from half-plate size by magnesium ribbon upon the new Ilford plates for black tones, and showed the capability of these plates for giving clear shadows and a pleasing colour.

Mr. Platt's new flash lamp was then shown, and was thought to be a cheap and useful lamp for many purposes.

February 3 will be a technical evening, and on February 17 the lantern slide competition will take place, and members are requested to send in their slides, with a motto attached, at as early a date as possible.

WEST LONDON PHOTOGRAPHIC SOCIETY.

January 23,—Mr. W. A. Brown (President) in the chair.

The President read a letter from Mr. John A. Hodges, resigning his appointment as Hon. Secretary, on account of ill-health. He (the President) said all the members would agree with him in regretting the great loss the Society would sustain through Mr. Hodges' resignation, but as they could not stand in the way, especially as Mr. Hodges was strictly ordered by his medical adviser to give up his secretarial work, the Council had accepted his resignation.

A cordial vote of sympathy with Mr. Hodges was put to the meeting and carried unanimously.

Mr. Harry Selby, of 42 Ladbroke-grove-road, W., was appointed to the vacant post of Hon. Secretary. The following further appointments were also made:—Mr. Leslie Selby to be Assistant Hon. Secretary, *vice* Mr. Lionel C. Bennett, who resigns. Mr. L. C. Bennett and Mr. J. Stein to be Hon. Auditors, *vice* Messrs. H. and L. Selby, who vacate the posts on their new appointments.

Messrs. H. W. Peal, H. F. Wilson, F. A. Walmisley, Cullinan, Dee, Gaston Hervien, and Scantleby were then proposed as new members.

The President then presented the medals to the successful competitors at the recent Society Exhibition.

Mr. J. Martin Dickins then read his paper, *A Suggestion and a Photographic Yarn.* Mr. Dickins' suggestion was that papers read before the Society should not be confined entirely to the scientific side of photography, but that, especially when other papers were lacking, proceedings should be made more cordial and less frigid by the relation of photographic adventures, and so forth. He then ventured, with the permission of the meeting, to 'spin a photographic yarn.' This consisted of the relation, in jocular verse, of the amusing adventures of two travellers in Australia, and of their difficulties in loading their slides in the open air, after losing their dark tent in a bush fire. The paper was interspersed with far-fetched puns on the names of certain members of the Society. A hearty vote of thanks was accorded to Mr. Dickins for his amusing paper.

A question was asked in the question box as to the effect of ammonia fumes on the lungs. No medical man being present, a professional opinion could not be obtained.

Mr. Whiting mentioned the ammoniaphone in connexion with the question.

A second question was asked as to the best toning bath for obtaining sepia tones on sensitised, rough drawing paper.

Mr. Bennett recommended platinum toning.

Mr. J. Wilson had obtained good results with weak gold and borax.

Mr. T. S. Hazeon suggested paper toned with a non-acid solution of platinum.

Mr. Whiting expressed a doubt as to what was a real sepia tone, remarking that he found it easiest to obtain black toues on such paper.

Mr. Dixon exhibited prints on matt-surface paper, and desired hints as to the method of obtaining black tones. The general opinion seemed to be that the negatives were too thin for black tones.

Mr. H. Selby exhibited a negative showing the sun with a distinct solar halo. The exposure was made on January 18, at 3 p.m., with rapid shutter on a Mawson plate, the lens working at *f*-8.

The President made some remarks on the question of procuring a concession of cheap railway fares to photographers on the same lines as those granted to anglers and others. He then read a draft memorial to the various Metropolitan railways which he proposed to seud to all Metropolitan Photographic Societies for signature by the members. After some conversation the proceedings terminated.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

January 26,—Mr. W. T. Goodhew (Vice-President) in the chair.

Mr. G. R. Martin, in opening a discussion on *Halation and Light Fog*, said he did not pretend to have more knowledge of these phenomena aud their causes than other members of the Society, but proposed to give his opinions for comparison with the experiences of others. He had, when the subject was first proposed some time ago, prepared negatives to illustrate his views. These, however, had beeu destroyed, and as he had not had time to repeat them he would attempt to explain with the aid of the blackboard. In the first place, he considered that the various kinds of halation and light fog were due to several causes, many or all of which were present at the same time, so that it would be futile to attempt to say to which cause any particular instance was due; and as light fog and halation were usually present at the same time, he proposed to take into consideration all species of fog which were impressed upon the plate during exposure in the camera. Halatiou in its usual form was a spreading of the high lights into the adjacent shadows, and was geuerally assumed to proceed from the reflection of these lights from the back of the plate. It had been objected that these rays would be reflected at an angle equal to the angle of their incidence, and so in many cases would appear in the form of a second image on one or the other side of the direct image. It was only necessary to remember that the film acted as a disperser of light, causing it to spread in all directions, and consequently to be reflected in the same way, to show that this objection

was unfounded. The second cause might be attributed to the reflection of small portions of the light in all directions from the crystals of haloid salt in the film. This would probably be small in quantity, entirely on the surface, and could be removed by gentle rubbing with a rag moistened with methylated alcohol. Another cause of fog when taking a negative with extreme contrasts was that the light was sometimes reflected from the edges of badly finished lenses, and even when the lens was perfect, uncondensed light entered and formed a halo on the plate. He then referred to ghost images, and showed by diagrams how they were formed. *Prevention.*—It had been suggested to back plates with some non-actinic matter, such as stained collodion, gamboge, and gum, or any medium which approached the refraction index of glass. He had in practice found that a piece of the Autotype Company's black film, wetted and applied to the back of the plate, was as good as any, was easy to apply and remove, and did not in any way injure the plate, even when kept in contact for two or three weeks. It had also been suggested to mask the windows or other brilliant objects with a screen, and either to take two exposures on different plates, giving a long exposure for the shadows with the screen in position, and a short one for the light with the screen removed, or to combine the two exposures on the one negative. He had not tried this method, but did not doubt that it was practicable in certain cases. He preferred to mask portions of the negative during the process of printing, and referred to successful instances of this method shown by a member of the Society at a previous meeting. It had been proposed to stain the film previous to exposure with a non-actinic colour, but he could not recommend the practice, as the exposure would be immoderately prolonged, or the shadow portions of the negative would be wanting in density. It had also been proposed to stain the film with orthochromatic dye or to use orthochromatic plates. He failed to see that any advantage would accrue from the use of either. A cause of halation not usually taken note of would be found in the motes of dust floating in front of the brilliant object; these would tend to disperse the light and produce fog. His attention had been called to a theory that when the haloid salts in the direct line of the light had been reduced, they would absorb bromine from the adjacent crystals and these in turn from those farther off, thus causing a spreading of the light. He thought it improbable, but understood that the Secretary had tested the theory. [The Secretary said his experiments were not conclusive.] Finally, he believed that the best method of preventing halation at the back of the plate, where it was impossible to remove it, was to use a slow, thickly coated plate.

The subject led to an animated discussion, in which Mr. March said he thought the use of a screen in front of church windows could hardly be seriously proposed.

Mr. Broader had seen it adopted, several men with ladders being employed.

Mr. Lever was of opinion that backing plates was next to useless, but had heard a salesman of celluloid films state at a society meeting that with those which had a matt surface halation was impossible. When the halation was slight, it was no more than was palpable to the eyes when viewing a brilliant light crossed by bright lines.

Mr. Mummery referred to the theory of the haloid salts being reduced by the mechanical action of the rapid vibration of light waves, and thought it possible that the impact might be communicated to the adjacent crystals.

Mr. Beadle had found that ground glass plates and the backing of ordinary plates with Brunswick black mitigated halation. The black might be removed with bichromate. He also deprecated the use of powerful developers when halation was suspected.

Mr. Smith had found so much emulsion on the backs of his plates, he thought it would cost the manufacturers little to cover them entirely, when a piece of paper could easily be brought into optical contact.

Mr. Gill developed his negatives till the high lights were well up, washed them thoroughly, applied vaseline to the part where development was complete, and then proceeded with the development of the shadows. The vaseline was easily removable from the dried negative with spirit.

Mr. W. T. Goodhew thought the amount of halation by reflection of light from the crystals of haloid salts would be but little. He preferred thickly coated rapid plates for interiors, and had taken negatives in Canterbury Cathedral on them in twenty minutes, and had been little troubled with halation. He also deprecated rapid development; and although the practice had been condemned, he flooded his plates with water, believing that by doing so he obtained requisite density without developing the halated portions at the back of the film. He was of opinion that orthochromatic plates were useful for interiors, as they were supersensitive to the red end of the spectrum, and the use of a colour screen would hold back the violet and blue rays.

Mr. Martin answered several questions, and received a vote of thanks for his admirable opening.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

January 21.—Annual meeting.

In his presidential address, Mr. E. Lovett congratulated the Society upon the position of the Club and the successful year's work. Forty-four new members had joined in twelve months, so that, in spite of losses by death and removals, the increase was steady and continuous. Fifteen lectures and papers on subjects of general interest had been read during the year, and the meetings and excursions had been well attended. The exhibits at the meetings had also largely increased, and had given much zest to those gatherings. Mr. Lovett also stated that the *soirée* had been one of the best ever held by the Club, due to a great extent to the splendid display of photographs by the members of that section. The reports of the Botanical, Geological, Meteorological, Microscopical, Photographic, and Zoological Sub-Committees were of great interest, and showed all these sections were working hard in the locality. Mr. Lovett then stated that he had succeeded in obtaining a room in the Public Hall, which he had fitted up as a dark room and laboratory for the photographic section, and which he now begged to present to the Club for the coming year. This room, which is twenty-five feet long, and supplied with water, and warmed and lighted with gas, has a permanent screen fitted at one end, and will be useful alike for enlarging, developing, and general photographic work. The President said that with this room, and its many other advantages, the Club would no doubt increase in members very largely during the coming year, the present membership being over 300.

Mr. Sturge was elected Treasurer in the place of Mr. McKean, resigned, and the two vacancies on Committee were filled by Mr. H. D. Gower, Hon. Secretary (photographic section), and Mr. McKean.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

January 19,—Annual general meeting.

Mr. John Morison, jnn., took the chair on his election as President.

The following office-bearers were also elected for 1891:—*Vice-President:* Mr. Thomas Taylor.—*Treasurer:* Mr. Hugh Reid.—*Secretaries:* Messrs. W. Goodwin and J. C. Oliver; and a Council of six members.

Mr. Thomas Taylor then gave an interesting demonstration of *Platinotype Printing.*

The meeting closed with the usual display of lantern views by members, shown by limelight.

Correspondence.

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

CALCULATIONS FOR LANTERN PROJECTIONS.

To the Editor.

Sir,—The following table I prepared for the Lantern Society on the 12th inst. may be of interest to your readers.

The first column contains the U. S. numbers. The second, the apertures in terms of the foci corresponding to the numbers in the first column, derived from the tangent system. The third column gives the equivalent angular apertures. The fourth, the apertures in terms of the foci derived from the sines of the semi-angles. The fifth, the equivalent angular apertures. The sixth, the sines of the semi-angles. The seventh, the squares of the sines in the sixth column.

In 1874 Professor Abbe, and independently Helmholtz, proved that the apertures of lenses were proportional to the sines of their semi-angles, be those angles wide or narrow. That being so it follows that if the exposures of photographic lenses are to be exactly proportional to the figures in the first column, their apertures must agree with the ratios in the fourth column and not with those in the second. The illuminating power of the apertures in the fourth column is directly proportional to the figures in the seventh column. The reason why there is not greater divergence between the two systems is because the tangents of small angles are practically proportional to the sines. If the U. S. notation was applied to wide-angled microscope lenses the error would be so large that the notation would be of more harm than good. I can see no reason why the "True Notation" should not be adopted, and then there would be a continuity of the nomenclature, beginning at low-angled photograph lenses and ending in wide-angled microscope ones. The table is calculated to the nearest second of arc.

U. S. Notation.		True Notation.		N. A.	(N. A.)².
		° ′ ″	° ′ ″		
·25	*f*-2	28 4 20	*f*-1·9525	28 43 36	·24807	·061538
·5	*f*-2·8284	20 3 0	*f*-2·8062	20 12 18	·17541	·030769
1	*f*-4	14 15 0	*f*-4	14 15 0	·124035	·0153846
2	*f*-5·6568	10 6 8	*f*-5·6788	10 3 48	·087706	·0076923
4	*f*-8	7 9 10	*f*-8·0468	7 6 40	·062017	·0038461
8	*f*-11·31368	5 3 40	*f*-11·3905	5 1 36	·043853	·0019231
16	*f*-16	3 34 48	*f*-16·117	3 33 14	·031009	·00096154
32	*f*-22·627	2 31 56	*f*-22·798	2 30 46	·021926	·00048077
64	*f*-32	1 47 26	*f*-32·245	1 46 36	·015504	·00024038
128	*f*-45·2547	1 15 58	*f*-45·607	1 15 23	·010963	·00012019
256	*f*-64	0 53 42	*f*-64·498	0 53 18	·0077522	·000060096

Edward M. Nelson.

"NICKEL IN THE SLOT" PHOTOGRAPHY.

To the Editor.

Sir,—Not long ago you asked in The British Journal of Photography about the nickel in the slot photographs, and as I saw one or two of them at work here in Paris, it may interest you to know some more about it. Here is what I saw:—At the Casino de Paris are placed in a recess or

small room two big boxes similar in size and form to the general weighing machines. In front of one is placed (screwed) a chair with a small white background for head exposures, and in front of the other is a grey background of a plain interior with two or three steps in front and a small piece of stone rail. The chair is nearer to the portrait objective than the other background is to the wider-angle lens, which takes full-sized figures. This, however, more or less, according to where one stands, higher or lower, and for that matter the same happens with the bust portraits according to the size of the parties, some having their hats cut half off.

The front of the machine has, in the centre, the lens, and to the right the slot, to the left the print to look at while the exposure is made. Above this are three small dials with hands which move all around, showing at what stage the process is at all times. The left dial refers to the coating of the tintype and evaporating; the centre one to the sensitising, getting ready, and *exposure*—this, when it begins, starts a bell, which rings until the exposure is complete; then the third dial shows developing, washing, fixing, and washing and drying, and the end falls out from an opening on the side. Then the assistant puts the result in a small brass frame, about $1\frac{1}{2} \times 2$ inches, and delivers the picture, which is backed by a small cardboard and in front a piece of mica.

The inside work, which is done by clockwork, or maybe by electricity as motive power, requires pretty often the attention of another attendant to put the thing in working order again. The exposure is always the same, which may be all well enough since the light does not vary. Over each machine are three powerful arc lights with white reflectors around them, and as the room is very small the six lights touch each other and give their full power to every sitter, and as there is no trial at light and shade or effect, the six lights staring you right in the face, the results can be well imagined. All the black or dark cloths, hats, bonnets, &c., are black enough on the tintype, but alas for the face! it is a total failure, showing but a ghost of the original—no shade but all light, and scarcely an outline, the light being so much in front and the background white as that. I will not speak of parties moving or laughing when half way done, &c., you can imagine them easily. If the light was managed somewhat more skilfully, I have no doubt that the results would be very presentable considering the way it is done and for the price—viz., fifty centimes, or fivepence.

At the present time the machine seems to be rather unreliable to leave it alone any length of time, but with a steady light it could be managed—however, smokers and lookers-on interfere with exposures certainly; but when daylight is taken as an agent, exposures will probably be sometimes at fault.—I am, yours, &c., ALBERT LEVY.

4, *Avenue Pinel, Asnières* (*Seine*), *January* 26, 1891.

THE LAMENT OF A NATURALISTIC.

To the EDITOR.

SIR,—It is not amusing to feel sold, shunted, played low down on, made to feel small, or left in the lurch. Dr. Emerson, like a will-o'-the-wisp, has decoyed a few of us guileless ones into the middle of a misty bog, and left us there; he has even allowed us to hear his unfeeling chuckle as he vanished with "a gibe on his lips." To follow his delusive corpse candle we have left old and well-tried friends, whom we can scarcely expect to kill the fatted calf for us on our return; and we feel hopeless, forsaken, and forlorn. The most humilating part of the whole business is, perhaps, that we have put on so much "side" as we strutted after him. We have been haughty, sir; we have derided what we were pleased to call the conventions of old; we have sneered at every doxy but our own; we have said, in the poetical language we affect, that "the supernatural is losing its power to command worship, and a nobler wonder, roused by the laying bare of the natural causes of the phenomena of the universe, reigns in its stead. Poets and philosophers have, equally with scientific men, been affected by the freer spirit," and all that sort of high-faluting, which ought to impress the uncultured, leading up to the sublime (but now, alas! ridiculous) idea that we—*we* who now find ourselves deserted in the bog—were the salt of this much photographed earth.

What makes us feel our late leader's treacherous desertion the more is that his ostensible reason for leaving us is so very thin. He is frightened at Hurter & Driffield's grease spot, and adds that Donatello and Hokusai have much persuaded him. This is too bad. We turn to the *History of Art*, and find that Donatello—who lived 500 years ago—was he Dr. Emerson of his period, and studied nature to the exclusion of art. He would not take a hint from the Greeks or any of his predecessors, but went straight to nature. Started fresh, in fact, like a free and independent naturalistic. What sayeth the historian? "Donatello, with the uncompromising candour of an artist bent on marking character, felt that he was bound to seize the very pith and kernel of his subject. If a Magdalen were demanded of him, he would not condescend to model a Venus, and then place a book and skull upon a rock beside her; nor did he imagine that the bloom and beauty of a laughing fawn were fitting attributes for the preacher of repentance." Why, this is the very essence of the naturalistic doctrine! As for Hokusai, he was a Japanese artist who studied from the same delusive nature. Well may the naughty *News* call it a partly ironical pamphlet.

This, as I have said, is *too thin*. The real reason, we apprehend, is that we loved the master too well, if not wisely, and followed his doctrine too closely. One of us—only an amateur as he is—greatly daring, improved on the original, and carried the doctrine so far that in time we hoped, as was suggested a few weeks ago by Mr. Maskelyne, to produce our best effects by leaving so much to the imagination that our rough paper would be left blank, and would economically do again for the next effect. All this beautiful simplicity is knocked on the head by a simplicity of another kind.

Now, what are we to do? We cannot remain in this slough of despond. Shall we correct our lenses and our language, promise to be good, and ask to be taken back to the old fold? How can we expect to be believed any more? Where be our tones, our subtlety, our insight, our æsthetic pleasure? Our old leader, on whom we always relied to defeat all opposition by sheer force of language (and genius, of course), has burst his own bubble, kicked over the house of cards the children were building, strewn the floor with the sawdust of the image he had built up. He cruelly says his chief disciple is without training, and has only superficial knowledge; moreover, he stigmatises him as an amateur, than which can anything be imagined more awful? He has called names aforetime, but never anything worse than this. All is chaos. We should like to save something out of the wreck. Help us, Mr. Editor; tell us what to do—we are at the last gasp: and how about that five shillings I paid for the book? I sign myself, for the last time— A NATURALISTIC.

THE GREAT RENUNCIATION.

To the EDITOR.

SIR,—Can it be true, or is Dr. Emerson playing off a joke on us? It seems too good news for actuality that the prime instigator of the naturalistic racket has at last felt the error of his ways, and returned to artistic sanity. If he means it to be a reality he must earn by it the goodwill and thanks of all who truly desire the advance of pictorial photography. It is easy to understand how a cultured gentleman must be annoyed by the sickly manner in which those who have supported his former views have "out-Heroded Herod" with their long rigmaroles of meaningless *palabras*, which must leave even the most highly versed students of modern critics' slang in perfect dismay in endeavouring to discover what these paper-stainers are driving at.

Probably they do not know themselves, and on the principle that "fine feathers make fine birds" sought, by the involved mysticism of their phraseology, to imbue the less intellectual of their hearers or readers with the idea that anything couched in such far-fetched terms necessarily contained considerable elements of nobility.

In his detail of the causes to which Dr. Emerson attributes his conversion there is nothing new to sensible men, but it appears to me very strange that he should so long have overlooked these matters, which are common experience.

I venture to differ with Dr. Emerson on the final cause which seems to have determined his brave renunciation. I do not think it is to be attributed to his examination of various studies in art after three and a half months' solitary study of nature in his house-boat. I think if he fairly analyses his inward reflections he will find that his change of views rather results from the mentioned three and a half months' study of nature away from access to art examples. He has at last appreciated what nature is, and how far away anything yet offered as art is from compare with it, and how infinitely farther still from it is anything emanating from the naturalistic schoolroom. He is the better artist for his unconscious training, for one who can produce the frontispiece to *Wild Life on a Tidal River* presents to his admirers a work which in artistic value is far ahead of the majority of those issuing from the studios of to-day.

All lovers of art photography must be delighted to find how Dr. Emerson throws off the tag-rag and bob-tail who have striven to render themselves illustrious by clinging to his coat-tails. It really seems as though he had been for some years piling up a big joke on them previous to depositing them very carefully in the mire. Anyhow, as Wilkes declared, he "never was a Wilkite," we have now Dr. Emerson's virtual declaration that he does not belong to the Emersonian school.—I am, yours, &c.,

HENRY E. DAVIS.

28, *Leinster-square, Bayswater, W., January* 26, 1891.

"NATURALISTIC PHOTOGRAPHY."

To the EDITOR.

SIR,—The fever of excitement caused by the news embodied in Dr. Emerson's essay of last week has probably by this subsided, and the manufacture of soft soap by the enemy commenced. If the word enemy applies to one who differed from Mr. Emerson on the question of naturalistic photography, it will not be very surprising if a little glee ("small-souled," or otherwise) be forthcoming. Be this as it may, most questions, like tombstones, have two sides, and the epitaph of last week seems to be the one side, of which the following may be the other:—"Here lies a veritable bone of contention, being all that is left of an attempt to theorise. Born prematurely, and nourished insufficiently, it crawled through a short and chequered career, admired by few, derided by many, and dying

very little lamented: the spirit of which, freed from conceit, personal ambition, and love of notoriety, may yet rise to honour and stability." This, I fancy, will embody rather more of the public opinion than that of last week.

Most people have heard of the fable of a boy who called "Wolf!" until he fell a victim to that complaint. Dr. Emerson has probably forgotten it when he mentioned his intention of reconsidering the matter and then calling again for help; under these circumstances the following suggestion may be of use to his friends:—"Here lies one who, like a pebble thrown into a stream, caused a slight ripple, and is now encased in mud." The fact of the signature, "P. H. Emerson," being immediately preceded by the words "and the humbug" is unfortunate, especially considering the present low state of morality, and the construction that may be put upon it by the wicked and "small-souled." In concluding, I cannot think of a more apt quotation than Dr. Emerson's own from Francis Bacon: "If offence come out of truth, it were better the offence come than the truth be concealed."—I am, yours, &c.,

H. Colebrook.

PROCESS BLOCKS.

To the Editor.

Sir,—The question is frequently asked, "How many impressions can be printed from half-tone blocks?" We think it will interest many of your readers to learn that 155,000 good copies have been printed from the Meisenbach blocks supplied for the Christmas number of the *Lady's Pictorial*, still leaving the blocks in a perfectly satisfactory condition, as will be seen from the sheets of specimens which we have the pleasure of enclosing herewith for your inspection. We think you will agree with us that the result is creditable alike to the engravers, printers, paper and ink makers, and shows what can be done with process blocks under fair conditions.—I am, yours, &c., W. T. Dilworth,

(For Meisenbach Company, Limited).

Wolfington-road, West Norwood, London, S.E., January 15, 1891.

[The blocks in question have behaved well.—Ed.]

REVERSING BY THIO-CARBAMIDES.

To the Editor.

Sir,—Your article on the reversing process in the Journal for October 24 interested me very much, and I was glad to have a reference to Professor Emerson Reynolds's later work on the thio-carbamides, which I regret I did not know of when making my experiments.

It may interest you to know that the tetra-thio-carbamide ammonium bromide compound salt prepared as described in Professor Reynolds's paper gives under favourable conditions exceedingly good reversals, much better than the thio-carbamide does itself. I found five drops of the saturated alcoholic solution to the ounce of eikonogen developer answer well for line work, but have yet to make further trial. I find that the nitric acid treatment is beneficial with this salt also in the case of line work. Owing to the press of other work of all sorts and the short days, I have had little time to go on with this investigation, but hope to do so soon, as good reversals seem to be more easily obtained now than they were in the hot weather. I hoped to have tried some other thio-carbamides by this time, but trust to get them soon, and have the results out if found to be of any value.—I am, yours, &c., J. Waterhouse.

Calcutta, December 31.

[Accompanying this letter were two admirable photo-etchings from negatives by Colonel Waterhouse.—Ed.]

MRS. CAMERON'S ORIGINALS.

To the Editor.

Sir,—I saw a short time ago an answer to a correspondent *re* Mrs. Cameron's photographs, and where they could be seen.

At Brockenhurst Station (five miles from here), in the waiting-room, can be seen a collection from the *original untouched* negatives, including Tennyson and a large head of Herschel. They are all signed, and stated in her writing to have been given to commemorate meeting her son at the station after an absence of five years. Darwin is also represented—a most characteristic likeness.—I am, yours, &c., C. Bennett.

104, *High-street, Lymington.*

ADVICE.

To the Editor.

Sir,—To intending purchasers, who may have businesses offered doing 1000*l.* and over, I offer a most essential piece of advice. See and get in writing that the business receipts are as represented, or you may "find when too late" that the high-class 1000*l.* affair is doing only 500*l.*, the rest consists of bad debts and free sittings. Also see if a printer's book is kept; this will in some way show the number of prints turned out weekly I went to see a business on one occasion; over a hundred printing frames were out for my inspection. A slip of the tongue on the part of the printer made me pause in purchasing. They were printing duplicate pictures for showcases and shop-windows. I think it would pay some person to investigate businesses for sale, and charge a moderate fee for so doing. On my own part it would have saved me some years of worry. It would require a person of general knowledge of photography; auctioneers and house agents are next to useless in transacting the transfer of photographic properties.—I am, yours, &c., Six and Eightpence.

FRAUDULENT PLATINOTYPES.

To the Editor.

Sir,—I wish to thank you for so openly and fully ventilating the above subject. I regret I cannot give you any names of persons who are deceiving the public by giving bromide prints, for platinotypes. I will state briefly my reasons for writing.

A gentleman who had attended a well-known photographic class, told me the lecturer there had demonstrated a means of working whereby bromide prints might be made to look so like platinotypes that there would be no difficulty in passing them off as such, and that the lecturer was aware of a firm who succeeded in practising the process quite advantageously.

The result of the lecture was that the impression given—either intentionally or otherwise, I cannot say—is that it was advocated to the students to try the process and follow in the footsteps of the firm above alluded to.—I am, yours, &c., Justice.

OUR PHOTOGRAPHIC EXHIBITIONS.

To the Editor.

Sir,—Having visited many of the exhibitions held in various parts of the country, I have been astonished to find that medals have in most cases been awarded to paintings in monochrome on a photographic base, and really good untouched photographs left out in the cold. How is this? If we have exhibitions for the encouragement of clever artistic treatment in photography, why award prizes to the big firms who employ clever artists to finish up their prints—in many cases so elaborately—that all trace of the pure photograph is gone? This was particularly the case at the last Crystal Palace Show; and at Edinburgh the silver medal for portraits above 15 × 12 was given to pictures that had been most carefully touched up, stump and otherwise, producing a delicate gradation of tone. This is scarcely just to the genuine photographic worker, and I trust that the judges at the forthcoming Liverpool Exhibition will reward the exhibitor who produces the best artistic and technical pictures without the aid of the brush.—I am, yours, &c., Walter Johnson.

Liverpool, January 27, 1891.

ARE PHOTOGRAPHERS PROVIDENT

To the Editor.

Sir,—At such seasons as the present, one has an opportunity to think and grumble, and perhaps to ask a question or two as to the cause and effect of things in general. My object in taking up my pen is to advise the profession to be more careful and considerate during the days of prosperity, so that they may be better prepared for the days of adversity. From my experience of photographers as a class, I take upon myself to say that they are anything but provident. I could name many cases were money is spent in a useless, wasteful, and unthinking way, so that after a course of great success they wind up with the balance on the wrong side, whereas with ordinary care and caution they might have realised a competency. I do not desire to enter into this subject further than to raise a warning note by asking the question, Have I, and am I acting with common caution in money matters as regards the past, present, or the future?—I am, yours, &c., Photographic Artist.

Cheltenham, January 27, 1891.

TO PHOTOGRAPHIC ARTISTS AND ASSISTANTS.

To the Editor.

Sir,—Your readers will have learned from your report that the above Union is at last floated. Three branches will very soon be established in London, meeting once a-week for the receipt of contributions and enrolment of members. In the meantime, applications for membership must be made direct to me. We intend to admit all classes of photographic workers to our Union, male and female, provided that each applicant gives proof of his or her efficiency as a worker. This proof will be secured by the applicant having served for a certain time (not less than two months) consecutively at (or above) the minimum wage paid to good workers in his or her district. This minimum will be decided on by each branch, but shall not be less than a minimum which we have drawn up as an

Executive, and by which we shall gauge the worthiness of all early applicants. The rates of subscription will probably be somewhat as follows:—

Class A, having salary of less than 25*s.* shall pay subscription per week of 4*d.*

Class B, less than 35*s.*, 5*d.*

Class C, less than 45*s.*, 6*d.*

Class D, 45*s.* and over, 8*d.*

Entrance-fee: Class A, 2*s.* 6*d.*; B, 3*s.* 6*d.*; C, 5*s.*; D, 7*s.* 6*d.*

After paying in for six months, each member out of employment through any cause over which he or she has no control shall receive the following benefits per week (or thereabouts):—

	A.	B.	C.	D.
For the first 4 weeks	9*s.*	10*s.* 6*d.*	12*s.* 6*d.*	15*s.*
For the second 4 weeks	8*s.*	9*s.*	10*s.* 6*d.*	12*s.* 6*d.*

No benefit for more than eight weeks per annum, but payment may be restricted to a smaller number of weeks if the state of funds render such action necessary.

This much for our benefit section. Our efforts as a trade union will be directed, not so much to squelch or defy some unscrupulous employer, as by co-operation with good employers and by conciliation to confine our transactions as workmen to the establishments of fair masters only. On our side we must offer something worth taking by such masters, and to that end we shall not rest until we have made our Union the representative of skilful labour only.

Mr. Thomas Bolas, F.C.S., F.I.C., has consented to act as President; Mr. Snowden Ward, of Bradford, is our Treasurer; and a committee of competent organizers is now at work forming detailed rules and collecting names of members. I not only appeal to workmen and lady assistants to join our ranks, but to sympathisers "with means" to contribute to the initiatory expenses by remittance to the Treasurer, Mr. H. Snowden Ward, *Practical Photographer* Office, Bradford, Yorks.—I am, yours, &c.,

Maidstone. ARTHUR FIELD, *Hon. Sec.*

THE VIENNA EXHIBITION.

To the EDITOR.

SIR,—"English as She is Spoke" closes his remarks upon my letter on the Vienna Exhibition by criticising my English style. This I will omit from our discussion, as not bearing upon the merits of the case. "English," &c., does not so much attack my views of the matter, but he only says that the President of the Committee signed the list of the jury with no comment, and that "another person altogether" sent the remarks on the exhibition and its jury to you. On this ground he accuses me of "rushing into print" without solid evidence. Now, Sir, I neither doubted when I wrote my first letter, nor do I now doubt, that the comments upon the Vienna Exhibition and the jury came from an official source, and as such were open to criticism.

It may be that two communications were sent, one containing the list of jurors and another the comment upon it—both or only one signed by the President, or one signed by the President, the other by the Vice-President or a member of the Committee; but it is difficult to believe that a person, "another altogether," without any official connexion with the Committee, took the trouble to send, coincidently with the President's official communication, but without his knowledge, explanatory remarks upon it to several photographic newspapers, and still more that you, Mr. Editor, made use (mixed up with the President's communication) of "another-person-altogether's" private letter and views. Now, in this case you, Sir, will be able to let us know if it is true that the comments upon the exhibition and the jury were contained in a letter of a person having no connexion with the Committee; also, which is the more important, *whether they were sent under the same cover or envelope, and at exactly the same date, with the list of jurors, or not.* This will clearly decide if the "another-person-altogether's" private letter and views got confounded by some mysterious chance with the "signed" communication not only to your valuable JOURNAL, but also in the note published in the issue of *Photography* for November 27, or both communications were received *together*, both signed by members of the Committee, and therefore open to discussion.

Excepting this ("Sir, it was not my sin, but another's"), "English as," &c., does not prove that my charges are unfounded. It would take too much of your valuable space to enter into questions on art in photography; but let me give "English as," &c., and the persons who instructed him to answer my letter, a piece of advice. When he says that the comparison with other juries applied only to Continental juries—not a very flattering one—he only makes his case worse. *He offends both French, German, and Italian;* but they will know what to do. If he also says that there is only a limited number of men acquainted with art in photography at Vienna, he *greatly offends the Parent Society in his own country*, which numbers amongst its members many men both in science and arts illustrious as photographers.

Lastly, when he says that photography is so "looked down" on at Vienna, and when, in fact, the Amateur Club there cannot comply with the common rules of exhibitions—well, we draw one prominent conclusion: we can see no necessity that so young a society, which already, on the completion of its first year of existence, held an international exhibition, should only two years later arrange again a second and extraordinary one—a *photographic Salon.* Let the Club, in the first place, arrange its own exhibitions for its members or their countrymen, after the example of the numerous English societies; let it grow in strength, and when it shall be able to hold its own, and shall have taken a more prominent place in the photographic world, then let it claim to become a centre for photography. It may be that a few persons who like to push to the front on such occasions, to gather decorations and crosses, as in their first exhibition, will have to moderate their impatience to *jouer un rôle.* For the majority of the members of the Amateur Club at Vienna, whose work by such undertakings will be entirely pushed in the background, acting by the given advice will be the more profitable course. At least, one will not have that curious impression which we gained, getting interested in the matter, upon closer inspection of the organ of the Club, that the Club's doings are assuming a prominent personal character, and are tending to serve, first of all, personal interests and personal vanity.

ENGLISH AS WE UNDERSTAND IT.

Exchange Column.

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

Two specimen 10×12 opal enlargements in oils, one framed; wanted, portrait lens.—Address, V., 42, Seaside-road, Eastbourne.

Will exchange Ross' No. 2 C.-D.-V. lens for whole-plate camera or wide-angle lens.—Address, W. C. CHIPPER, Highgate-hill, N.

Wanted, half-plate camera and double dark slide (only), with quarter-plate carrier; will exchange lens or complete small set.—Address, JOHN J. LAWES, 60, St. George's-road, Pimlico, S.W.

Wanted, rectilinear lens, by good maker, to cover quarter-plate; exchange, nearly new saloon rifle, with quantity of shot cartridges.—Address, W. PERCIVAL, Maywood, Worle, Somerset.

Sociable tricycle, in perfect condition, tyres almost new, in exchange for enlarging lantern, with oil lamp, or a good magic lantern, with slides.—Address, H. PIQUET, Kington, Herefordshire.

I will exchange Thornton & Pickard's time shutter, quarter-plate embossing press, and Tyler's current producer and discharger, for backgrounds and accessories.—Address, F. G. STEGGLES, Shepton Mallet.

Wanted, 10×8 square field camera with double backs in exchange for whole-plate camera and lens and eighteen-inch burnisher (camera and lens nearly new).—Address, C. W. BENNETT, 104, High-street, Lymington.

Will exchange forty-candle-power dynamo, whole-plate rapid rectilinear lens and instantaneous shutter, Weir sewing machine, marine engine, with two gun-metal cylinders (one and a half inch bore), fitted with force pump, and silver Geneva watch; want, studio chair, retouching desk, backgrounds, or studio accessories.—Address, S. J. GANNON, Chelmsford.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

Hely Smith, Belmont, Love, R.S.O., Cornwall.—*Photograph of the fish market on Plymouth Barbican, entitled, "Fisher Folk."*

HERBERT A. HUTCHINSON writes, thanking those correspondents who so kindly answered his query as to the necessary speed for shutters for moving objects.

JOHN J. LAWS.—Starch of the best quality is not only one of the best but the most convenient mounting medium. It must be used freshly made. Pure gelatine is perhaps better, but is not quite so convenient to use.

F. H.—Eleven feet or eleven feet six inches will be a better width than ten feet for the studio. If you cannot get greater length than you mention it must be put up with, but it will be short for general work. Either form will answer. It is very much a matter of taste. On the whole, we prefer the ridge roof. In either case blinds will be necessary for getting the best results. There is no book on studio-building.

TOMPKINS.—Apply Chinese white to the dark spots in the bromide enlargement.

G. M'D.—We strongly advise you to have nothing to do with the goods offered you. The person you name has a shady reputation.

P. A.—To prevent your silver prints from curling, soak them in a mixture of glycerine, alcohol, and water, equal parts, and dry between leaves of blotting paper.

JUVENIS.—A Daguerreotype is capable of being cleaned by a solution of cyanide of potassium; but, judging from your letter, you are by far too inexperienced to make the attempt. Send it to a professional photographer.

W. B. HULME.—Any camera is a pinhole camera if the lens be removed and its place supplied by a thin opaque material, such as thin copper foil, or even black paper, with, in either case, a small hole being punctured with a pin or needle.

C. W. BENNETT.—1. Mix the two solutions in equal proportions—say, an ounce each—with twice the bulk of water, or four ounces.—2. Crystallised carbonate of soda.—3. It does not matter whether apothecaries' or avoirdupois weights are used, the proportions will be the same.

C. W. R.—The negative sent is quite unsuited for photo-lithography. It is not nearly dense enough, and the lines are far too much veiled. The best negatives for this class of work are those by the wet collodion process, and next, those made on the photo-mechanical plates supplied by Mawson & Swan.

STEREO.—The principle of the "dissolving view" has been already applied to the stereoscope, and the effect is pleasant. While examining the picture an indistinctness becomes apparent, and the image seems to fade. In proportion as it does so another—a different subject—grows on the view, and gradually acquires its maximum of vigour, after which it, too, fades away as did its predecessor.

P. M. (Antrim).—The winter scenes are very interesting, but they are considerably marred by being printed on highly albumenised paper and toned to such a reddish brown. On matt-surface bromide paper or in platinotype they would be infinitely better. Cold tones on matt paper convey a far better impression of winter than warm tints on a garish surface. However, the negatives are excellent.

A CONSTANT READER (Kilburn) asks: "Will you kindly inform me of the best formula for printing on silver paper, and for toning same and fixing? Would you kindly give details of each stage of process?"—Our correspondent had better get an elementary manual on photography, which will give the information desired. Our space in this column is far too limited to give full working details of processes, even if the majority of our readers were not familiar with them already.

INQUIRER (Rochester).—1. The neatest way of trimming enamelled prints is to use a small card-cutting machine; Marion & Co. supply them. The strength of the gelatine solution will depend upon the kind used and the method of using it. Two or three experiments with different proportions will determine which are the most suitable to employ.—2. We know nothing of the toning bath mentioned. Are you right in saying that it is composed of acetate of soda and sulphate of copper alone?

ROBT. BILES.—The difficulty you have experienced in obtaining density in the collodion negatives no doubt arises from the lowness of the temperature experienced of late coupled with the feebleness of the light. These conditions materially militate against density in the collodion process. Keep the temperature of the studio and chemicals up to 55° or 60° Fahr., and, with the improved light we are having, much of the trouble will disappear. If not, communicate with us again, saying the class of subject upon which you are working.

A. S. B. writes: "Can you inform me what is the cause of the minute creases on enclosed print? I have had a batch of prints spoiled. They are all more or less covered with the marks; they show more after burnishing than before; it is ready sensitised paper. Is the fault in the paper, or is it in the toning or fixing bath? Your opinion would greatly oblige."—The "creases" are really cracks in the albumen. They are due to the prints being made very dry, so that they have become crisp and curled. Then when they were opened out the albumen suffered. The way to avoid the trouble is to dry the prints between blotting paper, so that they are kept flat, or to take care that they do not become bone dry.

ZERO inquires: "Am I correct in lining some wooden dishes I have had made with thin (one-sixteenth of an inch thick) white indiarubber? These wooden dishes are for sensitising albumenised paper (when covered), one dish for the silver solution, the other for the citric acid solution. Is there any chemical action takes place with the indiarubber which would interfere with the paper? The sheet indiarubber is cemented on to the wood. I shall thank you much for your advice."—Pure indiarubber has no very injurious action on silver solutions, except by very prolonged contact. We, however, presume by our correspondent's letter the "white indiarubber" is the vulcanised. As this is largely composed of sulphur, it is quite unfitted for contact with any solution containing silver. It will be best to coat the troughs with paraffin wax; that will render them waterproof, and have no ill effect upon the solutions.

K. E. S. inquires: "What is the name and type of lens answering the following description?—The front glass is convex in front and flat behind (plano convex), and measures four centimetres across, and the combination behind is made up of a diminishing lens about two and a half centimetres in diameter, which screws in contact with another lens which slightly magnifies and of the same diameter across. Its focal length is about sixteen or seventeen inches, while the open aperture is not above the size of the back combination, that is, about one inch (two and a half centimetres). I assume it works at *f*-16, open aperture, and is consequently too slow for portrait work. Also please state the largest plate, theoretically, it will cover."—The lens is evidently the old "Orthographic." A lens of the focus stated, if a good one of its type, should cover a 10×8 or 12×10 plate, the former size with the full aperture, and the latter with a medium stop. It is not slower for portraiture than many lenses that are now used for the purpose.

FORTHCOMING EXHIBITIONS.—The Liverpool Amateur Photographic Association announces Saturday, the 31st inst. (to-morrow) as the final day for closing entries for its international exhibition. Already exhibits have been received from Russia, Italy, Germany, India, Australia, and the United States, quite in excess of what was anticipated. The Manchester Amateur Society's will be held on February 9, and remain open for three days.

THE annual dinner of the Photographic Society of Great Britain will take place at the Café Royal, Regent-street, February 9, at half-past six. Tickets, 6*s.*, may be obtained of Mr. W. England, 7, St. James's-square, Notting-hill, W.; or of the Secretary of the Society, 50, Great Russell-street, W.C.

AT the Friday evening meeting of the Royal Institution on January 23, Lord Rayleigh's promised lecture on *Some Applications of Photography* had to be postponed. Mr. Alfred Watkins exhibited his exposure meter, with examples of its application; Messrs. Green, Cross, & Bevan their diazotype process; and Mr. J. R. Gotz his new camera.

THE National Association of Professional Photographers announce their first annual meeting, to take place at the Colonnade Hotel, on Wednesday, February 12, for the following business:—The enrolment of professional photographers as members, the election of office-bearers, and to discuss and adopt (if so desired) the rules drawn up by the provisional committee.

TO DR. EMERSON.

FROM A DISCIPLE.

Doctor, good-bye, if go you will,
And we'll drink you luck and a wealth of gold;
For we know that you'll treat with the self-same skill
The newer fashions as those of old.

Next time, Doctor, you feel inclined
To see one plane, and that in a mist,
Just dine with me, and we'll try to find
The eyes of the art idealist!

STEALING PHOTOGRAPHS.—The case reported in our issue of the 16th inst. was tried at the London Sessions on Friday last. It will be remembered that Mr. Mendelssohn missed certain pictures which were discovered in the possession of Mr. Perriman, who admitted that he received them from Barron, Mr. Mendelssohn's caretaker. For the defence, Mr. C. F. Gill called two photographers to prove it was not an unusual thing for artists to purchase plates of any one who had them for sale, and also Amy Tracey, a servant in Perriman's employ, who said she knew Barron well, and that he gave her several of the photographs. On being pressed she admitted some of them had been exhibited in Perriman's showcase. Mr. Frederick Cole, Mr. Thomas Gilting, Mr. Westacott, L.C.C., Mr. Robinson, L.C.C., Mr. Henry Smallman, and a number of other gentlemen were called who have known Perriman for years as a thoroughly respectable man. Mr. Taylor, on behalf of Barron, urged that the goods had been thrown away by the prosecutor, and that his client thought he had a right to dispose of them. The jury, without retiring to consider their verdict, found both prisoners guilty. Mr. Underhill, on the application of counsel, postponed sentence until the next sessions.

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THE BRITISH

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ALBUMENISED PAPER.

Some little time ago a print on albumenised paper exhibiting a peculiar stain was shown to us, with inquiries as to the possible cause of the marking, which to the whole staff of the establishment where it had occurred was a complete mystery. The remarkable part of the difficulty lay in the fact that the stain usually appeared in the same place upon a certain number of prints only. The same solutions and baths, sensitising, toning, and fixing were made in the accustomed manner, the same printing frames used, and the paper itself taken out of the same ream that had for some time given perfect results. Our verdict was that the paper was at fault, and the owner of the studio, being of the same opinion, was only restrained from returning it on the maker's hands by his knowledge that all the rest of the same ream, and also samples of another ream taken into stock at the same time, had been as nearly perfect as possible, and he felt, he said, that it was probable that all responsibility would be repudiated by the maker after a considerable lapse of time. A final investigation showed that one of the printers had allowed one corner of a sheet of paper to fall on some clean water, and, being busy at the time, had just covered it over with a piece of plain paper and gone on with his sensitising and forgot all about the matter. This wet piece was covered over by about a quire more paper, temporarily removed, and never thought of again. The wet had struck through the chief part of this quantity, and so altered the condition of the albumen coating that quite a different result was produced at that damp end from what was obtained from the rest of the sheet. Hence, also, the stain always appearing in a particular portion of the sheet. It is, however, a little remarkable that the inevitable "cockling" which must have happened had not arrested the printer's attention.

This account of a very recent accident enables us to lay particular stress upon a fact that does not sufficiently influence the users of albumenised paper: we refer to the extreme delicacy of its surface in other directions. It looks very hard, glossy, and bright; but, as a matter of fact, it is the reverse of hard, although, unless in the hands of those who produce a considerable number of vignetted pictures, the fact is apt to be unnoticed. Let any one observing a slight smear or finger mark in a finished mounted print endeavour to remove it by the moistened corner of a pocket handkerchief in the orthodox manner, the result will be in nine cases out of ten that the surface will be visibly injured, although in some lights this may not be observed. We are acquainted with one studio where the principal requires all prints before they are despatched to be examined for surface defects by a young lady in the reception room, the particular light at her desk reaching it through a sort of well, and lighting the prints up in a way to give prominence to the most trivial abrasion. The number of prints rejected at that desk, though they had already passed the scrutiny of three or four other hands during the sorting, cutting, mounting, spotting, respectively, would very much astonish some of the public, if not some amateurs also, and strongly negative the idea that photography "is all profit."

There is another danger to the surface of the paper that may now be pointed out. In the course of the making of the albumenised paper it is scarcely probable that a number of sheets do not get injured; doubtless most of them are rejected, although a glance through a ream by a maker of repute will not show every sheet to have a perfect surface, yet the general result is exceedingly good for such risky and tender material. From some cause, possibly during the rolling the dried sheets on the press, occasional very fine scratches are seen, and they are bound to appear in the finished print unless that cloak to a great multitude of sins, the burnisher, be used.

But there is another source of such scratches. Every photographer nowadays, before hanging up the sensitised sheet to dry, as he removes it from the bath draws it over the side of the dish or across a glass rod fixed in a suitable position for the purpose. This tends to prevent the liquid drying in tears, facilitates the drying, and aids in economising the solution. But we have traced the presence of occasional fine scratches on finished prints to this very practice. These fine scratches appeared at intervals only, and could not be traced at first, as it is only by a very close scrutiny that, on a dry unmounted print, fine abrasions or scratches can be seen; while the prints are wet they cannot be seen at all.

The glass rod used in the case referred to was really a piece of barometer tubing, and a very close examination of its surface revealed the fact that near one end there was a slight, almost imperceptible, irregularity of surface that took the form of a microscopic grain of sand, almost invisible, but quite perceptible to the touch. When that little projection happened to be uppermost while the paper was being drawn across the rod, the result was an excessively minute scratch that no one noticed till the print was mounted and rolled. We say "rolled" advisedly, for we do not mean "burnished." One great advantage of the use of a burnisher is that it gets rid of almost any quantity of surface defects. When to this is added the advantage of making rich prints from underdone negatives, and generally vamping up imperfect work, no wonder can be expressed at

few studios being without it. We consider it has done more than anything to lower the general average of negatives, for it must be a poor sort of an image that will not give a passable print when soaped and "burnished." However, be that as it may, burnisher or rolling press, the points we have as above directed attention to will, if not ignored, tend to the production of greater excellence in prints on albumenised paper.

MECHANICAL DEFECTS IN GELATINE PLATES.

We recently had occasion to pass in review a considerable number of unexposed gelatine plates drawn from a variety of sources, native and foreign, and we took advantage of the opportunity to submit them to a careful scrutiny with the design of ascertaining what comparisons, if any, were to be made between those qualities of the various makes of plates which are referable to the purely mechanical department of manufacture, as distinct from that which includes the preparation of the sensitive mixture. We shall possibly not go wide of the mark in the assumption that it is not often such a chance as that which fell to our share on the occasion under notice is placed at the disposal of the majority of people.

Contrary to what might be supposed by those of our readers who wisely limit themselves to the particular brand of plates which they find most adapted to their methods and requirements, and who, in consequence, fail to understand that there may be, and actually is, as much difference superficially between a couple of commercial gelatine plates as there is between a couple of Chinamen, than whom at first sight some observers have said no two things could be less dissimilar, we derived not a little instruction from our inspection, and by no means grudged the time expended therein. It enabled us, to some extent, to form a far more realistic idea of the force and justice of the complaints on the subject that are constantly reaching us than that which we gain from the perusal of our correspondents' letters, although, to be sure, these are generally vivid and emphatic enough to evoke our sympathies as well as to make us seize their meaning.

To begin with, we were surprised at the very large number of glasses which were so badly cut that, in all probability, a difficulty would be found in every single case in getting the plate to rest easily in the rebate of the dark slide, while, in some, after the application of a foot rule to the plates, we were certain that the latter would entirely refuse to fit, unless a jagged protuberance or two were removed by the aid of a diamond. Nothing can be more vexatious than such carelessness on the part of a glass cutter, unless indeed it be the neglect of those through whose hands the plate subsequently passes to add it to the other "throw-outs."

Badly cut plates are inexcusable. Very few professional photographers, and fewer amateurs, possess a diamond and the requisite gauges to enable them to "lop off" an offending fragment, so that as a rule a plate of this kind is simply wasted. We have ourselves been subjected to this form of annoyance, hence we write feelingly when we invite the glass cutters to be a little more exact in their simple task, and the responsible "examiners," without which no well-regulated dry plate factory is nowadays complete, to be stricter in their examination.

To save ourselves from the charge of hypercriticism we shall not urge that the variety of thickness of support which we observed among those plates is a fault, but we instance it as a field for improvement which would be highly appreciated by those whose lot it is to have to include boxes of dry plates among their travelling *impedimenta*. In the summer time, when the tourist season is on, gelatine plate makers are often asked to select "thin" plates for their customers, so that there is possibly some room for the exercise of a little discrimination in the matter at other times of the year. The invariable employment of the thinnest glass consistent with other things would be a boon valued by very many.

A great many plates, and more especially some of foreign manufacture, were not coated up to the edges, and on measuring a few of the strips of bare glass we were astonished to find some of them extend to a depth of a third of an inch. In lots of cases, of course, this marginal loss would be of no consequence. For example, it would not matter very much to a professional portraitist who only required to make use of the centre of the plate; but, on the other hand, there are occasions when one is constrained to employ the whole available area of the film, and in cases of this kind the loss would be badly felt.

Then, as if in atonement for the defect we have just pointed out, several other plates—in fact, most of them—were more or less liberally splashed on their backs with emulsion, a circumstance which drew from a friend who was with us a remark to the effect that if some makers would take care to obviate these waste patches and add the quantity of emulsion thus saved to the film on the proper side of the plate, the latter's gain would be nobody's loss. A little more cleanliness of working is certainly desirable now and again. From our knowledge of the subject we are less disposed to cast the blame for this and the preceding defect on the machine than on the custodian for the time being.

Uneven coating was tolerably common, while, besides occasional sharp scratches parallel to the greater sides of the plate, we detected here and there marks which bore a strong resemblance to the impression of a finger on the film before it had thoroughly dried. In like manner we could clearly discern, even by the guarded illumination of the dark room, certain marks obviously caused by the packing papers, although the batch of plates in which these occurred could not have been made more than a few weeks. Very simple tests as to the thickness of the films informed us that most elastic notions prevail among dry plate makers on this subject. We are not prepared to lay down any dogma governing the maximum quantity of gelatine emulsion of a given composition which should be spread on a support, but we are firmly persuaded that as regards some of the plates that passed through our hands on this occasion, the problem of coating them with the minimum quantity and poorest quality had been cleverly solved. Of defective films—such, for instance, as those with small transparent holes, dust spots, or other allied markings discernible before development—we encountered very few.

We admire without reserve the exquisite properties possessed by most modern sensitive films, but this does not blind us to the fact that there is frequently ground for legitimate complaint in connexion with the points we have drawn attention to. A little stricter examination of the plates for mechanical defects might not be disadvantageous to both makers and users of dry plates, in whose interests we hereby make the suggestion. From various circumstances that have come to our knowledge from time to time, we are convinced that very often the principals of plate manufactories are ignorant of the existence of such defects in the plates that are sent out from their establishments. The duty of supervision is one that should surely not be left to irresponsible persons, or to those

whose knowledge—or, better, lack of knowledge—of the precise uses to which a gelatine dry plate is put is sufficient to account for any errors of judgment of which they may be guilty.

Writing on the subject of the article in our issue of the 16th ult., *Photographers and their Residues*, Mr. W. D. Valentine, of Dundee—see his letter in the present number—says that he has just received a return for his residues of a little under sixty per cent. of the amount they expended for silver and gold during the past year. As Messrs. Valentine & Sons are amongst the largest, if they are not the largest, consumers of nitrate of silver for printing purposes in the kingdom, experience on such an extended scale is valuable. Some years ago, in our columns, Mr. E. W. Foxlee, who has had a large experience of saving and recovering the metals from wastes, calculated that although it was quite possible to regain from seventy to eighty per cent. of the silver used, about sixty-five per cent. was probably the limit that could be recovered profitably, when time and trouble were taken into consideration. At the time that estimate was formed nitrate of silver was, in comparison with the value of the metal, cheaper than it is now; therefore it will be seen that the estimate was very correct. Hence, when a photographer receives from fifty-five to sixty per cent. for his residues of what he has expended on nitrate, he ought to be content. To recover this amount the saving must be done systematically, as it evidently is at Messrs. Valentine's establishment.

There is an interesting item in Mr. Valentine's letter that deserves note. He mentions that for the year's residues in platinum printing the refiner has returned twenty-six pounds. It has been asserted that platinotype wastes are not worth saving, but this substantial return proves the contrary.

A curious sight, in a photographic sense, was to be seen near Kew Bridge soon after the thaw set in. The tide, as it ran down, left large masses of conglomerate snow and ice like miniature icebergs lying on each side of the river, in some places piled on each other. These, by floating about in the muddy stream, had become anything but white. Had a negative been taken at the time it would have conveyed the impression that the banks of the Thames were of rock instead of mud, with ice and snow upon them.

A question was raised at the last technical meeting of the Photographic Society of Great Britain as to the performance of "combination sets of lenses." The general opinion was that it is satisfactory. Of course there are combination sets of various degrees of merit, and some makers' instruments may be much better than others. Respecting the convenience of such sets there cannot be two opinions. On many previous occasions we have pointed out the convenience of being able to combine, say, the back lens of one combination with the front of another to obtain an instrument of intermediate focus. This is practically what is accomplished in these sets, and some little discretion is required in combining in order to obtain the best result, as well as in the use of the stops and their position, when that is adjustable, as it is in some sets. As a rule, these combinations require more stopping down than do single combinations.

According to one of the financial papers, that giant amalgamation, The United Alkali Company, is not working altogether satisfactorily. Dissensions, it says, are arising, and competition is threatened in several directions. The price of hypo was the only thing photographic that was likely to be influenced by the Union.

The case of the Camden-town photographer, who was convicted—sentence postponed—at the last Middlesex Sessions of receiving photographs alleged to have been stolen from Mr. Mendelssohn, ought to serve as a caution to the public not to rely upon the specimens in showcases and showrooms as being samples of the work produced by the exhibitors. It is no unusual circumstance for people who have been attracted by the good work shown in shop windows or showcases to find themselves sadly disappointed with their own portraits when taken. Naturally they imagine that the work issued will be something like that exhibited, though they often find themselves very much deceived. We have even seen portraits of public characters that are to be seen in all the shop windows of London fancy stationers exhibited in the showcases of photographers in small towns as being specimens of their own work. Of the morality of this proceeding nothing need be said.

When the portraits of public characters are thus exhibited, the artist who produced them does not suffer much injury. But in the case of private individuals the case is very different. Any one who pays a high price to be taken at a first-class establishment would naturally feel aggrieved at seeing or knowing that their portraits were being exhibited at a third or fourth-rate photographer's, more particularly if the pictures happened to be rejected proofs. The artist would by some persons be suspected of selling the pictures for the purpose to which they were applied. An instance of this came under our notice some years ago, when considerable annoyance was caused alike to sitters and the photographer through the dishonesty of an errand-boy in the employ of the latter.

Anent the subject of specimens, our advertisement columns remind us that the season has arrived when changes are being made both by employers and *employés*. We once more caution the latter against sending specimens of their work to those of whom they know nothing, more especially to those who advertise anonymously, and *never under any circumstances to send the originals of their testimonials*. There is no question that a shilling advertisement has served to stock many a showcase at a very serious loss to many a struggling assistant. We are pleased to say that the establishing of a "black list" of defaulters in the return of operators' specimens has borne good fruit. We invite all who do not obtain the return of their pictures within a reasonable time to at once communicate with us, that the delinquent may be added to the list, which is always open for inspection by those interested. Stealing—there is no other term for it—an operator's specimens is a theft of the worst description, and it is our endeavour to put a stop to the system.

There is good news for platinotype workers, inasmuch as there is a prospect of the price of platinum being considerably reduced in the near future. Already the price of the metal is falling. A new source of supply has been discovered in Australia, but as this is so recent, one can scarcely imagine that it alone has influenced the market. At present the trade in platinum throughout the world is in the hands of a few individuals, and the new discovery will tend to destroy monopoly in the future.

At a recent meeting of one of the suburban societies the question of halation and light fog was discussed. On the subject of light fog it may not be out of place to give a word of caution. Much loss of brilliancy in negatives is often due to reflected light from the sides of the camera and from the mounts of the lenses. By constant wiping, the dead black surface becomes more or less polished and reflective of light, which reaches the plate either directly or by diffusion. Now that the light is rapidly improving, both in brightness and actinic quality, apparatus both for studio and outdoor work should be carefully examined. A minute crack or pinhole in the camera, or an ill-fitting stop in the lens, may have little or no influence during the dark weather we have experienced the last few months; but, with the advent of spring light, the case may be different and the reason unsuspected.

RULED SCREENS FOR PRINTING PROCESSES.

In The British Journal of Photography for November 28 last, page 757, I had an article entitled *A Novelty in Printing*, and since then several letters have reached me asking for various particulars with regard to the screen negatives required in the process there described. As stated in that article, the difficulty is to get the screens or to make

them, for they are necessarily expensive if purchased, and require equally expensive and elaborate apparatus to manufacture them in the ordinary way. I am afraid there is no "royal road" to their production, though some of my correspondents would appear to think so, and evidently many would like to try the style of picture described, if only the screens were readily available. I described one or two of the easiest methods of preparing such films or negatives, and a couple of articles on the same subject appeared previously in the numbers for August 15 and 22, in which various plans for reproducing them photographically were discussed; but in all these a basis of some sort to work upon is a *sine quâ non*, and the materials ordinarily procurable are far from offering perfect results.

A mechanically ruled plate from which to print the absolutely uniform and extremely fine series of lines required to produce the ideal screen is necessarily a costly affair, and in the hands of an amateur, or one unaccustomed to the work, would be practically useless. Hand ruling is altogether out of the question, and therefore many expedients have been adopted in which photography is utilised to reproduce on a reduced scale the grain or texture presented by various materials, such as fine wire gauze, perforated zinc, or even such fabrics as muslin; but these, though they may appear beautifully uniform when examined in small pieces, can seldom be obtained absolutely free from faults in sufficiently large sizes to admit of the needful degree of reduction for even a small plate or screen.

I have long since recognised the hopelessness of attempting hand ruling, even when aided by simple mechanical arrangements. In order to obtain anything like uniformity in thickness of line and spacing, it is necessary to work on such a much larger scale, that the original has to be at least a foot square to photograph down to a screen the size of a postage stamp with one hundred lines to the inch; and the labour, time, and intense care that would have to be lavished on a screen the size of a quarter-plate may be imagined.

Ruling on metal to form an engraved plate is out of the question, the choice of surfaces resting between fine paper or Bristol board and glass coated with some non-actinic preparation capable of being scratched in fine clear lines to form a negative which may be printed from on to any of the usual photographic surfaces. The latter would seem theoretically to be the better plan, but unfortunately the material on which the ruling is to be done is not easily arrived at. For even moderately fine work the substance must be such as to cut cleanly and without the slightest tearing, and must be spread so evenly that the light touch of the ruling needle will penetrate it equally, and just touch the glass without unnecessary pressure. No varnish or preparation of wax that I have tried will permit this, the nearest approach to success has been with a developed collodion film, but it is very difficult indeed to get a sample of collodion, or rather of pyroxyline, that will combine the necessary qualities for giving cleanness of cutting. Heavily smoked glass presents an admirable surface for the needle to work upon, but it is so excessively tender as to be scarcely workable, and must, of course, be reproduced by means of the camera, as it is impossible to fix it in a suitable manner for contact work. With this, as well as with collodion, the fine dust abraded by the needle causes a considerable amount of trouble by attaching itself to the glass and partly filling the lines, and owing to the extreme tenderness of the surfaces, especially after ruling, it is almost impossible to remove it without injury to the work. It must also be borne in mind that a single false stroke—one imperfect line—will ruin the whole of, perhaps, many hours' work, so that ruling on such delicate surfaces can scarcely be recommended.

Turning to paper, though the surface is in some respects better, the difficulties are not much reduced. The ink requires to be thin and to run freely and evenly, and at the same time to present sufficient contrast with the white ground. It must dry quickly, otherwise the lines are extremely liable to run into one another. The pen must be of such construction that it is practically impossible with a moderately even pressure to draw lines of varying thickness. The ordinary "bow" drawing pen is almost useless for the purpose unless comparatively coarse ruling is undertaken, and the only thing that I have found to work satisfactorily is a pen made something in the fashion of a paper-ruler's pen, as employed for ruling account-book paper. This consists of a strip of extremely thin metal, copper or brass, folded so as to form a gradually narrow V-shaped trough, pinched closely at the ruling end to give the required thickness of line, and carefully smoothed on an oil stone to make it rule smoothly. The ink is placed in the wider portion of the trough by means of a brush, and a large quantity will remain there by capillary attraction, and may be replenished from time to time without interfering with the ruling-point. The ink requires to be very fluid, and absolutely free from dust or other particles, which would soon clog the pen. The best I have used has been an alcoholic solution of some of the aniline dyes.

Whatever may be the materials employed, there still remains the most important part of the business—the ruling, and this cannot possibly be performed without some mechanical aid. The fine lining and hatching put into an architectural drawing by a clever draughtsman with no more elaborate tools than a parallel ruler and bow-pen are all very well so far as they go, but if the lines have to be a foot long or more, and cover a width of the same dimensions with perfect uniformity, I fancy the hand ruler would "give it up." An elaborate ruling machine is a thing that no one would think of constructing for just this purpose, so it is not worth discussing its requirements; but a comparatively simple contrivance on the principle of the paper-ruler's machine is not beyond the bounds of an ordinarily ingenious mechanic's constructive powers. In this machine a series of pens, such as those just described, are fixed to a horizontal pivoted bar, so balanced that the ruling-points bear lightly on the surface to be ruled, but with sufficient force to impress a line of a given thickness. The pens being charged with ink—usually they communicate with a trough that keeps them supplied—the sheet of paper is drawn steadily under the ink bar, and a series of lines are described, dependent as regards their straightness on the means employed to draw the paper. This is usually effected by attaching the paper to tapes passing over rollers, which are actuated by simple gearing to give regularity.

With such an apparatus it is obviously impossible to place the pens sufficiently close together to rule even a moderately fine screen at one operation, but by a little modification the work may be done. Let us suppose the intention is to rule a series of lines sixteen to the inch, to be afterwards reduced photographically. Let the pens be placed on the bar *exactly* one inch apart, and let the bar be fitted with a fine screw of sixteen threads to the inch, capable of moving it in the direction of its length. After each passage of the paper, a turn of the screw brings the pens into fresh position to describe a second series of lines parallel to the first, and one-sixteenth of an inch distant. After sixteen rulings, if the pens are all uniform in the thickness of their lines and are accurately spaced, have been kept full of ink, and, in fact, if everything has been done properly, the result will be a *cliché* suitable for photographing down to one-fifth, sixth, or eighth, according to the grain required. A second cross ruling may be performed if preferred, but this is better done by double printing (photographically) from the simple line screen.

I have already said that I long since discovered the hopelessness, or at least the difficulty, of these kinds of procedure, and had long thought over the possibility of performing the ruling operation at any rate with better pens, ink, and paper, or, in other words, of eliminating to a greater extent the mechanical appliances and relying more completely upon photography. Shortly after my article appeared in November the method suggested itself, and after elaborating it somewhat, I shall offer it for the trial of those who wish to construct screen negatives for process or other work. In this method pens and ink, properly so-called, are entirely dispensed with, and the principal care is in ruling a screen of *any* degree of fineness to arrange for *one* motion in a perfectly straight line of the substitute for the pen or pen bar. This looks comparatively easy, but, after all, it requires a considerable amount of thought and care; so I am afraid some at least of my readers will hesitate before venturing on a trial.

The idea upon which I started was to utilise the sensitive photographic plate as the direct ruling surface, with light as the "ink," and a series of minute apertures as the "pens." The first rough trial was made with a sort of drop shutter, having a line of fine holes drilled across the "drop," which was allowed to pass athwart the plate in frictional contact. The result was satisfactory so far as it showed the principle to be all right; but the holes were too far apart, though I could not squeeze more into the line. Next I drilled a *series* of lines of holes, each successive line having its apertures a shade out of the straight line with their predecessors, and in this manner I managed to

introduce three or four more lines between the original ones—but still they were far too wide apart for anything but reduction from a very large plate. So I endeavoured to find some mechanical means of perforating a series of exceedingly fine holes suitable for the purpose. What the difficulty is will be better understood when I say that the perforations in a sheet of postage stamps are sixteen to the inch, and with that degree of fineness it would be necessary to use a plate from fifteen to twenty inches long in order to produce a reduced quarter-plate screen. Something far finer was evidently necessary.

Without going through in detail the many ideas that presented themselves, I may say that the first practical one was taken from Zuccato's "Trypograph" multiple letter-writing machine. In this a sort of stencil plate is made in thin waxed paper by writing with a steel style upon a flat file, the writing point cutting through the paper wherever it comes in contact with the teeth of the file. I was not long in ruling a line with the back of the point of my penknife on a piece of tinfoil laid on a fine, flat file, about forty teeth to the inch, and the result induced me to say, mentally, Eureka! For though the line of perforations was not *all* that could be desired, I could readily account for the slight want of uniformity. The file itself had seen good service, and, in fact, very little use remained in it for its legitimate purpose; the teeth were worn, and the lines more or less filled up with dirt and metal, so it was no wonder that it left much to be wished. On obtaining a *new* file the result was perfect, or nearly so. Files may be obtained of a length of twelve or fourteen inches, with as many as upwards of a hundred cuts to the inch, so that in this manner a single "ruling" may be made to answer for a direct screen if desired; but I think a better result is generally obtained by reduction. About forty to the inch for the original seems to me the best size, and this can be manipulated afterwards in the camera to suit any purpose.

But an even better result is obtained so far as absolute uniformity of perforation is concerned, though it is a little more troublesome in another manner. Instead of the file I finally settled down to the use of a "milling wheel," such as is employed by turners for milling the heads of screws. These are necessarily absolutely uniform, are excessively hard, and can be obtained in almost any degree of coarseness or fineness at such tool shops as Buck's. The mode of use is rather more difficult, as the paper or tinfoil has to be folded over a straightedge, and the milling tool run firmly and quickly the whole length, which is not particularly easy. The wheels may, however, be obtained with *concave* edge, and such are more easily guided, all that is necessary being then to hold the straightedge firm. This latter should be of steel and with bevelled edge, though iron or brass will do. If a square edge be used the perforations take the form of short lines, which is not objectionable, except that more care and force are required to get them uniform, whereas the bevelled edge cuts very finely without much pressure. Printers' brass rule answers admirably, but will not stand many operations. The edge must be *perfectly free from notches*, otherwise the line of perforations will present corresponding gaps.

Space will scarcely permit a description of the ruling apparatus, which, however, will be given on another occasion.

W. B. Bolton.

PHOTOGRAPHY IN COLOURED INKS.

Those who had the pleasure of listening to Mr. Warnerke's eloquent discourse, and witnessed the intelligent handling of the demonstration of photo-mechanical printing at the South London Photographic Society's room on January 16, came in for one of those treats that now and again occur at photographic and, for the matter of that, at all societies, the reward that the regular attendant deservedly reaps. The main object of Mr. Warnerke's address was to show that the ordinary photographer, professional or amateur, possessed the means of easily, quickly, and certainly cheaply, obtaining photographic prints of the now well-known platinum or bromide class at, it may be said, one-tenth the price if only a few are required, and at one-hundredth the price if a long number is required, of what ordinary silver prints cost, and with this advantage, that the colour or tone could easily be altered from black, pure black and white, to moonlight, and ranging up and down the scale from warm to cold colours; and, in fact, it was quite as easy, and often more artistic, to have the shadows one tint and the half tones another. Besides cheapness, the fact that most photographers would possess some, if not all, the apparatus needed rendered his description and the process more tantilising, because one saw in their mind's eye the work put in execution.

Mr. Warnerke began his lecturette by describing the Woodburytype, Edwards's heliotype, the zinc photo-mechanical process of Captain Waterhouse, and the Southampton process; also Albertype, lickdruck, collotype, and collographic processes, all of which, and many others, including those under discussion, depend upon the well-known property that gelatine possesses when impregnated with bichromate of potash, that is, of being sensitive to light. This is the pith and essence of the whole of these processes, that when a bichromated film is exposed under a negative, those parts that are unprotected from the light have the power of receiving or absorbing a greasy ink, and those parts that are protected repel the ink, the bichromated gelatine acting, in fact, like a lithographic stone, only more faithfully, because you can obtain a rich pure black by the process described by Mr. Warnerke, and you cannot do so by lithography. And this bichromated film also possesses another very interesting feature, that exactly as the action of the light has acted, so is the *tint* or *half tone*. In fact, these films are in strong relief, like sometimes is seen on a developed dry plate still moist, or on a varnished negative.

When it is mentioned that the lecturette and the demonstration, which included starting with a clean film to the actual production of half a dozen prints, did not occupy one and a half hours, and after the first dozen are got off the printing proceeds at the rate of two to three a minute, and remembering that these are finished prints all ready for mounting, there is one other, or perhaps it would be better to say another, advantage, and it is this: Any paper that is sized can be used, from common fish paper, 4*d*. per quire, to the most highly glazed chromo-lithographic paper, white or coloured. It is also possible—in fact, easy—to print titles or a tint and the picture all at one operation.

The complete apparatus is supplied by representatives of the Company in London.

In the demonstration that followed the introduction, Mr. Warnerke explained that he saw the patentee working the process at a continental international exhibition, and that until recently he has been obliged to obtain the materials from Paris.

The first thing shown was a roll of vegetable parchment coated with plain gelatine; this is cut to size, some two inches or so larger than the picture is to be when finished, and immersed or floated upon a three per cent. solution of bichromate of potash for about three minutes, temperature 50° to 60° Fahr.: if colder, float rather longer; if warmer, reduce temperature with ice, or float a trifle shorter: immerse if many sheets are to be done. Increased floating makes the film more sensitive, a disadvantage with thin negatives, but a positive advantage with dense negatives. The film is slowly withdrawn over the edge of the bath, suspended for a few minutes to allow surplus moisture to drip, and squeegeed on to a piece of clean plate glass, previously dusted with talc or French chalk, talc sprinkled on the glass and nearly all of it rubbed off, just leaving an invisible film.

If coated overnight and stood up to dry, the film should be ready the next morning. Note, bichromate of potash and gelatine are not sensitive to light when wet, but the dried film possesses about the same rapidity as ordinary sensitive albumenised silver paper; there is this exception, that it possesses to a remarkable degree what is known as the continuing action of light, so a little more care is needed until the film is stripped from the glass, which is the next operation, and the film carefully stored away from the light. These films are in their best condition up to the third or fourth day, and are quite useless after three weeks. The exposure is made thus:—An ordinary photographic printing frame with glass in front is used, sufficiently large to take the film; thus, for a half-plate negative a 10 × 8 frame, and for a whole-plate at least a 12 × 10 frame; the negative and film are laid down in the usual manner, and a nice piece of white blotting paper is next laid on, after which the usual padding, and the back placed in position, and printed, if possible, in sun or strong light; in many cases it is advisable to cover over the frame with a sheet of tissue paper. The image can be seen as the printing goes on, but if the film is looked at, it should be in the dark room or a very subdued light. When it is well printed out, remove from frame, and place film face downwards on a piece of black velvet, a drawing board covered with black velvet is the best to use in regular practice; cover with a piece of glass and expose the back of the film to a moderate light for about five minutes, *just to tint the back;* this renders it insoluble, and saves the transferring it to zinc or stone. This is the pith of the process. It is now placed in a dish to dissolve out the unaltered bichromate of potash by soaking it in water and giving frequent changes, or

by running water; leave in till the film is quite clear, faintly opalescent (about four hours is the average time), take out and just drain, squeegee carefully on to glass, film upwards, pour on the glycerine solution described at foot, drain off, something like coating a plate with emulsion, *i.e.*, leave enough on and set to dry in a level place free from dust; a box lid is not a bad thing to put over, or make a square of four pieces of wood, stretch a few strings across, and throw over the top a sheet or so of paper. The solution remaining on one hour, this hardens and toughens the film, and the same solution is dabbed on whenever the film seems to soften during the action of printing. In cold weather some 300 could be easily obtained without rehardening, but in summer perhaps not more than fifty or sixty. Next, the film is placed in a special frame something like artists use when a water-colour drawing is in process of being painted, it may be briefly described as a stretcher frame fitting over another frame, and at the back a padded block of wood fits in, so that the film rests upon this padded block.

Thick and thin lithographers' ink, special varnish, and a piece of lard; two special rollers, one for each ink, a palette knife, and two glass slabs to mull and roll the ink on are required, also an ordinary copying press, such as is found in all commercial offices; these, with sized paper, complete the outfit. A very little of each ink is placed on each glass slab and carefully worked up and down and across the slab, then the roller with the thick ink is carefully and slowly rolled on the film, beginning at the right hand end, so that the foreground and middle distance is inked. The change in the film is magical, a picture seems to start from under the roller. This inking is repeated a few times, then the thin ink roller is passed slowly over the whole, thus working in the shadows and the half tints, the lights being formed of the paper itself. After several proofs have been pulled (usually ten to twelve) the printer finds out how much of each ink to use for each impression, and then the work proceeds rapidly.

Instructions for working off the impression. First thing, to cut a thin paper mask the size the picture is to show; in fact, cut two or three while about it, in case of damaging the one in use. This is fastened on one side or end with gummed paper forming an hinge, because it has to be lifted off each time the skin or film is inked.

The film having had the needful number of proofs pulled off, has the mask fastened down as before described, a pad or two of felt is placed under the block that supports the film, unless this has been done previously. The thick ink is rolled on and then the thin all over, and it is instructive to notice the difference that slow, quick, or medium rolling gives; then the paper mask is hinged over. Next, lay in the paper that the impression is to be printed upon, then the needful number of blankets, as they are called in the letterpress printing trade, better known to us as felt pads; the whole affair is now placed in the copying press, the screw turned for pressure, re-turned, the frame withdrawn, the blankets removed and paper carefully taken off by one edge or side, and then you see the print in all its beauty, and it is thoroughly permanent. As before stated, any colour or tint that you prefer may be used to ink it; and so on repeating the process. Gilt designs, lines, and titles can easily be made by using a gilder's mop and brushing in with it some gold or gold bronze powder, or any coloured bronze powder can be used, and then brushing it off, as it only adheres to the inked portion.

The glycerine solution is made as follows:—

Glycerine	70 parts.
Water	13 „
Liquid ammonia	3 „

An apparatus to print a quarter-plate surface, that is, a picture $4\frac{1}{4} \times 3\frac{1}{4}$, with a white margin proportionate to the size of the picture, only costs 2*l.* 15*s.*, and for a picture 12×10 only 4*l.*, less than double the price of the quarter size, and a much more useful size. The films also make excellent MS. copying machines, and are superior to the usual gelatine graph. ARCHER CLARKE.

PHOTO-MICROGRAPHY.

PHOTOGRAPHIC delineation may be regarded from two different points of view; these are from the artistic point and the point of utility. The first case is that in which photography is employed for the purpose of producing pictures of landscape scenery modelled on the strictest canons of art, or as near to them as our limited capabilities will permit. In the second case usefulness alone comes in, apart from any consideration of art, such as in the copying of paintings, the reproduction of ancient documents and inscriptions, the recording of astronomical and meteorological phenomena, or in that branch of it which will occupy our attention for a short period this evening—viz., photo-micrography.

Photo-micrography may be considered under two heads, according as the practitioner may wish to employ low or high-power objectives; whether he may be content with moderate amplification, or desire to perform feats of optical athletics in defining critical images. Under the first head he may find abundance of recreation, under the second he will find himself plunged into a maelström of worry and perplexity. But, presuming that he may be content with amplifications up to 200 diameters, I see no reason why any one possessing a microscope and a camera should not be able to practise this branch of the photographic art with satisfaction to himself and instruction to his friends. I would, in all cases, recommend the beginner to commence with low powers—say, of about an inch focus, and pass up gradually to a quarter of an inch—and, after he has mastered some of those difficulties he will be sure to encounter at first, then pass on to powers of higher denomination.

In the practice of photo-micrography three things are essential, viz., a camera, a microscope, and a lamp. It will be convenient if I address myself to these several points, and first let me say that cameras for this work have been devised of every possible form, but the principle is the same. The one I particularly favour, and which, in my hands, has given me very good results, is not a camera at all in its usually accepted sense, but is a lidless box placed on its side, and containing the microscope and lamp, these, in working, being shut in by a velvet curtain to exclude the light from the studio. One end of this box is open to allow the protrusion of the microscope tube. The image of the object to be photographed is projected through the microscope on to a white paper screen fixed in the carrier, which also will hold, in subsequent operations, the sensitive plate; hence it follows that, if I can focus my object on this white screen with fairly good and sharp definition, I ought to get my negative as sharp as this image on the white screen, so you see the principle is the same as in ordinary enlargement. This carrier is mounted on a sliding baseboard, and allows of the screen being withdrawn to the distance I think suitable for the work I have in hand. I can, by this method, cover a $7\frac{1}{2} \times 5$ plate, or, by pushing the carrier within about a foot of the microscope, reduce my image to a size suitable for lantern plates. This, therefore, gives me a great range of amplification.

There is one point about this sliding base which I might mention, as by it I am enabled to decide the number of diameters my object is magnified. Starting with the lower power I use, I place a diatom whose known diameter is exactly one-hundredth of an inch in the microscope; I project its image on to the screen at one foot from the microscope, and, with a pair of compasses, measure off its amplification with that power on an ordinary rule, and thus arrive at the number of diameters it is magnified. I then do the same thing at two feet, three feet, and so on. I thus register the magnifying power of that object glass at these several distances. I adopt the same procedure with all the objectives I use, and thus form a table of measurements, to which I can readily refer in all cases. This apparatus of mine is comparatively simple and inexpensive, a matter to be considered in the absence of any regular department in the State set apart for our assistance in these matters. There is another advantage in this arrangement, and that is, I can do all my work in one room, as the velvet curtain shuts in the lamp, and I can develop my negatives in the same room. But I must not take up more time in explaining this apparatus; a lantern slide to be passed through this evening will give a clear explanation of its construction. It may be necessary to say that all that is generally required is an ordinary bellows camera, or, even better, a sliding camera placed on a firm baseboard of well-seasoned mahogany or teak, about five feet long and one and a half inch thick, and sufficiently wider than the camera to admit of a wooden ledge on each side being fixed, to form a broad groove in which the camera can slide backwards or forwards as required, with a thumbscrew through its tailboard to clamp it at any desired distance. This baseboard must be supported in such a manner that any vibrations from passing traffic, or persons moving about the house, may not be communicated to the apparatus. I accomplish this by standing it on a fairly good-sized bundle of journals placed at each end, and I find this stops the vibrations so far that very little evidence of a tremor is manifest in photographs I have taken up to 200 diameters.

I now come to that division of my subject which treats of the microscope. It is essential that this should be a steady, solid monocular, having a good, fine adjustment, for this is very necessary in getting absolutely sharp definition. Another indispensable adjunct is a substage condenser, fitted with a revolving diaphragm pierced with holes of varying diameters. In my rotating diaphragm attached to the condensers the apertures vary from 1-16th of an inch, the smallest, to half an inch, the largest. The smallest is of no use in photographing, but it serves a very important office in enabling me to centre the light. Presuming that your camera and microscope

are axially centred with each other and the lamp, it does not follow that the beam traversing these must be central, and allowing that a great deal of this excentricity may be overcome by moving the lamp, it is not entirely overcome; but if the substage condenser has adjusting screws—which it ought to have—perfect centricity can be attained in this way:—Put in a very low power, and having turned the diaphragm to the smallest aperture, project its image in the middle of the focussing screen, and get its borders quite sharp; now rack the condenser back, and the field will be found evenly illuminated. Should the low power be now changed for one of a higher grade, a further slight adjustment may be required, but having already a rough approximation, this may be readily obtained. The centring of the light is a most important proceeding, for unless this is attended to, one side of the object will have a dark and fuzzy border, while the opposite side will be light and coloured, and what is thus easily perceptible in the borders extends throughout the whole object, and detracts from the general sharpness of the photograph; therefore, too much attention cannot be devoted to this point. The tube of the microscope should be lined with a dead-black paper, or a flare-spot from internal reflection will make itself obnoxiously evident in your negative. Some recommend black velvet as a lining; this answers very well, but being thicker than paper, it helps to diminish the already constricted field. The tube in my microscope is trumpet-shaped, which allows the rays from the object to diverge immediately on passing through the lens, thus removing the constriction and neutralising any tendency to a flare-spot. I might also say that I never use the eyepiece of the microscope, as I find for my purpose I can do better without it.

While we are discussing the microscopic division of this subject, I would especially recommend that the lamp should be kept burning for some quarter of an hour or so before attempting to photograph, to allow of all the constituent parts of the apparatus to warm up and expand. The necessity for this is easily demonstrated by focussing your object as sharp as possible, and let everything remain undisturbed for about ten minutes. When looking at your object again you will find all sharpness has disappeared, and nothing but a blurred, indistinct mass is evident; but let expansion once take place, and no alteration of focus will take place the rest of the evening. I may add that in working with powers less than one inch focus, a great advantage will be derived from interposing a piece of ground glass between the bull's-eye lens of the lamp and the substage condenser, its ground surface being placed next to the object. This, while it makes the light a trifle less powerful and slightly prolongs the exposure, gives a soft, diffused light by its acting as a radiant.

The plan I have always adopted for obtaining a sharp image on the sensitive plate is one that I may recommend straightway, and thus save you the trouble of trying the various expedients suggested by many practitioners, but without satisfactory results in my hands. I say, remove the ordinary ground glass focussing screen from your camera and replace it by a plain glass having some fine lines drawn across it with a writing diamond, these lines being placed next the objective. Now set your focussing glass till these lines are sharply defined. These lines will closely approximate to the plane of your emulsion on the sensitive plate, and therefore, if you get the details of your object into focus with the lines on the focussing screen, the probability will be in favour of a sharp image on the negative.

The lamp I employ is an ordinary microscope lamp burning Strange's crystal oil, in which some camphor is dissolved to increase the whiteness of the light. A plano-convex bull's-eye lens is attached to it. Much discussion has taken place with reference to the position of this lens, some saying that the plane side should be next to the light, others advocating the reverse. I have tried very carefully the results to be obtained in both positions, and I cannot detect any difference in them; but, if anything, I prefer the flat side away from the lamp and next to the condenser. I don't pretend to any knowledge of the laws of optics, and I only speak from my experience.

Having got these three constituent elements—camera, microscope, and lamp—as accurately centred as it is possible, and the apparatus warmed up, we may proceed to operate; and here the question of exposures crops up, and the difficulty begins. Exposures vary in proportion to the magnifying power of the objective used and the colour of the object to be photographed. Although exposure tables, as in landscape photography, may offer the tyro a rough guide, giving some kind of idea to help at first, yet nothing but a cultivated judgment founded on experience can be of any permanent service. I know of no table which assisted me more than that framed by Mr. Walmsley, of Philadelphia, and for which I have in my heart often thanked him, and which I append to these rather voluminous notes.

When using

1½ inch objective	.....	3–45 seconds.
⅔ „ „	.....	7–90 „
1/10 „ „	.....	½– 3 minutes.
⅕ „ „	.....	2– 7 „
1/10 „ „	.....	4–10 „

These times may be regarded as approximate, but to be controlled by the nature, colour, and general character of the subject, and which nothing but experience can furnish the right cue. I have left out much that might be considered desirable to touch on, but my great desire has been to render myself more extensively serviceable to my fellow-men; and in the hope that there may be some present this evening who may feel inclined to extend their researches in the direction of photo-micrography, I have been tempted to lay the subject before them in its barest simplicity. T. Charters White.

SUGGESTIONS FOR APPLYING BALLOONING AND PHOTOGRAPHY TO LAND SURVEYING.

In the Republic of Mexico there are from 200 to 400 million acres of land that up till now (1891) have never been surveyed, so that neither the owners of the land nor the Government can have any precise notion of the extent and boundaries of private estates and the immense territories that belong to the nation, and are known as *terrenos baldios*, or waste lands. The consequence is that boundary disputes are continually arising between adjoining owners and between adjacent villages and districts, and none of the States composing the Federal Republic have been able to adopt a satisfactory fiscal system with regard to real property.

To remedy this state of things, the Federal Government have adopted the system of granting concessions for the survey of enormous slices of the national *terrenos baldios* on the liberal terms of awarding to the *concessionnaires* thirty-three per cent. of the lands surveyed by them. These terms are so liberal that it would be thought that the Government would soon obtain surveys of all the lands at their disposal on such terms. But, as a matter of fact, the demand for such concessions is not so great as would seem natural under the circumstances, the reasons being:—

1. The land, although fertile in a degree almost fabulous in old countries, is at the present moment of small market value, ranging from 1*s.* to 20*s.* per acre, so that the remuneration awarded (4*d.* to 6*s.* 8*d.* per acre) is insufficient for a reg lar survey in accordance with the system now in vogue.

2. Some of the land is so streaked by belts of almost impenetrable forest that an ordinary survey would involve the cutting of extensive paths, the cost of which would more than swallow up the surveyor's remuneration.

3. Other land (in the State of Tabasco, for instance) is so intersected by rivers and brooks, and so *piebald* with *lagunas* (lakes), that its survey by ordinary means would be almost as difficult and expensive as that of the forest land.

So much for the evil; now for the remedy.

The main principle of these suggestions consists in photographing the land from a balloon—at a high elevation for prairie, forest, and open country, and at a low elevation for villages and other areas involving details. And it should here be remarked that in certain seasons of the year the climate of Mexico is favourable for such operations, the sky being clear and the air almost motionless.

An initial difficulty presents itself, viz., the *scale* of the plans photographed, which of course varies with the height of the balloon, which, even if "captive," could never be maintained at precisely the same distance from the earth. To obviate this difficulty, place on the area to be surveyed a sufficient number of large white discs, with black Latin crosses (pointing to the magnetic north) at equal distances from each other—20, 50, 100, 500, or 1000 metres, according to the height the balloon is to ascend, and according to the amount of detail in the plan to be photographed. By these means the camera, in photographing a place, will at the same time photograph the *scale* of it; and, as will be seen, it is a matter of indifference whether the ground allows the discs to be placed in a straight line or not, so long as the distance between every two remains the same.

To reduce the various pictures obtained to the same scale is not difficult by photography, and the pictures, once obtained on the same scale, can be easily patched together on a board to form the map of the whole area to be surveyed, and this operation will be facilitated by the fact that the Latin crosses on the discs always point to the magnetic north.

With regard to altitudes, they could be taken barometrically in places difficult of access, and by levelling in the usual way in the case of important roads, &c.

For large areas the balloon would, of course, have to be free, so as to ascend to an altitude sufficient to enable the camera to take in the whole extent of the area to be surveyed. But for a small area with much detail, such as a village, a small captive balloon would suffice, the camera being worked by clockwork set in motion by an electro-magnet controlled by the operator on the land; and the wire connecting the electro-magnet of the camera with the battery on the land might serve as one of the guy ropes for retaining the captive balloon in position.

It may be objected that the margins of a picture will be on a somewhat smaller scale than the centre of it; but the discs will always indicate the precise scale of all parts of the picture.

As the author of these suggestions is neither a land surveyor, nor an aeronaut, nor a photographer, he has no special aptitude for reducing his theories to practice, and he would therefore recommend them to the consideration of the societies learned in the branches of science involved in them, in the hope that they may result in something practical, in which case the Republic of Mexico will offer a wide and lucrative field for the exercise of the new profession of *land surveying by balloon and camera*.

A. Baker.

TRANSPARENT FILMS AND ROLLER SLIDES PAST AND PRESENT.

On the 11th of September, 1885, I attended a lecture, given before the Balloon Society of Great Britain, by Leon Warnerke, on *A New Departure in Photography*, at which Mr. Bolas presided. As this paper was reported in detail in the photographic periodicals about that date, it is sufficient for my present purpose to state that the object of the lecturer was to advocate the employment of a tissue composed of a paper support, coated with gelatine, surfaced with a gelatine negative emulsion, which, it was stated, "gave results in no way inferior to those obtained from negatives on glass," to "*entirely dispense with the use of the cumbrous and fragile glass supports for negative films previously in use!*"*

At the conclusion of Mr. Warnerke's lecture—addressing myself to Mr. Bolas—I said, that while the advent of a process which would dispense with the employment of a glass support for the negative film must be thankfully greeted, I was astonished that no mention had been made of Mr. Thomas Sutton's suggestion for inventing, or of Mr. George Dawson's ultimate working out into practical form, *transparent, flexible, negative films*, which completely dispensed with the employment of *glass* as a support, and this as far back as between May, 1867, and April, 1869, thus *pioneering* an all-important revolution in the future practice of negative photography.

Previous to Mr. Warnerke's lecture, a mysterious advertisement had appeared in the photographic periodicals simply consisting of the words:

"AT LAST!"

This enigma was explained about August 15, 1885, by an advertisement, "At Last: A Complete System of Film Photography," consisting of flexible negative films for ordinary carriers, or "roll-holder backs," by the Eastman Company, of London and New York.

Warnerke had introduced a "roller slide" in 1870. The employment of roller slides, charged with sufficient tissue to allow of sixty or one hundred negatives being taken when on our without having occasion to employ a tent or a dark room, was without question "a truly great stride from the process of wet collodion."

Both Warnerke's and Eastman's films of this date involved a paper support for sensitised gelatine emulsion. In Warnerke's system the negatives obtained were transferred from the paper to glass plates by aid of a squeegee. Eastman's so-called "stripping films" were treated in a similar manner.

Recently Messrs. Eastman have introduced a very ingenious "roll holder" for their "Kodak" or instantaneous hand cameras; and still more recently, "a rollable transparent sensitive film," freed from a paper support, being "*as thin and flexible as paper and transparent as glass.*" With such "flexible films" and "roll holders," we have a grip on the future of photography.

Like Leon Warnerke, the Eastman Company claims to be "*the pioneer* in modern film photography." To this I say No! You are "the Advanced Guard in the Army of Occupation," but the "pioneer" went before you, and his name is George Dawson, formerly Lecturer in the Photographic Department at King's College, London, and in 1864 joint editor with Mr. J. Traill Taylor of the old British Journal of Photography.

Having Sutton's suggestion and Dawson's experiments clear in my mind's eye, on the 15th September, 1885 (as I find by the tickets still in my possession), four days after Leon Warnerke's lecture, I got out the volumes of Sutton's *Photographic Notes*, for 1866–7, and of the *Illustrated Photographer*, 1868–9, and then spent some days at the British Museum Library taking notes of the progressive history of this interesting and important subject. As space is precious, I must give an epitome of what I traced out.

Sutton's first suggestion as to the possible production of a sensitised, transparent, flexible material, suitable alike for the ordinary or panoramic camera, such as would relieve the photographic tourist from the weight and risk of breakage of glass, is given in his *Photographic Notes*, vol. xii. No. 266, May 7, 1867, p. 132. In his well-remembered enthusiastic spirit he goes on to say, "What an impulse would be given to photography by the introduction of this novelty! How future generations of photographers would smile at the idea of collodion and a nitrate bath (or a tent) ever having been employed by their predecessors! Are such hopes as these utterly vain and absurd? We cannot think so. . . . . The above idea has haunted our imagination for some time, and almost induced us to throw up literary occupation and bestow our whole time to working it out. Success in this direction would be a fortune to any man. We make our readers a present of the idea, and shall be truly glad if any of them can make anything of it. . . . . We know of nothing so likely to repay an experimentalist, both in glory and profit, as the achievement of success in the direction now indicated."

Alas! that this never proved so for my old friend and colleague, George Dawson; for, through his having experienced much buffeting by the storms of life, and resultant wreckage, I have been forced to secure for him a quiet and pleasant harbour of refuge to the end of his days in Charterhouse, a place of world-wide renown (especially since Thackeray wrote *The Newcomes*), founded by another Thomas Sutton in the reign of Elizabeth, for aged gentlemen to whom the world has proved cruel and unkind.

Nearly a year after, on April 9, 1868, Sutton wrote, "A few months ago I said in my *Notes* that photographers sadly wanted a perfectly transparent medium which should be as clear and colourless as glass, and that fortune awaited the discovery of this substance, and would certainly reward the lucky man who should solve the problem. And now it has actually been solved, and I have sheets of the very material for which I sighed lying upon the table before me. They are as clear and transparent as glass, and as strong and flexible as the sheet of foreign paper on which I am writing."

Upon Sutton's first suggestion, many expert photographic manipulators went to work upon the production of this much desired material, and with greater or less success.

Being greatly interested in the subject, as I felt that the future of photography lay in this direction, I collected specimens of the resultant films of such experiments, wherever procurable, and I always considered that Dawson's *final* results met the requirements, though others trod close upon his heels.

Samuel Highley, F.G.S.

(To be continued.)

* This claim was afterwards supplemented (February 21, 1887) by a specification (No. 2662, Patent Office) of an "improved photographic film paper."

INTERNATIONAL PHOTOGRAPHIC CONGRESS AT PARIS.

It will be remembered that in 1889 an International Photographic Congress was held in Paris; at the end of the session a committee was appointed to make arrangements for a second Congress, which will be held in Brussels this year. A circular letter, signed by M. Janssen, the chairman of the above-mentioned committee, has been issued, inviting those interested in photography to send suggestions they may wish to make to M. Pector the secretary of the Congress, so that they may, if considered suitable, be inserted in the programme of the forthcoming Congress. At the last Congress, for some reason, the Photographic Society of Great Britain was not represented, but we are pleased to learn that the Council have appointed Captain Abney, Sir H. Trueman Wood, and Mr. Leon Warnerke, with power to add to their number, as the Society's delegates. These gentlemen have invited the members to forward any suggestions they may wish to make to Captain Abney.

It may be interesting to recall the action of the late Congress. Ten questions were brought up for discussion, and we will briefly enumerate them, and the conclusions arrived at. The first subject was a standard of light to be used in photographic investigations, the measurement of the intensity of light, and the determination of the sensitiveness of plates. The standard of light determined upon was an amyl acetate lamp of certain specified dimensions; a committee was appointed to ascertain the luminous value of its flame in relation to different units of light. The same committee was also instructed to study various methods of measuring the intensity of the light reflected from the object, with a view of finding a standard actinometer. As regards the sensitiveness of plates, the committee was instructed to examine various instruments. Warnerke's apparatus was not considered quite satisfactory, and recently it has been pointed out in Germany that it does not register the sensitiveness of orthochromatic plates correctly, owing to the luminous tablets being deficient in green

and yellow rays. Probably an instrument based on Spurge's principle and used with a standard light at a fixed distance will give strictly comparable results with all classes of plates.

The second point considered was the means of ensuring uniformity in measuring the focal length. Professor Vogel has recently published in our columns a communication upon this subject, so it is possible the question may be again discussed.

Methods of marking lens diaphragms was the third subject considered. A suggestion was made to use the $\sqrt{10}$ as the basis, but was overruled, a different decimal system being adopted. The Photographic Society's standard *f*-4 was mentioned, but the Congress ignored the fact that there are thousands of lenses in existence with diaphragms based upon that standard, and that it would have been convenient to have adopted it. Possibly, if this view of the matter be put before the next Congress, it may be induced to alter the decision arrived at in Paris.

The determination of the speed of instantaneous shutters was also discussed, and was referred to a committee for report.

The sizes of camera screws, lens flanges, and screws, &c., were considered, and the English standards were practically adopted.

The dimensions of photographic plates and papers were also brought before the Congress. It seems that the ordinary sized albumenised paper is somewhat wasteful for English sized pictures. If this matter were brought before the Congress it is possible that some alteration might he made.

As regards writing photographic formulæ, it was decided to adopt the decimal system, expressing weight in grammes, and fluid measure in cubic centimetres. If English writers express their results in grains, as recommended by the Photographic Convention, the formulæ may be read either grains or grammes, fluid grains or cubic centimetres, without altering the proportions.

Suggestions were also made with a view of obtaining an international nomenclature for photographic processes. However, since the Congress met, the Germans have renamed all their processes, substituting words of German origin for the words of Latin derivation previously in use, and now, unless one has followed the new nomenclature, it is difficult to understand to what process the term refers; hence we fear it will be impossible to come to an agreement on this point.

Custom House regulations were dealt with, and we believe that tourists have felt the benefits of the recommendations made.

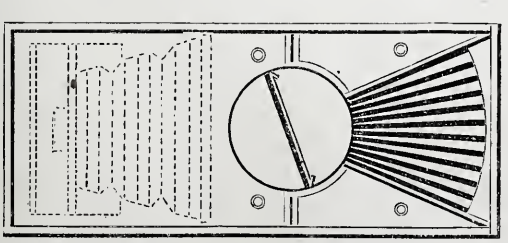
Photographic copyright was also discussed, but the subject being a very important one, at least to English photographers, ought to be brought up again, and some definite action taken.

Possibly important points will suggest themselves to our readers, and we think it might be advantageous if they communicated any suggestion that may occur to them to Captain Abney; indeed, if any other Society is sending delegates to the Congress it would possibly lead to uniformity of action if they laid their views before the Parent Society's representatives.

THE RADIAL HAND CAMERA.

This new claimant for public favour is being introduced by Messrs. Marion & Co., Soho-square. The name is suggested by the method of carrying the plates in radiating grooves which find their common axis in the centre of the exposing position.

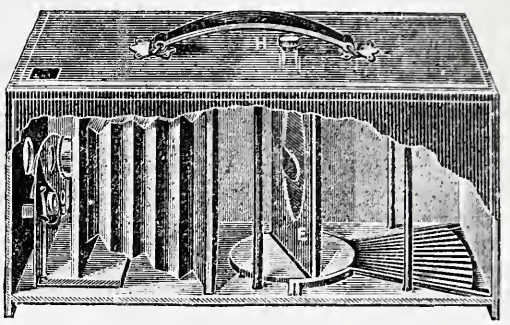
Assuming the lid of the camera to be removed so as to allow us to look downward upon it, we see, as shown in the cut, at the rear end a series



of grooves in metallic copper radiating each from a common centre, and in these grooves the plates are inserted from behind. Revolving on the centre mentioned is a drum containing one groove only right across its centre, and capable of being rotated by the motion of an index pointer which moves over a graduated scale on the bottom, the adjustments being so made as to bring the groove in the central drum exactly opposite to any of the radiating grooves at will.

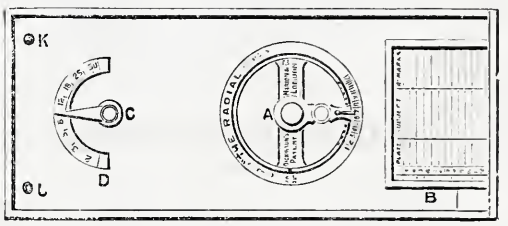
It thus follows that when rotated till it is opposite to, say, the first radial groove, the plate therein will, upon tilting down the front end, slide into the drum, which when thus changed is then rotated until the plate is placed squarely opposite to the lens. The exposure is then made, and the drum again rotated until the plate is ready to be re-deposited in the grooved receptacle from which it was taken. This operation is repeated until the whole of the dozen are exposed. As all the radial grooves are numbered, it will be obvious that plates of different properties and degrees of rapidity may be inserted, as the operator has it in his power to select and use one here or there with equal facility as doing so in a consecutive manner.

In the next cut the interior of the camera is shown as seen from the



side. In it are discovered the relation of the shutter, the lens, and the camera to the exposing plane, E, on the central drum.

The third cut shows the bottom of the camera, C and D being respectively the end of the focussing pinion, and the scale by which the focal



distance is indicated. A represents the axis of the drum; B, the card on which particulars of exposure, &c., are written in pencil; and K and J, respectively, are cords by which the shutter is set and exposure, either time or instantaneous, effected.

As we examined the camera, it occurred to us that in the central drum system, as there carried out, there was the germ of a *desideratum* for hand cameras, viz., the providing a means by which they could be pointed upwards so as to take in a lofty building with freedom from the distortion of convergence. It only needs that the sensitive plate be rotated to such a position as to stand vertically when the camera is being tilted to enable this to be done. We were much pleased with the whole aspect of the camera, and we have no doubt it will work well.

PHOTOGRAPHIC ASSISTANTS' UNION.

We have been asked by the promoters of the new Union of Photographic Assistants to insert their manifesto to the workmen and lady-workers in photography:—

Fellow-Craftsmen and Lady Assistants,—

Now that we have by a meeting in London laid the foundations of Trade Union in photography, we beg to place our main proposals before you, subject to amendment by future meetings of the committee.

Roughly speaking, we appeal to all workers in the craft (male and female), of all grades of work, to unite for the purpose of safeguarding present trade privileges, and of mutually avoiding establishments notoriously unfair to their employees. In order that want of employment may not cause our members to accept or offer unfair terms of engagement, we intend to pay to all members of six months' standing "benefits" of from 8*s*. to 15*s*. per week. The payments for membership are arranged in classes according to the salary received, and range from 4*d*. to 8*d*. per week.

We do not intend to start on a "squelching" or other aggressive movement. We simply unite to refuse to accept engagements under sweaters and swindlers. As for the good employers, we shall be pleased to act with them wherever they will allow us.

In return for fair treatment we offer *qualified labour*. We shall

guarantee our members' ability by requiring them to have been for eight weeks continuously (at some date within two years of application) in receipt of at least the following wages:—*Minimum Salary to Admit:*—Operators or retouchers (or both)—West-end of London, 40*s.*; East, 30*s.*; other parts, 35*s.*; printers (silver)—West, 27*s.* 6*d.*; other parts, 20*s.*; lady retouchers and other artists—West, 30*s.*; other parts, 15*s.*; reception-room duties, 15*s.* and 10*s.* respectively; carbon printers, 30*s.*; monochrome artists, 40*s.*; photo processes (operators, printers, etchers, photo-litho artists), 40*s.*; (retouching, redrawing, opening-up, &c.), 35*s.*

Special arrangements for piece workers and workers in season towns. Membership restricted to workers under forty. The above figures are subject to early amendment.

Our work cannot be carried on without expenses, and the primary expenses will be the heaviest. Therefore we trust the necessary monetary aid will be forthcoming from all who have any interest in the new departure. All donations to be sent direct to H. Snowden Ward, Treasurer, Bradford, Yorkshire.

We need hardly repeat the urgency of this question. However sure one may feel of the permanency of situation, yet unexpectedly it often happens that one is thrown suddenly into a helpless position—helpless because *isolated.* To prevent this we have started this movement for unity and mutual help. Let "organization" be the watchword of our disunited workers; let "moderation" be our policy; and "defence, not defiance," our motto. T. Bolas, Chiswick, President; H. Snowden-Ward, Bradford, Treasurer and Secretary for Bradford.

Committee (London): W. Goebelhoff, G. J. Nield, Napier, Krauss, Phillips, Forbes. Secretaries (Honorary): G. Nield, 44, Englefield-road, London, N.; F. Mann, 175, Malpas-road, Brockley, S.E.; C. Harrap, 8, Victoria-road, Plymouth-grove, Manchester; Arthur, M. Henderson, 42, Frederick-street, Edinburgh. All information from

ARTHUR FIELD, *General Hon. Sec., Maidstone.*

Our Editorial Table.

"PHOTOGRAPHY IN A NUTSHELL."

By the KERNEL. London: Iliffe & Son.

SUCH is the title of a shilling handbook printed for Mr. W. Tylar, of Birmingham. It contains chapters on apparatus, exposure, development, intensifying and reducing negatives, printing, and the other etceteras of the art. The *Nutshell* will prove a handy book of reference to photographers. We here give an extract from the chapter *On Exposure:*—

"But first a very necessary bit of advice is needed. It is simply to *take ample time.* Look at your subject in every possible way before deciding on the point of view, or the arrangement of figures most suitable. See that your picture composes well on the ground glass; the movement of the camera a little to one side or the other will often make all the difference between success and failure. With figures, and especially with animals, *wait* until the attitudes are natural and unconstrained. When taking landscapes in cloudy weather wait half an hour, if necessary, for a bright gleam of light; in short, do every operation deliberately and thoughtfully. Better make no exposure at all than do so, unless everything combines to promise a successful result."

To the credit of the author be it said that it is singularly free from "shop." It contains three good illustrations and a copious catalogue of Mr. Tylar's specialities.

PORTABLE EIKONOGEN DEVELOPER.

MESSRS. MARION & Co. have sent us a sample box containing Dr. M. Andresen's eikonogen put up in little portable tubes in quantities, and with the other appliances requisite, for mixing as required with 100 cubic centimetres of water. All that is necessary is to mix the powder with this quantity of water, shake up for a few minutes till dissolved, and the developer is then ready for use. In cases of over exposure the proportion of water may be doubled. The solution can be used several consecutive times.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1400.—"Improvements in Combination Photographic Cameras and Lanterns." J. B. KING and J. BICKLE.—*Dated January* 26, 1891.

No. 1450.—"Improvements in 'Hand' or 'Detective' Cameras, applicable also to other Cameras." M. JOHNSTONE.—*Dated January* 27, 1891.

No. 1528.—"Improvements in and Method of Cooling Magic Lanterns, Resistance and other Optical or Electrical Apparatus liable to get Overheated." C. W. COX.—*Dated January* 28, 1891.

No. 1583.—"An Improvement in the Production of Names, Numbers, or Descriptions on Photographic Views or Prints." A. GRAY.—*Dated January* 28, 1891.

No. 1590.—"An Improved Stop or Diaphragm for Photographic Cameras." Communicated by L. G. Bigelow. W. W. HORN.—*Dated January* 28, 1891.

No. 1621.—"An Improved Clip for Holding, Suspending, and Supporting Photographic Printing Frames and like Articles." J. B. BROOKS.—*Dated January* 29, 1891.

No. 1736.—"New or Improved Developers for Photographic Pictures." Communicated by The Actien Gesellschaft für Anilin Fabrikation. O. IMRAY.—*Dated January* 30, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 3392.—"Detective Cameras." GRIFFITHS.—Price 8*d.*

No. 3482.—"Photographic Cameras." VAN NECK.—Price 8*d.*

No. 3730.—"Photographic Cameras." EVANS.—Price 8*d.*

No. 15,091.—"Photographic Plates." MCDONALD.—Price 4*d.*

No. 18,369.—"Shutters for Optical Lanterns." THOMPSON.—Price 8*d.*

PATENTS COMPLETED.

AN IMPROVED ADJUSTMENT FOR PHOTOGRAPHIC OBJECTIVES.

No. 19,488. ERNST GUNDLACH, 112, South-avenue, Rochester, New York, U.S.A.—*January* 3, 1891.

MY invention relates to such photographic objectives or lenses which are to be used with different openings or diaphragms according to light, distance of object, angle of field, and other circumstances. Such objectives are most generally composed of two achromatic lenses, which are mounted rigidly on to the ends of a tube, and in such a distance from each other as is most favourable to the special purpose of the objective, the diaphragm being situated about midways between the lenses.

Such most favourable distance of the lenses, however, varies considerably with the diameter or opening of the diaphragm used, and also with the angle of field to be embraced by the objective. For instance, in landscape lenses, which require a wide angle of field, and are mostly used with small diaphragms, the best photographic result is obtained with a comparatively short distance of the lenses from each other or from the diaphragm, while in portrait lenses, which have a much smaller angle of field, but are generally required to work with comparatively wide openings or large diaphragms, the distance of the lenses is to be correspondingly great, in order to produce the least possible focal distortion at or near the edges of the picture.

In fact, if the distance of the lenses is so regulated that the objective will with a small diaphragm produce the best possible picture, it will work very unsatisfactory with a large diaphragm, producing a curved field and much distortion at the sides. If, however, the lenses are brought farther apart so as to have the most favourable position for a large diaphragm, then the picture produced with such will certainly show considerable improvement, while, on the other hand, it would then be much inferior if a small diaphragm were used.

A similar relation exists between the angle of field and the distance of the lenses. The wider an angle the objective is to embrace, the nearer the lenses must be brought together or to the diaphragm, not for the immediate purpose of widening or increasing the angle of said objective, as is actually done thereby, to some extent, but to reduce the distortion at the sides and the aberrations in the flatness of the field, which certainly increase with the angle. Thus, a short distance of the lenses will adjust the objective for small diaphragm and wide angle, and a long distance for large diaphragm and narrow angle at the same time.

Furthermore, if the object is very near to the objective and the diaphragm of the latter is large, as is, for instance, generally the case with the portrait objective, then the proper or most favourable distance of the lenses of the objective also varies considerably with the distance of the object, and still more with the difference of the distances of different parts of the object, if those parts forming the centre of the picture have another distance than those near the edges. If, for instance, a person is to be taken in a sitting position, the hands are usually much nearer to the objective than the face, and consequently, if the image of the latter appears sharply defined on the focussing screen, the hands will be out of focus, the latter being too long, and lying behind the plane of the image. Provided, then, the image of the hands to be near the edge, and the face at or near the centre of the picture, the defect could be remedied by bringing the lenses of the objective nearer together, in order to shorten the oblique focus, or that which forms the image of the hands. Thus, in this particular or exceptional case, a shorter distance between the lenses than that most favourable for general purposes would be proper.

The object of my invention is to provide for suitable means of conveniently varying the distance of the lenses of the photographic objective from each other or from the diaphragm at will, so that the same may be expressly and accurately adjusted for any size of diaphragm, and also for any angle of field or size of picture, if required; or, as in the case of the portrait objective, for any distance of object or difference of distances of different parts of the object. I accomplish this end in several ways. (*These are described with a drawing.*)

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. In a compound photographic objective, the variation or adjustment of the position of the lenses or their distance or distances from each other or from the diaphragm, substantially as herein specified and for the purpose described. 2. In a single photographic objective, the variation or

adjustment of the distance between the lens and the diaphragm, substantially as herein described and for the purpose specified. 3. In a photographic objective, the variation or adjustment of the distance or distances of the lenses from the diaphragm or from each other, for different sizes of diaphragm-opening, substantially as specified, for the purpose described. 4. In a photographic objective, the variation or adjustment of the distance or distances of the lenses from the diaphragm or from each other for different angles of field or sizes of picture, substantially as specified and for the purpose described. 5. In a photographic objective, the variation or adjustment of the distance or distances of the lenses from the diaphragm or from each other, for different distances of the object from the objective, substantially as herein described. 6. In a photographic objective, the variation or adjustment of the distance or distances of the lenses from the diaphragm or from each other, for different distances from the objective, of different objects or subjects, or parts of the same embraced in the image or picture, substantially as herein described, for the purpose specified. 7. In a photographic objective, a mechanism or contrivance by which the distance of the lens or lenses from the diaphragm, or the distance or distances of the lenses from each other, can be varied and adjusted for different sizes of diaphragm-opening; or for different angles of field or sizes of picture, or for different distances of the object or subject from the objective, or for different distances from the objective, of different objects or subjects or parts of the same embraced in the image or picture, substantially as herein described and for the purpose specified. 8. In a compound photographic objective, the combination, with an iris or other suitable diaphragm, of a mechanism or contrivance, which automatically lengthens the distances of the lenses from the diaphragm, or the distance or distances of the lenses from each other, when the size of the opening of the diaphragm is increased, and shortens said distance or distances when the size of said opening is diminished, substantially as described, for the purpose specified. 9. In a single photographic objective, the combination with an iris or other suitable diaphragm, of a mechanism or contrivance, which automatically lengthens the distance between the diaphragm and the lens when the size of the opening of the diaphragm is increased, and shortens said distance when the size of said opening is diminished, substantially as herein described and for the purpose specified.

[Unless amended to some considerable extent, we are doubtful if Mr. Gundlach will be able to hold his patent in a satisfactory manner. Facilities for varying the difference between the diaphragm and the lens in single or landscape objectives have long been known, and almost all of Grubb's aplanatic lenses, especially the larger ones, had such an adaptation. And in course of a paper, *On Defects Incident to the Construction and Use of Rapid Combination Lenses*, read at the Convention of the Photographers' Association of America, in Buffalo, N.Y., on July 14, 1885, the author (Mr. J. Traill Taylor) said: "The most perfect mount for lenses of this class would be that in which the privilege was afforded the user of making an adjustment to suit work of any nature by the separation of the lenses to a limited extent, so as to be used under the most perfect conditions for the special work in hand. With a lens of eleven inches focus, a sliding adjustment of half an inch *has been adopted with beneficial results.*" That lens was present in the room while the paper referred to was being read, and the paper was published at the time in both American and English journals. On re-examining this lens we find, as stated, that the power of separation at each end of the tube is half an inch, as stated, thus permitting the withdrawal of the lenses from each other to the extent of one inch.—Ed.]

Improvements in Detective or Hand Cameras.

No. 3392. Walter Griffiths, Highgate-square, Birmingham, Warwickshire.—*January* 10, 1891.

My invention has for its object a new or improved detective or hand camera by which I provide a thoroughly efficient and trustworthy camera with all the necessary accessories complete, much more cheaply and economically than has been done hitherto, and which will allow such a camera to be sold at about one quarter the cost of present cameras of equal capabilities and power.

In carrying my invention into effect I form the box, case, or cover of the camera of mill-board, straw-board, or other similar material, which I preferably bind or cover with American cloth and strengthen where required by wood or other stiffeners. This case is provided with a top lid which is hinged upon a cloth or other similar hinge, and fastened by a strap arrangement or other suitable contrivance. The front end of this case, which is provided with the necessary aperture opposite the lens, is also made to hinge, so as to gain ready access to the shutter mechanism, afterwards to be described, and upon the top lid, or from any other convenient part, I provide a handle by which the camera would be held or carried by the hand. Within a portion of this case I form the camera with mill-board sides and strengthened at back with wooden stiffeners, the front being formed of wood and having the lens attached to the internal side of the wood, and the shutter frame to the external side, the hole in the shutter frame being made to form the stop for the light, and the wooden division being of the necessary thickness to form the correct distance from the lens on the inside to the stop hole in the shutter frame on the outside, and thus by placing the lens inside and the shutter outside I am enabled to expose and cut off the light at the most concentrated point—*i.e.*, at the stop—in a simple, very cheap, and effective manner. The rebounding shutter and frame used is of an ordinary type, consisting of a thin metal frame turned over at the edges to form grooves in which the ebonite shutter slides. A piece of elastic is attached to the upper part of the frame, and attached to the shutter when closed over the aperture, where it is held by a catch provided for the purpose, but upon the shutter being released it is rapidly shot up by the elastic, from which it is thereby disengaged, after which it rebounds against a similar length of elastic to its former position over the aperture in the frame

An opening is provided in the bottom of the outside cover to allow the fingers to act in operating the catch which releases the shutter.

My camera is arranged so as to take negatives of lantern-slide size, but the dark slides to be hereafter described are arranged to receive quarter-plate size, which is usually the most convenient size to be obtained, and thus lantern slides may be printed by contact with the negatives taken in my camera.

Another portion of my improvement consists of the dark slides, each of which are formed of strong mill, straw, or other such board, and are each made to contain two plates, and consist of three leaves, which are bound together by cloth to open in a similar way to a book, each of the two outside leaves of which are composed of three pieces of mill-card or other similar board, sprigged, tacked, or otherwise fastened together, the inside piece having an aperture cut out large enough to receive a quarter-plate, and the mill-board being thick enough for the plate to be contained within the thickness flush, and the centre and outer pieces, which are of somewhat thinner proportions, and are provided with an aperture of the size of a lantern slide, between which two pieces the dark-slide shutter (which consists of thin metal) slides, the shutter being provided with a curl in the metal at the top for convenience in withdrawing.

Between these two outside leaves I provide the centre mill-board leaf having attached to it on each side a spring which presses against the plates and keeps them firmly in position, the leaves being tightly retained together when in use by means of a metal clip of the shape of the three sides of the book, which slides on and embraces the edges of the two stiff pieces of mill-board within the thickness of which the plates are contained, at the same time effectually excluding any light which might otherwise penetrate between the leaves. A number of these dark slides may be provided to each camera, and their position may readily be fixed in the first instance, when the camera is being made, by means of a wooden frame made temporarily movable against which they butt and which may be moved until the plate is in focus, after which the frame is permanently fixed so that the dark slides are always pressed against it in the same position by springs which are provided in the body of the outer casing.

A velvet surface between the dark slide and this frame prevents any light entering, as also a velvet surface is provided upon the two surfaces between which the dark-slide shutters slide.

I provide a finder consisting of the ordinary concave lens and mirror, but for cheapness and ease in using I mount them in a folding or collapsible frame of cloth, leather, or suitable material, and attach the same to any convenient portion of my outside covering, so that upon opening the purse-shaped frame the lens and mirror will occupy the proper position with regard to the camera to illustrate the view upon the plate.

The finder would be fastened when closed, and open by any convenient arrangement of strap, tape, buttons, or similar contrivance.

I do not confine myself to the exact details here described, as I may use my other improvements in combination with a casing made of metal or other material, but as a rule I prefer to use them in a similar manner to that herein described.

Improvements in Photographic Cameras.

No. 3482. Louis van Neck, Brussels, Belgium.—*January* 10, 1891.

This invention relates to photographic cameras.

The camera constructed according to the said invention has the appearance of a case covered with leather, and presents in front two circular openings, one being designed for the objective, and the other for the sighting.

At the upper part of the camera is arranged a handle for the transport, and a square opening provided with a deadened glass protected by a spring-actuated shutter.

The camera possesses at its lower part a rectangular opening likewise provided with a deadened glass masked by its metallic shutter, the lever of the obturator having an exterior helical spring which can be detached at will and expanded so as to act upon a series of tappets, and a knob provided on a rack designed for focussing.

On the side of the apparatus is arranged a presser of the disengaging device.

The camera has at its rear a closing device operated by a spring, which device enables a portion of the cover to be removed, and the bag which serves for changing the plates or films, or the key of the roller frame to be uncovered or laid bare; furthermore, a metallic handle and an opening for the numbering frame.

My improved apparatus is composed of two distinct parts, one being fixed and the other removable. The latter part includes the portion of the cover hereinbefore referred to.

The anterior fixed part is formed of a reservoir upon which is placed in front the objective, actuated by the rack for the focussing, and immediately preceding the obturator having a mirror which exactly closes the opening on the side of the chamber for the plates or films placed behind. Above, the deadened glass is at the exterior, and reflects the image produced by the objective. A number of levers actuated by springs enables the obturator to be put under tension without uncovering the opening of the chamber towards the sensitive plates or films. At the moment of the disengagement the mirror is raised and lowered with a velocity corresponding to the tension of the springs acting upon the levers. For prolonging the exposure, the obturator can be manipulated through the medium of a string, or the like.

The posterior fixed part of the apparatus comprises a chamber which can hold say from twelve to thirty sensitive plates or films, possessing frames of metal, celluloid, or other light material. Use can also be made of a roller frame having say from forty-eight to one hundred sensitive plates or films.

After each exposure the sensitive plate or film can be changed by means of a key; or giving a quarter of a turn to the handle at the rear the last frame holding the sensitive plate or film is raised in the impermeable bag in such a manner that the operator can seize it and easily place the same before the others without fear of making a mistake. At the same time the numbering disc is caused to advance through the distance between two notches, and in the opening provided for this purpose appears the number corresponding to the figure indicating the number of plates or films used. In like manner a hand shows upon the roller frame the number of turns imparted to the rollers.

Improvements in or Applicable to Photographic Cameras.

No. 3730. Mortimer Evans, Savile Club, Piccadilly, London.—*January* 10, 1890.

This invention relates to certain improvements in or applicable to photographic cameras of the kind described in the specification accompanying application for Letters Patent No. 10,131, dated the 21st day of June, 1889, made by William Friese Greene and myself, in which cameras the consecutive movements necessary for the obtainment of a latent photographic representation, or a series thereof, are caused to be effected automatically, and, if required, in rapid series by means dependent for their actuation upon the rotation of a common shaft or its equivalent (hereinafter referred to as the "main shaft"), to which motion may be imparted by any suitable means.

The objects of the present invention are to simplify the means by which the successively adjacent or following portions of a sensitised strip (upon which successive or following representations are taken) are caused to be presented in position for exposure, arrested in position during exposure, and removed from position after exposure, and to lessen the period of each arrestment of the strip, so as to allow of and cause the strip to be more gradually advanced into and from such position between its successive times of arrestment.

To this end I cause the advance of the strip to be effected directly from the main shaft or by parts operated thereby, in lieu of causing such advance to be effected by intermittently operating escapement devices independently and momentarily operating when released from the control of such shaft, as described in the aforesaid specification.

In such lastly referred to means the portion of the strip in position for exposure is stationary during the whole, or nearly the whole, of the period between the successive operations of the escapement device, and the strip is momentarily shifted; but by the present improvements the portion of the strip in position for exposure is arrested in position only for the period required to effect the exposure, and the whole of the period between such successive times of arrestment is utilised in shifting the strip so that it is more gradually advanced.

I can effect this object by various modifications of suitably arranged devices.

According to one modification, I mount a take-up roller and a winding-on roller in opposite side-rocking levers, on the pivot or connecting spindle of which I mount a roller, guiding the strip from a suitably mounted let-off roller in alignment for exposure to the take-up roller, partly around which the strip passes on to the winding-on roller; and I drive the latter by a frictional hub and by connecting gearing from the spindle of the take-up roller at a relatively higher speed, such as may be practically most advantageous, such parts being so arranged as that the motion of the several rollers, and consequently the advance of the strip, is dependent upon the motion of the take-up roller. I impart the necessary movement to this latter roller from the main shaft (which may be continuously rotated) by driving it by frictional surface contact with a drum on such shaft, and I cause such movement of such roller to be intermittent by disconnecting such roller and its actuating drum at the time the arrestment of the strip and the exposure thereof is required to be effected. I can also effect this object by various arrangements of suitable means, as, for example, by mounting a pin or pins in the ends of the said drum, and by mounting disconnecting spring or gravity levers in arms extending from the said rocking levers, so constructing and arranging such disconnecting levers as that they will be automatically actuated by the said pin or pins at the times required so to be caused to be effective in rocking the levers into position and holding the strip in position for and during exposure, and until (immediately after the exposure) the actuating pin passes beyond the range of the disconnecting levers, which thereupon fall, or are caused to fall, into position ready for the next actuation of the pins, the take-up roller and its actuating drum being simultaneously automatically thrown into gear by a suitably disposed spring acting upon the rocking levers.

According to another modification, the winding-on roller is applied directly to the main shaft, being driven frictionally from the hub. Its winding-on and advancing action upon the strip is caused to be arrested when required as aforesaid by pins or discs connected to the shaft, which intermittently engage with a conveniently mounted brake lever and cause the same to arrest the strip by nipping it against an opposite fixed part until the pins have passed beyond the range of the brake lever, when the latter is automatically released by a spring, and the rotation of the roller and the advance of the strip proceeds.

According to a further modification, the take-up device consists of a pair of rollers between which the strip is passed, and which receive a continuous feeding motion from a drum mounted on the main shaft, and are mounted in rocking arms, which by a suitable arrangement of actuating parts are caused to receive a reciprocating traversing motion equal to the speed of rotation of the rolls. Such means are effective in causing the rollers in their backward traverse (during which the portion of the strip in position for exposure is required to be stationery) to roll over the strip without effecting any movement thereof, and in causing the rollers during their forward traverse both to roll forward and pull forward the same amount of strip; the strip being consequently advanced equal to the sum of the gathering motion of the rollers, plus the traversing motion of their carrying levers.

An Improved Preparation of Chemicals adapted to the Development of Photographic Plates and the Like.

No. 15,091. Abel McDonald, 1, Lawn-terrace, Silloth, Cumberland.—*January* 10, 1891.

In the preparation of developers for photographic plates and the like, it is necessary to possess a number of different chemicals, both in crystals and solutions, such as liquid ammonia, nitric acid, &c., which are more or less injurious to the health; this necessitates the manipulator to have in possession a number of bottles of solution, &c., from which an accurate portion must be mixed at the time of development by aid of weights and measures.

This causes loss of time, risk of breakage, and encumbrance when on a tour.

To dispense with the aforesaid disadvantages I purpose manufacturing a combination of chemicals into one body possessing the essential properties of a first-class developer.

This I accomplish with the following chemicals and in the following manner.

I fuse together one part of sodium oxide, four parts of sodium carbonate, and eight parts of sodium sulphite, or other proportions that may from time to time be found necessary.

I then form the compound into tablets or sticks of a convenient size and weight, ready for dissolving in a given quantity of water, without the aid of weights and measures.

The advantages of my invention are:—

1st. Being a combination of chemicals in one solid body the photographer does not require to have in stock a number of different chemicals.

2nd. Being of a convenient size and weight and soluble, it can be readily mixed at the time of use without the aid of weights and measures by an inexperienced person.

3rdly. It entirely dispenses with the burdensome practice of having to carry developing solution in bottles as it is used with dry pyrogallic acid alone: thus the entire chemicals necessary for developing are light and can be kept in a small compass, making it an acceptable boon to tourists as well as professional photographers at home.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—To manufacture a combination of sodium chemicals into a solid body, substantially as and for the purposes described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 9.....	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 10.....	Great Britain	5a, Pall Mall East.
,, 10.....	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 10.....	Derby	Society's Rooms, Derwent-bldings.
,, 10.....	Bradford.....	50, Godwin-street.
,, 10.....	Manchester Amateur	Manchester Athenæum.
,, 10	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 10.....	Paisley	Committee Rm., Free Lib. & Museum
,, 11.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 12.. ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 12.....	Birkenhead	Association Rooms, Price-street.
,, 12.....	Cheltenham	
,, 12.....	Manchester Photo. Society	36, George-street, Manchester.
,, 13.....	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 29,—Mr. A. Haddon in the chair.

A further contribution to the library was received.

Mr. Charters White read a paper on *Micro-photography* [see p. 86].

In reply to an inquiry, Mr. White said that he used an opaque screen for obtaining position and rough focussing, and then substituted a piece of clear glass, on the face of which lines had been ruled for getting the focus of the eyepiece. He then focussed the image on the transparent surface. Fine focussing could not be accomplished on a ground or matted surface.

Mr. W. Coles inquired whether, when the enlargement was great, a slight displacement of the focussing plane would make a perceptible difference; say a displacement of the eighth of an inch, with a distance of five feet.

Mr. White said that it would.

The Chairman asked whether Mr. White found any considerable allowance for imperfect correction of the lenses for the photographic range to be necessary.

Mr. White said that he did not generally find any allowance required. In one case he had found a slight adjustment necessary.

Mr. J. J. Briginshaw had never found adjustment necessary when working without an eyepiece. For centring he used a cap on the condenser with a very small orifice in it.

Mr. T. E. Freshwater had only used the eyepiece a few times. In the first place, it stops a very great amount of light, and as the place where he worked was liable to much vibration from traffic, it was desirable to make the exposures short. Originally he used an oil lamp, but now worked with the limelight and the lantern front shown. He often found that he could scarcely expose short time enough.

Mr. Briginshaw remarked upon the very creditable work done in the early days, and thought that with the much improved appliances and methods now available even more might be expected than had been accomplished.

On the amount of enlargement obtainable, Mr. White said that very good images could be had at, say, 800 diameters, but when coming to 3000 they were very fuzzy from diffraction.

The Chairman asked whether it was not a fact that when using the eyepiece only a very small area was in focus.

Mr. White said that that was so.

Mr. Briginshaw asked whether Mr. White had found any advantage in the use of the yellow screen.

Mr. White said only when using isochromatic plates, and then not very decided.

A large number of slides by Messrs. Charters White, Freshwater, and Guardia were then exhibited in the lantern, including some showing the apparatus employed, but for the most part consisting of examples of photo-micrography of various subjects.

The Chairman, in thanking Mr. Charters White for the paper, said that any one taking up photo-micrography would find it of great service; and Mr. White added that if any of the members of the Association tried photo-micrography and got into difficulties, he would be pleased to advise them.

CROYDON CAMERA CLUB.

FEBRUARY 2.—The first annual meeting was held at the Club Rooms, 96, George-street—the President (Mr. H. Maclean, F.G.S.) in the chair.

The report stated that no less than seventy members had been elected since the Society was founded on February 25, 1890. The accounts showed a balance to the good of 16*l.* 15*s.* 4*d.* The Club has the sole use of central rooms, including properly fitted dark room, and meeting room open every weekday from 10 a.m. to 10.45 p.m. The following officers were elected for 1891 :—*President:* H. Macleau, F.G.S.—*Vice-President:* H. J. Strong, J.P.—*Treasurer:* Mr. Sargeant.—*Hon. Secretary:* G. R. White.—*Hon. Assistant Secretary:* E. F. Blow.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

JANUARY 31,—Rev. L. Macdona in the chair.

Mr. HOWSON, of the Britannia Works Company, gave a demonstration on the new Ilford special lantern plates, and, after describing their particular features, he referred at some length to their coming competition. He then exposed three plates, two to ordinary gaslight, giving fifteen and twenty-five seconds exposure, and one to the light of a wax vesta. Upon development it was impossible to distinguish one from another.

February 11, Flash-light demoustration.

TOOTING CAMERA CLUB.

JANUARY 27,—The President in the chair.

The evening was devoted to lantern slide making by Mr. J. F. Child.

The next ordinary meeting will be held on February 24, when Mr. Berger will demonstrate *Pyro Development.*

SHEFFIELD PHOTOGRAPHIC SOCIETY.

FEBRUARY 3,—Mr. B. J. Taylor in the chair.

After the election of new members a lantern exhibition was given.

SHEFFIELD CAMERA CLUB.

JANUARY 28.—Annual meeting.

The report of the Secretary on the working of the Club during the past year was exceedingly satisfactory.

The following were elected as officers for the ensuing year :—*President :* Mr. G. T. Newsholme, F.C.S.—*Vice-Presidents :* Dr. T. H. Morton and Mr. H. J. Rawson.—*Council :* Professor J. O. Arnold, F.C.S., Drs. J. A. Manton and E. Skinner, Messrs. Wm. Gilby, jun., A. Copley, and P. Slater.—*Treasurer :* Mr. B. W. Winder.—*Hon. Secretary :* Mr. G. E. Malcham.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JANUARY 29,—Mr. W. J. Harrison, F.G.S., in the chair.

Eight new members were elected.

There were two exhibits—viz., Hume's cantilever enlarging lantern, which was greatly admired both for excellence and portability; and two permanent photographs burnt into porcelain, which were shown by the Chairman.

The evening was then devoted to a developing competition and demonstration. Plates were exposed behind negatives in the room, and then developed with the developer and by the member whose name follows it :—Pyro and ammonia, by Mr. J. T. Mousley ; pyro and potash, by Mr. J. Simkin ; hydroquinone, by Mr. G. A. Thomason ; eikonogen, by Mr. A. J. Leeson ; "Demon," by Mr. J. H. Pickard ; ferrous oxalate, by Mr. W. J. Harrison.

The question box contained the following :—"How are photo-etchings produced ?"

Mr. JEROME HARRISON said that he was not aware of the details of the "photo-etching" process, but that in principle he believed it to consist in imposing a carbon print upon a grained metal plate. A solution of perchloride of iron was then poured over the carbon picture, and this solution acted through the carbon image, biting or etching the metal beneath. The metal plate could then be used to print from.

BATH PHOTOGRAPHIC SOCIETY.

JANUARY 28,—Mr. W. Pumphrey (the President) in the chair.

Miss Melita Bird and Messrs. Cecil Bradshawe, Ernest Lambert, Graystone Bird, and C. W. Dykes, were elected members.

The CHAIRMAN drew attention to the proposed visit of the Photographers' Convention to Bath next July, and a circular was read from the Camera Club inviting members to be present at their Conference, April 7th and 8th next. The Chairman said Dr. P. H. Emerson had sent them a pamphlet which appeared to be a recantation of the views expressed in his work, *East Anglian Life.* Portions of the pamphlet were read, and the Chairman said the recantation added tenfold value to the book itself.

Mr. J. DUGDALE then showed an improved form of lanternscope he has recently devised for the purpose of viewing lantern slides. By its use the slide under examination is seen with both eyes at the same time, thus enabling the observer to form a more correct judgment as to the qualities of the work.

Mr. PUMPHREY then followed up his demonstration of enlarging processes. In this instance a very simple apparatus was used—a dark chamber, in an aperture of which the negative to be enlarged was placed—in front of that an expanding camera minus the focussing and dark slide, and in front and movable in three directions an easel to carry the sensitive paper. A paraffin lamp placed within the chamber was used for focussing the enlarged image on the easel, after which it was removed to a tin lantern with a red glass front. A piece of oiled ground glass was next placed before the negative to act as a diffuser, the sensitive paper adjusted on the easel, and the exposure made. This was done by means of magnesium ribbou. A string of ribbon, six inches long and held by pliers, was ignited at a spirit flame inside the chamber, and passed during combustion from side to side and up and down in front of the ground-glass screen, this process being repeated as often as required. To produce a fully impressed enlarged positive on bromide paper, say from a dense half-plate negative, the enlargement being about three times, lens working at *f*-12, three such pieces of ribbon would be required. If a negative possesses great density in parts, the plan of illuminating offers distinct facilities for adapting the light to suit it. Mr. Pumphrey stated that this method was introduced by Mr. Monkhouse, York, and that it was by his special permission he brought it before the Society. The exposed paper was developed and the result handed round.

An exhibition of lantern transparencies then took place, the President's oxy-hydrogen lantern being used. First, there was a competition for the best set of slides, the work of the competing members, and also of the best individual slide. Mr. H. G. P. Wells secured the highest number of votes for his series. For the best individual slide the award was given to Mr. Ernest Peacock.

Annual meeting, February 25, when, after the formal business, Mr. Wells will demonstrate the method of producing lantern transparencies.

BOLTON CAMERA CLUB.

JANUARY 28.—The PRESIDENT (Dr. J. Johnston) gave an account of his visit to America during the last summer, illustrating by lantern slides and prints scenes taken on board and the different places visited, and gave a very graphic description of Walt Whitman's residence, exterior and interior, with two or three very good portraits of the fine old poet.

At the previous meeting the Vice-President (Dr. Mackechuie) gave his recent tour, *Three Weeks in Scotland,* showing slides and prints, which were much appreciated.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

JANUARY 29,—The President (Mr. Paul Lange) occupied the chair.

The following were elected members :—Norman Croak, A. C. Batty, Theodore Hubback, Miss Adams, F. W. Walker, E. S. Sole, and F. H. Edsby.

The President distributed the medals awarded in the prize competition of last November.

The meeting was then resolved into a special meeting to consider certain alterations in the rules of the Association, at the close of which Mr. E. Anyon gave an exhibition of a new lantern, with which he showed a series of slides, some of them of exceptionally high merit.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 3,—Bailie Lawrence (Vice-President) in the chair.

Mr. GEORGE MACKIE gave a practical demonstration of making lantern slides by the wet collodion process. A slide was made by contact, after being allowed to get surface dry, and the mats placed between it and the negative. Thereafter another slide was made by reduction from a quarter-plate negative. The contact slide was exposed to a gas flame, but magnesium was used for the reduced one. Both were very successful. Fifty slides sent for exchange by the Paisley Society were then exhibited.

EDINBURGH PHOTOGRAPHIC SOCIETY.

JANUARY 28.—Mr. H. Blanc (President) in the chair, who in opening the proceedings stated that although these popular meetings had generally been conducted by members of the Society, on this occasion they had secured the services of a gentleman whose work had attracted much attention during the recently closed exhibition. He alluded to Mr. Gambier Bolton, F.Z.S., who would that evening entertain them with a lecture on *Photographing Wild Beasts and Birds from Life,* and exhibit a large number of slides from his pictures of them.

He then introduced Mr. BOLTON, who stated that the peculiar *rôle* he had taken up—the production of pictures of wild animals—was one that required not only a love of the subjects, but careful study of their habits and ways ; and taking them photographically, as he only did, without the accompaniment of their bars and cages, it involved not ouly risks but a great deal of patience, more especially as he (the lecturer) had made it a condition that he must have them standing on their four legs, and looking alive, free of all cast shadows, and showing the tail. He had no double printings or combinations, and always took them with the natural background they had. Many people were under the impression that his pictures were the results of snapshots from small or hand cameras, and so, to a considerable extent, matters of chance ; but he assured them that they were all taken on whole-plates, and never *in sunshine,* as his experience was with the coats of wild animals *that* gave no detail in the shadows, but simply blots or blurs ; whereas they would find in these pictures the fullest detail made out in the deepest shadowed parts, and to do this required not exposures of the sixtieth or the three-thousandth of a second, as in some of those of Mr. Muybridge, which showed the animals as no human eye had ever seen or could see them, but with exposures varying from one to two seconds and upwards. As illustratiug the amount of patience required, he stated on one set of this class of subjects he had expended a hundred and eighty plates and only got some sixteen pictures that he was satisfied with. Most animals had an aversion to being photographed. They seemed to know, and did not like the lens being pointed at them through the bars, and in one instance the big tiger at the Zoo made a grab at him with his great paw, and before he could think, the lens was rolling on the floor of the cage, the focussing cloth torn off his head, and he bore the mark on his person to this day. The slides began with the lions at the Zoo in various positions, of which there were some ten—all characteristic and natural. Then proceeding with tigers and leopards, on one of the latter of which there was pointed out the ghost of a foot where the animal, a leopardess, had made a sudden shift during exposure, which he was careful to point out, but could not explain. The three examples of the Polar bear were very successful, as he is a very restless animal. The zebra series were exceedingly interesting, as were also those of several others which are rapidly being cleared off the face of the earth, and soon to be as extinct as the dodo. Among the bigger brutes of the pachydermata,

the elephants, the hippopotami, the rhinoceros, both single and double-horned (if horn it should be called), the giraffe, which long-legged and long-necked quadruped was shown in two very peculiar and characteristic positions, and caught in less than the usual time of exposure—the fifth of a second; also the Brazilian tapir, which was a fine picture of a rare class of mammalia—a type of the oldest living of its order and class. The bovidæ in all the varieties were well represented—from the wild British breeds still preserved at Chillingham and Cadzow to the yaks of the Thibetan mountains. One of this class, the urus breed—the European bison—gave a whole lot of trouble, as he was continually rolling over in the straw of his shed, so trying the patience of his photographer for four long days in picking off the straws, till patience succeeded, and he was photographed without those adjuncts. After exhibiting several alligators taken during a trip to Paris, as also a good example of the sea lion, but which was not better that the pair in the Zoo ten or twelve years ago, the lecturer proceeded to a fine series of animals from the parks and collection of that enthusiastic naturalist, Mr. Walter Rothschild, embracing examples of the giant kangaroo, the wallaby, emus, and rheas, as also the most wonderful of them all, if not the queerest animal or bird on earth, the kiwi, standing or sleeping on one leg, and supporting himself by his long beak being stuck in the ground. Many of the others with catch-title names and queer positions, as well as a large selection of the canine race, gave opportunity during the lecture for the introduction of racy anecdotes, which received frequent rounds of applause, and made the two hours which the hundred slides occupied in being shown seem quite short.

At the close of a most successful exhibition, the President, in the name of the Society, thanked the lecturer.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

JANUARY 14,—The President (Mr. John G. Bullock) in the chair.

The paper for the evening was read by Mr. FREDERIC E. IVES, being an abstract of his recent lecture delivered before the Franklin Institute on *Heliochromy, or Photography in the Colours of Nature*. Four permanent colour-print heliochromes by his patented process were shown. He also repeated a suggestion which he made, incidentally, in his lecture at the Franklin Institute, and which was not published because the lecture was in print when the suggestion was made. After speaking of the insensitiveness of the old chloride of silver process, which is suitable only for printing-out under-coloured glasses and similar copy, he said he believed a far better printing-out process could be devised, employing fugitive dyes, which, as is well known, are bleached by the light rays which they absorb. He said: Suppose we take for this purpose three very fugitive dyes, a green-blue, a magenta, and a yellow. Every part of the spectrum can be represented by means of films more or less deeply stained by these dyes, separate or superimposed upon a white surface; and if the three fully coloured films are superimposed together, we get a good black. Project the solar spectrum upon this compound film, and what will it do? Sooner or later, depending upon the light-sensitiveness of the dyes, the red rays will bleach the green-blue dye, which is the only one that absorbs those rays, and leave the yellow and magenta unaltered, making a full red. The yellow rays, which are absorbed by the magenta and the green-blue dyes, will bleach them both, leaving only the yellow. The green rays, which are absorbed only by the magenta dye, will bleach it and leave the yellow and green-blue dyes unaltered, making a full green. The blue rays, which are absorbed only by the yellow dye, will bleach it, leaving the green-blue and magenta dyes unaltered, making a full blue. Other parts of the spectrum, acting upon the same principle, will give intermediate tints, by only partly bleaching the dyes which they do not completely absorb, and white light will bleach all the dyes, exposing the white support. It might be possible to mix the dyes so as to apply them together in a single film, as of collodion or gelatine. Should the light-sensitiveness of the dyes be unequal, evenness of action could be secured by the use of light-filters, as in orthochromatic photography. The process might be named 'heliochromography.' Turmeric exactly fulfils the requirements for a fugitive yellow dye, printing-out completely in a few minutes in bright sunlight. It will be only necessary to find equally fugitive dyes of the right shades of green-blue and magenta-red in order to obtain direct-colour prints far brighter and truer than the best that have been made on the silver-chloride plates. Cyanine, which prints out as quick as turmeric, makes pictures that can be rendered permanent, but it is not exactly the right shade of blue to carry out the process with only three dyes. There are many coal-tar dyes so fugitive that they have no commercial value, and are not manufactured; among these it is quite likely that suitable dyes for carrying out the process may be found. Should it ever be found possible to continue, by chemical agency, the process started in the dyes by the light-rays themselves, the picture could then be made in the camera, and if all the colours could be fixed, like cyanine, when sufficiently reduced, permanent photography in the natural colours would then be within the reach of every amateur. Meanwhile, we shall probably have to content ourselves with the more roundabout but no less scientific and capable method of composite heliochromy.

The Society expressed its hearty appreciation of the great work Mr. Ives has accomplished.

Mr. BROWNE said, some time about 1862 or 1863, he remembered seeing a Daguerreotype plate sent from France, and which M. Becquerel claimed to have been made in the camera. It represented a Scotch plaid or shawl. The picture originally had very bright colours, but was then considerably faded. It was sent here as a very great curiosity, and was shown to some of the members of the Franklin Institute. Did Mr. Ives remember what process that was?

Mr. IVES said it was the same old chloride of silver process, of which they had an illustration now on the President's table. It was considerably brighter than the pictures he had shown them, but it was substantially the same process, and was obtained by two days' exposure in the sunlight, using a portrait lens. A two days' exposure in the sunlight was, of course, entirely impracticable, no matter what the result might be. A method of fixing these pictures permanently had not yet been found; they had to be kept from light.

Mr. EARLE showed and described a rubber-type outfit for printing titles, numbers, &c., on negatives. The novel feature was the fact that the types were positive instead of negative, as usual with type. As a consequence, they printed on the film of the negative in *negative letters*, and when so used a print from the negative showed the letters as *positive*, so that they could be read properly on the positive print. The type were easily set up, and could be read and corrected in the holder before any printing was done. It was small enough to be adapted to small prints or lantern slides, and did not detract from the appearance of a picture when thrown on the screen, and that was one of its most important uses.

The meeting closed with an exhibition of lantern slides by Mr. A. M. Spangler, a visitor, representing a large number of views in the Yellowstone Park, &c. Many of the slides were coloured to show the vivid hues of the rocks and geyser formations in that wonderful region, which added greatly to the interest of the collection.

Correspondence.

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

RESIDUES.

To the EDITOR.

SIR,—I read with interest some notes on residues in your issue of the 16th inst. The following figures may be of interest to you. During a certain period of last year I used in my printing works chloride of gold and nitrate of silver, from which I received as value of residues sent to refiners nearly sixty per cent. of the amount expended. For a few years past the manager of my works has saved the residue from platinum printing, though we had been assured there was little or no money in it. This was sent to be assayed, and the value of it was 26*l*. You will see that I have received back considerably more than half the money I paid. In former years I used to be able to save a larger proportion, but a few years ago I was obliged, from want of room, to construct very deep depositing tanks, and which also had the disadvantage of not being well exposed to light, a most important factor in recovering chloride of silver. You can use these notes if you like. I published an account many years ago of our system of recovering residue; if of any interest, either I or my son would write you another.—I am, yours, &c.,

Dundee, January 31, 1891. W. D. VALENTINE.

[We shall be glad to receive an account of Messrs. Valentine's method of recovering residues.—ED.]

LENSES AND CONDENSERS.

To the EDITOR.

SIR,—In purchasing a half-plate lens one naturally expects the lens to cover $6\frac{1}{2} \times 4\frac{3}{4}$, but unless a stop is inserted it is almost impossible to cover more than a 5×4. This is not as it should be: a half-plate lens should cover a half-plate fully without a stop at all. It is a great mistake, and spoils no end of beginners for good work. The old notion of stopping down for the purpose of getting pictures like cut-out cardboard is now quite upset here—the now accepted method being a lens a size larger than the plate, a fairly large aperture, and a quick exposure; the resulting picture should then show relative distances correctly, beautiful natural skies, and a pleasing gradation of light and shade not obtainable when stop after stop has to be inserted to get the ends of the plate covered. Opticians should think of this, and make their lenses to cover the size plate for which they are sold, and not have the hard black and white pictures laid at their doors because their lenses would not cover without being stopped down till nearly all light is excluded.

In lantern work the lenses and condensers, as now used, do not seem to do all that can be done. It is all right as long as you continue to show pictures with circular openings, but as soon as you come to squares the trouble begins; the corners nearly always suffering both in definition and illumination. Now, what is to hinder opticians supplying square condensers and lenses that will illuminate and focus any shaped slide within the standard size? It would be a good move for some one to try the effect. I notice that Mr. Hughes now supplies square condensers with his enlarging lanterns, so that there must be some truth in the theory.

It has always struck me as odd that round lenses should be supplied to make square pictures. Perhaps some enterprising optician will introduce square lenses that *will* cover by way of a change.—I am, yours, &c.,

Hobart, December 29, 1890. TASMANIAN.

[Any optician will make a square lens for our Tasmanian correspondent, provided he will not grudge the price.—ED.]

DR. EMERSON'S RENUNCIATION.

To the EDITOR.

SIR,—Amongst the reasons put forward by Dr. Emerson and those who have since written on the subject for his renunciation of his former teaching, one that may naturally be thought to have considerable weight seems to be scarcely, if at all, mentioned. During the past year, commencing with an article by Mr. W. K. Burton, a series of arguments have been brought forward to show that the assumed scientific bases for Dr. Emerson's conclusions on the subject of focus and definition are essentially unsound. Dr. Emerson surely does not claim to be in-

accessible to all argument, and to admit only his own inner consciousness as influencing his adoption or renunciation of particular theories.

To abandon a position as indefensible, and at the same time to revile as "a mob of small-souled pseudo-scientists" those who have pointed out the erroneous character of the supports on which that position was based, does not seem to be a very generous or candid proceeding.—I am, yours, &c., DISTINCTNESS.

GAUGING COMPRESSED HYDROGEN.

To the EDITOR.

SIR,—I am glad Mr. Horton wrote respecting weighing hydrogen. I was not correct in coupling house gas with hydrogen, for while it would be difficult without delicate balances to weigh pure hydrogen, the coal gas as now supplied in London can be weighed, for it has a specific gravity of 216·77 grains (or about half an ounce) per cubic foot.

I recently had a fifteen feet hydrogen cylinder weighed when empty, it showed sixteen and a quarter pounds, and when filled with coal gas showed seven and a half ounces more. So half an ounce per cubic foot compressed will be safe reckoning. I have not yet had time to test the weight of pure hydrogen compressed in the same way, but expect for fifteen feet it will show about three and three-quarter ounces difference between empty and full.—I am, yours, &c., G. R. BAKER.

TRADES' UNIONISM.

To the EDITOR.

SIR,—May I be allowed, through your valuable JOURNAL, to express my opinion how the apparent difficulties in Trades' Unionism in the photographic profession could easily be overcome, if the following rules were to be adopted?—

Firstly.—A judge-committee be formed, to which applicants for membership shall have to send a series of specimens of their own work (as specified by the said committee), references as to where employed since, say at least the last twelve months, to state what salary received within that period. After the committee has been satisfied the applicant shall be elected.

Secondly.—Wages be fixed as for operators not less than 2*l.* 2*s.* per week; retouchers not less than 1*l.* 16*s.* per week; printers not less than 1*l.* 10*s.* per week. Here I wish to mention that the above fixed wages shall be the minimum. It shall certainly prevent nobody in accepting higher wages if he can obtain them. This rule is accepted by all Trades' Unions. The main object can only be to secure a reasonable wage for skilled work. Those assistants who cannot command the Trades' Union standard of wages through their inferior work have to remain outside the Union. It is manifest, if this point were strictly adhered to, the employers would be pleased to engage none but Trades' Union men.

The other points as to benefits, &c., I shall not refer to at present, as these will have to be worked out by the committee elected.—I am, yours, &c., W. G.

7, *Rattray-road, Brixton, S.W., February* 2, 1891.

THE PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—Our very warmest thanks are due to the JOURNAL for its sympathetic notice of our young Union. We shall strive to always merit the support and encouragement which you have extended to us; and by a policy of the utmost justice and moderation we shall win over to us the few (*very* few) who are treating our new departure with some asperity. A report of our inaugural meeting at the Polytechnic has got about which is exaggerated and malicious, and this veiled attack on us has led a few prominent sympathisers to somewhat moderate their attachment to our cause. We ask all such and your readers generally to believe us that no mad attack upon employers or arrogant misuse of our power is contemplated by us. The leading article in your last issue will repay perusal by those who fail to see the necessity for combination among the assistants; and it will be on the lines laid down there, and in consonance with the general tone employed therein of fairness and common-sense, that our work as a Union will be undertaken.

I want to correct you on one point which tends to weaken your article on trade unionism. Unions do not prohibit, nor do they deprecate, the receipt of a higher wage than that fixed by them in each district as the minimum wage at which their members shall take employment. "Uniformity of wages" only extends in the work of unionism to the fixing of a uniform sum in each district, *below* which no member (first, second, third, or thirty-third rate) shall accept engagement.

While recognising the truth of your remarks concerning the varied degrees of competency among art workers, and the consequent inexpediency, if not injustice, of demanding uniform rates of remuneration, I think you will see that (provided we select qualified workers as members who have once been in receipt of, at least, a given wage) it will be only just to demand for them a certain sum as the *lowest* at which they shall work, and above which all special remuneration shall be secured by special ability only. Can *you* see anything "arrogant" or "despotic" or "socialistic" in this?

The wage fixed as qualifying applicants for admission into this Union (as mentioned by me in my letter of last week) must have been received by the applicant for at least eight weeks consecutively at some time within two years of the date of application, and must not be less than the following wage per week:—

Operators or retouchers (or both), West-end, London, 40*s.*; East, 30*s.*; other parts, 35*s.* Silver printers: West, 27*s.* 6*d.*; other parts, 20*s.* Carbon printers: 30*s.* Lady retouchers and other artists: West, 30*s.*; other parts, 15*s.* Reception-room duties, &c.: 15*s.* and 10*s.* respectively. Monochrome artists: 40*s.* Photo-process workers, operators, &c.: 40*s.* Retouchers, &c.: 35*s.* Piece workers must have earned the above minimum per week.

I want to say here that the above is not a schedule of prices for which we are going to strive as a Union. It is simply formulated as a gauge of worth and a limit to admission of applicants. We shall not seek to coerce employers by attempts to block their trade; we shall simply, wherever fair terms are constantly evaded, withdraw our members from such establishments and secure them work elsewhere.—I am, yours, &c.,

Maidstone. ARTHUR FIELD, *General Hon. Sec.*

"ARE PHOTOGRAPHER'S PROVIDENT?"

To the EDITOR.

SIR,—Your correspondent in last week's JOURNAL, "Photographic Artist," points out the general improvidence of his class. Although I am not prepared to go to the extreme opinion which he expresses, still, from an experience of twenty years with photographers, I am rather inclined to allow that the average of improvidence is rather high with them. I do not attribute this to any moral failing, but rather to the deficiency of accurate business knowledge or training. In this connexion it may not be amiss to notice the communication of Mr. Arthur Field in the JOURNAL of equal date. If the figures there suggested are intended as a serious plan for the establishment of his Union, which apparently will be little more than a benefit society, I do not think they are very attractive when analysed. I subjoin a table which will place the matter clearly before your readers.

	Pays per Week.	Equals per Annum.	Entrance Fee.	Highest Possible Annual Benefit.
	d.	£ *s.* *d.*	*s.* *d.*	£ *s.* *d.*
Class A	4	0 17 4	2 6	3 8 0
„ B	5	1 1 8	3 6	3 18 0
„ C	6	1 6 0	5 0	4 12 0
„ D	8	1 14 8	7 6	5 10 0
Average ...		1 4 11	4 7½	4 7 0

Now, presuming the successful establishment of the Union, and, say, a membership of 1000, we have an income, taking the average contribution of 1*l.* 4*s.* 11*d.*, amounting to 1245*l.* 16*s.* 8*d.* *We will say nothing about the* 1000 *entrance fees averaging* 4*s.* 7½*d.*, *allowing them to cover expenses.* If we then allow twenty per cent. of the members to enjoy during the year their *greatest possible benefit*, averaging 4*l.* 7*s.* each, we have an expenditure for this purpose of 870*l.*, leaving 375*l.* 16*s.* 8*d.* in the Society's hands as balance from one year's income on 1000 members only. But, practically, for twenty per cent. of the members to claim and receive the *greatest possible benefits* would be extremely improbable, as if their trade is so overloaded with labour some would seek other channels of support; therefore, probably, to reckon that as an average ten per cent. of the membership received *the greatest possible benefit* would be about a fair estimate, in which case the statement would stand as follows (from 1000 *members*):—

		£	*s.*	*d.*
Average payment, 1*l.* 4*s.* 11*d.*	=	1245	16	8
100 receive highest possible benefit (average), 4*l.* 7*s.*	=	435	0	0
Excess balance of year	=	810	16	8

which in either case shows an extent of overloading in the contributions which cannot attract the truly provident.

I know nothing of the usual contributions to benefit and trade societies, but if they resemble nearly Mr. Field's proposed subscriptions for the Photographic Assistants' Union, I can only say that I am extremely surprised the establishment of friendly societies under the Limited Liability Act on an imposing scale has failed to attract the attention of the ever-seeking company promoter. It is, of course, impossible to estimate how many of either class will support Mr. Field; but as I have averaged all the figures and assumed a reasonable success for his effects, the results would in any case be practically the same. If the proposed Union cannot offer some very serious addition to its *benefits* as an inducement to membership, it can surprise no one that the provident photographic worker should preferably subscribe to his local friendly society, of which there are many very substantially established, and find himself associated with his neighbours.—I am, yours, &c., HENRY E. DAVIS.

February 2, 1891.

NATIONAL PHOTOGRAPHIC EXHIBITION, APRIL, 1891.

To the EDITOR.

SIR,—I am requested by the Directors to inform you that the National Photographic Exhibition will be held at the Crystal Palace from April 13th to May 2nd inclusive.—I am, yours, &c., S. G. BUCHANAN WOLLASTON.

Crystal Palace Company, Crystal Palace, S.E., January 29th, 1891.

Exchange Column.

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

Marion's 7×5 rapid rectilinear in exchange for half-plate portrait lens or offers.—Address, H. PARLOW, 60, High-street, Hythe, Kent.

Wanted, Hardwich's *Photographic Chemistry*, the eighth edition, by Dawson, published in 1874; new books, apparatus, &c., offered in exchange.—Address, W. HARRISON, Board School, Icknield-street, Birmingham.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

DAGGAR.—See answer to "Juvenis" last week.

SILENDO.—Scarcely ripe yet. Wait a little longer.

F. H., JUN.—Try Aspinall's enamel or Brunswick black.

T. DUNARB.—The spots on the blotting paper are mildew.

W. M. L.—Better take dry pyro, ammonia, and a concentrated solution of bromide.

NESCIENS.—There is now a petition before the Court for winding up the Company.

S. B. J.—As you do not append your own name, we cannot place the name on the black list.

HERBERT TEAR.—The strength of the platinum toning bath for ceramics is immaterial; simply acidify with nitric acid.

VENTO.—No such book exists. All that has been published on zinc etching has appeared in back numbers of this JOURNAL.

B. W. W.—Schlippe's salt may be obtained of all dealers in photographic chemicals. It is not expensive—only a few pence per ounce.

WILLIAM SHOTTON.—1. Gotz or Watson.—2. The lenses you mention are good, but we cannot institute a comparison between them and others.

A. E. G.—There is no work published on finishing bromide enlargements. The trade enlargers will supply you with light prints if specially ordered.

L. M.—We are not acquainted with the particular lens in question. The only way to arrive at the information you require is by actual measurement.

EDWARDS inquires for a receipt for making "paper pulp" for moulding accessories. Perhaps some reader will be good enough to supply the desired information.

R. BRADEN.—No duty will be charged on your photographic apparatus on landing at New York if you explain that it is for your own use while on the visit. No permit to take photographs will be necessary.

W. DUVAL.—The distance of the light from the condenser is best determined by gently moving it backwards and forwards while watching the effect upon the screen. The *carte* lens will be far better than the symmetrical as an objective.

NEW STUDIO asks what is the best colour for the blinds for a new studio.—The answer would depend upon the aspect of the studio—whether direct sunlight has to be dealt with or not. If our correspondent will let us know the aspect of the studio we can the better reply.

BROMIDE.—The fault is that the paper has been what is termed light-struck; that is, it has at some time or other been exposed to sufficient light to fog it, possibly during the time it—the enlargement—was being made. But this is only a suggestion. One thing, however, is clear, namely, the paper has been fogged by light.

CRYSTOLEUM inquires which is the best material for rendering photographs transparent for colouring from the back. He says several different materials have from time to time been recommended, but he wishes to use the best.—On the whole paraffin wax is the best, as it is least likely to change colour with time and exposure to light.

NOVICE asks: "Are dry plate negatives as good as those that used to be taken by the wet collodion process? A friend who worked the latter says they are much inferior. Your opinion will oblige."—Dry plates will yield quite as good negatives as wet collodion. However, for some purposes, as in one or two of the photo-mechanical processes, collodion is still preferred, as it is found to answer best. But for ordinary work dry plates are in no way inferior.

TUSCAN.—1. We have had no experience with the lens referred to.—2. If the small specks are merely air-bells in the components of the lens they are of no importance.—3. With regard to the query, "Is there any substance that can be rubbed into the leather hinges of dark slides to prevent markings on plates if they are kept in them a considerable length of time?" we know of no such material that can be depended upon under the conditions laid down. The best method is to have the hinges which act injuriously replaced by those of an inert material.

C. Y. says: "A year to two ago I ordered a number of mounts, and was told they would not cause the prints to fade. Now I am having large numbers of prints, mounted upon them, brought back because they have become covered with small spots. The one who supplied them says that they were made abroad, and I must complain to the makers, as he is not responsible. What is your opinion?"—It matters not who the maker is, if the seller guaranteed the cards to have no injurious action on the pictures. It is the latter against whom proceedings must be taken.

T. H. BILLINGHURST writes as follows: "Will you be kind enough to inform me if lantern transparencies can or have been made on transparent substances other than glass, and, if so, what they are, and if patent or not? If not been made or patented up to present time, do you think there is a market for any process which would enable 100 lantern slides to be packed in an ordinary envelope, and which was not liable to damage by breaking—in fact, indestructible?"—Lantern slides have been made on almost every transparent substance, such as celluloid, gelatine, talc, &c., but we do not know of any patents in connexion with the subject. Any invention that would enable 100 slides to be carried in "an ordinary envelope," if they answered their purpose as well as glass, ought to have some commercial value.

A. BIGGS writes: "I have recently made several attempts to mount prints with gelatine, but cannot succeed. Before I can get the solution over the back of the print it sets, and then will not adhere to the cards. I thought this might be caused by the cold weather, but I have tried several times in a very warm room, though with no better result. I do not think that it can be the fault of the gelatine, as I have tried with two kinds of the best—Coignet's and Heinrich's. Can you help me?"—The fault is with the gelatine. It is of too good a quality as a gelatine, it sets too quickly. The kind best suited for mounting purposes is one of a very soluble kind, such as that sold by Nelson & Co. under the name of "No. 2 soluble." This is a pure article, but sets slowly. Common glues would be convenient to use as they set very slowly, but they must be avoided if the permanence of the picture be a consideration.

COLONEL NICHOLL (Teneriffe) inquires: "1. Has sulphocyanide of ammonium any deleterious effect on hyposulphite of soda as a fixing agent? I should think not, as it is used in the combined toning and fixing bath, and in Hardwich's *Photographic Chemistry* it states it has been recommended as a fixing agent instead of hyposulphite of soda. I have an idea that there is a mutual advantage in using sulphocyanide of ammonium in conjunction with hyposulphite of soda when fixing prints or albumenised and some other papers. I can find nothing about the properties of sulphocyanide of ammonium either in Hardwich's *Photographic Chemistry* or Roscoe's *Elementary Chemistry*.—2. What is the meaning of the expression "fort" when used in regard to a liquid? *e.g.*, does "liq. ferri-perchlor. fort" mean a saturated solution of ferri-perchloride?"—In reply:—1. Sulphocyanide of ammonium will have no deleterious effect on hyposulphite of soda though we can see no advantages in the admixture. 2. "Fort," or fortior means strong. "Liquor ferri-perchloride fort." is a pharmacopœia preparation compounded as follows:—Iron wire, 2 ounces; hydrochloric acid, 12 ounces; nitric acid, 9 drachms; distilled water, 8 ounces. This is four times the strength of the liquor ferri-perchloride.

RECEIVED.—Mawson & Swan's *Photographers' Pocket Diary* for February.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—February 12 Lantern night. Visitors invited.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 11, *The Production of Reversed Negatives;* February 18, *Blisters.*

ALUMINIUM LENS MOUNTS.—From specimens shown to us we are glad to perceive that the well-known firm of W. Wray, optician, is now substituting aluminium for brass in his lens mounts, as required. The diminution of the weight is remarkable.

CRYSTAL PALACE EXHIBITION.—The fourth National Photographic Exhibition is announced to be held from April 13 to May 2. It is open alike to professionals and amateurs, and, as formerly, medals will be awarded. For particulars, address "The Manager," Crystal Palace.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The Annual General Meeting, which will be held on Tuesday, February 10, at eight p.m., at 50, Great Russell-street, W.C., will be devoted to the consideration of the report of the Council, the Treasurer's report, the election of a new Council, and other general business.

RICHMOND PHOTOGRAPHIC SOCIETY.—A lecture on *Wild Animals in Captivity*, illustrated by the optical lantern, will be given by Major J. Fortuné Nott, President of the Society, at the Lecture Hall, Hill-street, Richmond, on Monday, February 16, 1891, at eight p.m. Admission, 1*s.* The proceeds will be given to the Richmond Hospital.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1606. Vol. XXXVIII.—FEBRUARY 13, 1891.

THE PROJECTED COPYRIGHT ACT.

Several times during the last ten or a dozen years Bills referring to copyright in works of fine art and photographs have been introduced into Parliament, and even alluded to in a Queen's Speech, but they have all been crowded out at the end of the Session by a press of more important business. This Session a Bill has been introduced, this time in the House of Lords, by Lord Monkswell; whether it will share any better fate than its predecessors of course depends upon circumstances. As, however, this Bill is first brought into the Upper House, and business is progressing in the Commons, there may be a possibility of its becoming law. Therefore, it should receive the consideration of those concerned, and that without delay.

Unlike the preceding Bills, which dealt only with the copyright in fine arts and photographs, this one embraces copyright generally, including books, musical and dramatic works, as well as paintings, sculpture, engravings, and photographs. The title of the Bill is "An Act to Amend and Consolidate the Law relating to Copyright." In its general tenor the new Bill, as concerns photographers, differs but little from the previous ones, and to which we called attention at the times they were brought forward. Indeed, it is mentioned in the memorandum to the present one that "the part of the Bill which relates to the fine arts and photography is taken, almost without alteration, from the Copyright (Works of Fine Art) Bill which was introduced into the House of Commons in the Session of 1886 by Mr. Hastings, Mr. Gregory, and Mr. Agnew." One of the alterations is, however, that the proposed duration of copyright in photographs is to be thirty years from the year of publication, instead of fifty years. Under the present Act it is for the author's life and seven years after his death. With paintings and sculpture it is to be different; with them it is to be for the author's lifetime and for thirty years after.

Here are some of the principal features of the Bill as applying to photography. The term engraving is defined so that it embraces photo-engraving and process work generally. The term "photograph" includes the negative and any positives or copies made therefrom. Where a photograph is taken from a copyright picture, to the order of the owner of the copyright, the copyright in the photograph is vested in the owner of the picture, and not in the photographer. Clauses 41 and 42 in the Bill are very important ones, hence we give them in their entirety:—

"41. (1.) Whenever after the commencement of this Act any photographic likeness of any person is taken on commission, neither the photographer, nor any other person, whether he owns the copyright therein or not, shall, without the consent in writing of the person for whom the work was executed, sell, offer for sale, or exhibit in public in any shop window or otherwise any copy of such likeness.

"(2.) If such photographer or other person shall sell, offer for sale, or exhibit any copy of such likeness in manner aforesaid, every copy of such likeness in his possession shall be forfeited and delivered up to the person for whom the work was executed.

"42. If any person, being a British subject, or domiciled as aforesaid, employs another as his assistant, servant, or workman to work for him for salary, wages, or hire, for the purpose of executing, making, or taking, or assisting in executing, making, or taking, any work of fine art, or any photograph, the copyright in such work or photograph shall belong to the employer."

Any one may copy a work of fine art in which there is no copyright and make his reproduction copyright, notwithstanding that some one else has done the same thing before. The penalty for affixing any name, monogram, or mark to a photograph or negative, so as to make it appear that it is the work of some person who did not execute it, or knowingly offering such falsely signed work for sale, is twenty pounds and double the price for which the work was sold, costs, and forfeiture. The importation of pirated works is prohibited, and may be arrested at the Custom House. Persons selling or exhibiting pirated works are compelled to give information as to whence they were obtained, under a penalty of five pounds. Pirated copies hawked about the streets may be seized by any peace officer. Proceedings for infringement may be taken in different ways—by action for damages, injunction, or by summary proceedings before a magistrate. In the last case the penalty is limited to five pounds, which goes to the aggrieved party. Under the present law the penalty is ten pounds.

The form of securing copyright is by registration, as now; but instead of this being done at Stationers' Hall, it is proposed to have a copyright registration office under the control of the Board of Trade. The above are only some of the more important parts of the Bill as it affects photographers. It is very probable, however, that it may be considerably altered before it becomes law, and photographers as a body will do well to take some concerted action in watching their interests in this matter.

The question is, Who is to take the initiative? We now have a photographic section of the London Chamber of Commerce, and a Society of Professional Photographers is announced. We have also the Photographic Society of Great Britain; but whether either body possesses the prestige necessary to represent the profession generally may be questionable.

It will be seen that Clause 41 will considerably affect the business of those who make a practice of producing enlargements on speculation. It will also prevent portraits being exhibited as specimens, or copies being sold without the sitter's

consent, and that in writing, too. There is little in this, in principle, of which a conscientious photographer ought to complain; he has been paid for his work, and therefore is not entitled to use the picture for his own purposes. In practice, however, this clause may often get the artist into difficulty. For example, it is usual when the number of a negative and the name are quoted for photographers to execute an order for duplicates without further formality; but with the new Bill this will be illegal, the order must be received from the sitters or with their consent in writing. Again, a sitter may give permission, verbally, for the portrait being exhibited, but would probably decline to do so formally in writing; and, without such consent, the photographer subjects himself to forfeiture of the negative, costs, and other troubles. Under this clause, as it stands, it is illegal for a photographer to supply a child with a copy of a portrait of a parent without the latter's written consent. Neither could he supply the portrait, say, of a suspected murderer or thief, even in furthering the ends of justice, without the supposed delinquent's consent in writing.

There are several points in the Bill as affecting photographers that require amending, and with concerted action this may be possible. There is nothing in the Bill to make it retrospective, and it is desirable that it should be, at least so far as to make the copyright in works which have been executed by paid assistants the property of the employer. No allusion is made in the Bill to the vexed question of the ownership of the negative. But by implication, in the case of a portrait, it belongs to the photographer, though the copyright is vested in the sitter. This might be made more definite. Here is another point, now that detective cameras are so general, that may become important. The sitter taken in the ordinary course of business has the copyright in the portrait, and can prevent its being exhibited or sold. How will it be with "instantaneous pictures," taken without payment, knowledge, or consent?

As there is the possibility of the question of copyright being dealt with this Session, photographers, as we have said before, ought to lose no time in taking some concerted and definite action, or they may find, when too late for remedy, that an Act has been passed that may materially affect their trade interests.

The Bill contains ninety-four clauses, and copies of it can be had from the Queen's printers at sixpence each. All photographers interested in the subject should obtain a copy.

CONSIDERATIONS IN DEVELOPMENT.

No subject connected with practical photography has for very many years past been written and talked about so much—with, on the whole, so feeble an approach towards a general, much less a particular, agreement as to what constitutes the most serviceable mode of working—as the development of the photographic image. It is just about as difficult to get together three or four photographers—particularly amateurs—who are in accord upon the merits of a given developer as it is to find at short notice as many persons who are all of one way of thinking in regard to political or religious matters. The battle of the developers appears doomed to be always with us, and the likelihood of its cessation diminishes rather than increases with the multiplication of formulæ and the actual or prospective introduction of new reducing agents.

The least of our intentions on the present occasion is to handle the matter of development either in a theoretical or practical manner. We have done this fully and frequently many times previously, and since we last wrote on the subject, or on any one department of it, no new fact or feature has been brought to light which calls for consideration at our hands now. We intend merely to make one or two general observations arising from a perusal of the paper recently read by Dr. J. K. Tulloch before the Dundee and East of Scotland Photographic Association, and printed in our issues of January 23 and 30. These observations shall have reference to development in some of its aspects residing nearer to what we will term the philosophy, in contradistinction to the technology, of the subject.

If Dr. Tulloch's paper contains less information of a practical kind than we usually find in similar disquisitions—and it is not by any means the case that such information possesses a value which is to be measured by its apparent practicability—it teems with well-considered advice and sound common-sense, which have too often been conspicuously absent from the utterances and writings of those who have attacked what our author succinctly and effectively calls "the most difficult subject in photography." We fear that there are very many amateurs "who imagine that a few experiments with half a dozen different formulæ is all that is needed to clear up the whole subject of development," and that the net outcome of such a proceeding is a total want of familiarity with the capabilities or properties of any formula, and a consequent inability to employ it to the best advantage when occasion demands.

We do not give an unqualified assent to Dr. Tulloch's proposition that the compounding of a developer is the simplest part of the whole question of development, since it has been before now abundantly proved that in the choice and proportions of the ingredients of a developer a skilful operator may provide himself with means which will give him a mastery over the character of his resultant negatives, perhaps equalling that with which his own intelligence supplies him, and answering to his will because of the control which his intimate knowledge of it gives him; but we entirely agree with him when he emphasises the importance of knowing what it is one wishes to develop, and how and by what means the object is to be attained. It is possible to "get too much" out of a plate in the way of detail, just as it is to get too little, and Dr. Tulloch wisely says that if an artist "has thought out the effect he wishes to produce he must be prepared to sacrifice detail, or pluck, or even roundness." How many amateurs, we wonder, think out, or try to think out, the kind of picture they wish or would like to produce? In reality, it is not the developer which determines the qualities of the negative, but the mind of the worker for which the solutions, be they compounded never so cunningly, will ever form but a poor substitute. Most of us are only too familiar with the class of worker whose aim it is to get as much as can be got into a plate without any regard to the artistic requirements of the picture sought for.

We note a very useful piece of advice which Dr. Tulloch gives on the point of determining when to stop development. "In the ordinary course," he remarks, "it is necessary to look through the plate," and he thinks it "almost a necessity to adopt artificial light in the dark room." He rightly mentions the difficulty of judging a plate to a nicety in the variable light that may come in from outside. "I have a small gas lamp enclosed in white glass covered with yellow paper. I have the same light every time, for I have what they call a

rat-tail flame, which I turn up till it touches a wire exactly two and a half inches above the burner. This is a very constant power of light, and adds much to the ease and certainty of judging the density." The constancy of the dark-room illuminant is perhaps very generally neglected, but the hint thus given should not be lost upon those who experience a difficulty in judging of the density of their plates.

With regard to Dr. Tulloch's favourite plan of developing a thin image by means of a weak developer of no special formula in order to get detail, and afterwards adding to the density by applying a more concentrated solution, we are afraid that the majority of amateurs will never be converted from the bad old way which he condemns, although his method has undoubtedly a very great deal to recommend it, and in the hands of a careful worker affords unlimited command over the qualities of the negative. But to the modern amateur, who lacks both the patience and enthusiasm of his predecessor of a few years ago, such a system of development bears an uncommon resemblance to a double operation, for has he not been taught that detail and density are easily obtained by the concurrent action of the developing agents? Nor are we ourselves disposed to regard such teaching as erroneous, Dr. Tulloch's implied dictum to the contrary notwithstanding, assuming of course an intelligent employment of separate solutions, and not one of the ready mixed developers now so common.

It is when Dr. Tulloch touches upon the fluctuations of taste concerning the various developing combinations that have come into vogue at different times that we are enabled to deduce one or two small lessons that should carry weight with those to whom his remarks are addressed. Our author has tried almost every combination devised, and, with two exceptions, has got good results from all; and yet he has abandoned everything but ammonia and pyro. For pure negative work, we think we can discern a marked reaction in favour of this old favourite. Very few professional photographers have been weaned from it, for, however beautiful to look at the negatives may be that have been produced by other combinations, there is not and never has been any doubt that for power of producing negatives from which the maximum of *printing* value may be obtained, pyro-ammonia has not been surpassed. We are, however, departing from our subject. Not only does Dr. Tulloch confess to have tried almost every combination devised, with the result that he is left adhering to ammonia and pyro, but he also finds, after hundreds of experiments, that none of the substitutes are better than pyro. We anticipate having many more admissions of this kind in the next few years.

Dr. Tulloch's paper has the very rare merit of not concluding with a formula, for which he is entitled to our thanks. We can honestly recommend the amateur in the throes of the great developer difficulty to read it for himself. Developing agents, developing formulæ, and the constituents of developing solutions, are far too numerous and complicated nowadays, while development itself, in the sense in which Dr. Tulloch conveys, is not studied half enough. The preliminary process of "thinking out" the quality of picture sought for is perhaps omitted in the vague belief that if the exposure has been correct the picture will develop itself. This may be true in some cases, but in most it is pure fallacy—especially in landscape work, where every essential must be studied and noted at the moment of exposure, and no two pictures can possibly reproduce the same effects of light and shade. The art of development would be the more perfectly understood and practised if it were thoroughly realised that, after all, the functions of the developing solution were in reality only of secondary importance, and that, as it has so often been said, a little brains was of the first necessity in the operation.

A CORRESPONDENT informs us that, in consequence of reading our remarks upon possible errors in the indications of minimum thermometers, he took the trouble to carefully examine the registering instrument he possessed and found that it was incorrect from a rather unusual cause—a slight air-bubble which he found in the bulb. A close examination revealed the fact that the hook which usually terminates the stem was broken off in this particular thermometer and had apparently laid bare the capillary termination of the bore, through which a small portion of air had obtained access.

REFERENCE has occasionally been made in these columns to the use of wood in the manufacture of paper, a singular instance of so-called "fading" in a carbon print being explained by the use of a paper containing wood fibre. In a recent number of the *Journal de Pharmacie et de Chimie*, M. Wurster gives the following list of reagents to enable wood paper to be distinguished from pure cellulose:—

REAGENT.	WOOD PAPER.	CELLULOSE.
Orcine.....	Dark red.....	Nothing.
Resorcine	Deep green	Violet.
Pyrogallic acid	Blue green	„
Phenol	Yellow green	„
Phloroglucine	Blue violet	Nothing.

The presence of wood in paper can be detected, and the quantity even estimated, by means of dimethyl paraphenyleudiamine.

IN *Nature* last week, over the signature of Frederick J. Smith, Trinity College, Oxford, is an account of the bursting of a pressure gauge affixed to an oxygen cylinder. The only explanation is that the inside of the curved Bourdon tube gave way, the how or the why not being indicated. There appears to be nothing in the account given that could not be explained by the ingenious theory of Mr. W. Morton Jackson which appeared in this JOURNAL a few weeks ago. There is one singular phenomenon in the Oxford accident (which also providentially resulted in no personal injury) that may be quoted to show the remarkable effect of gaseous friction:—"The particles of metal which were shot out from the apparatus were found to be nearly quite spherical in shape; fragments of glass and metal fused together were also found. The metal seems to have been heated to fusion in the same way as meteors are, by air friction."

As a further comment upon the "purity of snow," our readers may refer to a letter in the same journal in which the writer describes the result of the melting of the snow collected from a patch equal to one square link. He obtained from it a quantity of soot, such as indicated for the whole area of London 1000 tons! "Imagine," says he, "a month's allowance being drawn in a line by 1000 horses! The line would extend to about four miles in length." It is fair, however, to add that that this was London snow, and had been on the ground for a month.

WE described a little while ago some experiments upon the photographing of small marine animals in motion by a French *savant*, and we have now to chronicle photographic work in a somewhat similar direction—that is, the locomotion of flies. Mr. H. H. Dixon writes from the Physical Laboratory, Trinity College, Dublin, that he has made a series of instantaneous photographs of flies walking, and has been able to describe the exact mode in which the various feet progress. He has been able to observe a similar "tripodic walk," as he terms it (owing to three legs being moved at a time), in earwigs, water scorpions, aphides, and some beetles. Caterpillars use their feet in a different fashion. As to the *modus operandi*,

Mr. Dixon says, "In taking the photographs a small camera with magnifying lens and fast shutter were used, and the analyses of the motions arrived at by the comparison of a large number of snap pictures. The insect was in each case placed on a white ground within a shallow box covered with glass, and illuminated by oblique sunlight. In this way the disposition of the shadows became of great service in determining the positions of the legs." There is here an entirely new walk in photography opened out. Taking snapshots at the bluebottles will commend itself to many minds as an entirely novel sensation.

A PHOTO-MICROGRAPHIC laboratory has been opened at Rimini by Count R. Sernagiotto, purposely for the preparation and publication of photo-micrographic reproductions, one photo-micrograph of *Pleurosigma Angulatum* published abroad being considered of exceptional clearness and beauty. It was enlarged to five thousand diameters.

THE proposed South Kensington and Paddington sub-railway is exciting a great deal of attention in scientific circles, the authorities in connexion with the physical laboratory at the Museum declaring that fine work of even an ordinary character will become quite impossible. Professors Ayston and Rücker have recently been making experiments to ascertain the magnitude of the disturbance that would be caused if the proposed route were followed. Ordinary rough apparatus, such as is in daily use by students in an ordinary physical laboratory, was seriously affected by mechanical vibrations, and the Professors have been led to the conclusion, they say, in their letter to the *Times*, "that the earth-waves produced by the passage of large weights at high speeds affect measuring apparatus far more seriously than the noisy street traffic that rattles the windows of a house." There is little doubt that similar remarks will apply to photo-micrographic work.

THE OPTICAL LANTERN: ITS HISTORY AND DEVELOPMENT.

[A Communication to the Glasgow Photographic Association.]

IN compressing into a short paper a few facts regarding the optical lantern, I would wish at the outset to state that I do not presume to be able to deal at all exhaustively with my subject in the few minutes at my disposal, which might probably be extended to as many hours. I have simply collated a few facts, historical and otherwise, which, perhaps, to some of you may be sufficiently novel, and which I hope may interest.

I think we may take it that the lantern has long since ceased to be regarded as a plaything, and it almost seems unnecessary to state to a photographic gathering, such as we have here to-night, that the main factor in bringing about this result has been photography.

As a Society we did well when we resolved to have a lantern of our own, ready to be used at a moment's notice, either to show a pleasing picture or to assist in illustrating papers which members may from time to time bring before us. As a means of education the lantern is coming to the front, lecturers and teachers are now making use of the lantern, dispensing with cumbrous diagrams, and by means of a well-defined picture riveting the attention of the audience in a manner that was quite unattainable by previous methods.

The name which has been universally associated with the lantern's early beginnings is that of the Jesuit priest, Athanasius Kircher, a man of no mean scientific attainments, who flourished in the seventeenth century. The work which contains the earliest known representation of the lantern is Kircher's *Ars Magna lucis et Umbræ* ("The Great Art of Light and Shade"), published in Rome in 1646. An edition was also published in Amsterdam, but considerably later, in 1671.

Kircher was born in the sixteenth century, in 1598. He was a native of Hungary, and taught in Wurtzbourg. In addition to the work already mentioned, he was the author of at least a dozen treatises, embracing all sorts of subjects—optics, magnetic phenomena, Egyptian obelisks, Tower of Babel, &c. I have never yet been able to procure a copy of his *Ars Magna lucis et Umbræ*, but I have brought as a curiosity a folio volume published in Amsterdam in 1669 of Kircher's entitled *Ars Magna Sciendi* ("The Great Art of Knowledge or Learning"). There are some quaint engravings throughout the book, and although somewhat worm-eaten, the volume is not without interest. Kircher founded in Rome a museum of apparatus and antiquities.

To return to the more immediate subject we are considering. There are figured in the work ("The Great Art of Light and Shade") two forms of the early lantern, but it has to be noted that these pictures do not occur in the early edition of 1646, but only in the latter one of 1671. We will have one of these forms projected on the screen. It represents a square box of wood, with a sort of shaft in upper portion to carry off the smoke of the lamp; the said lamp carries a reflector of a kind. Opposite the light is the projecting lens, and outside is shown the painted glass slide. To judge from the picture which is to be found on the wall of the apartment, the subjects chosen were certainly not the loveliest nor the most agreeable. The gentleman with outstretched arms is supposed to be an unfortunate individual surrounded with eternal flames, so that you see the early lantern was an instrument of education of a kind.

The other picture now shown shows a slightly different arrangement, inasmuch as the lantern itself is concealed, as it were, in a separate compartment. This was, of course, to heighten the effect. The oil lamp hangs suspended from the roof of the lantern by means of a chain, and the picture shown on the wall represents Father Time as a skeleton with scythe and hour-glass.

In a quaint work, *Recreations Mathematical and Physical*, published in London in 1708, we find an engraving of a lantern very much the same as the foregoing. This work was a translation of a French one by Professor Ozanam, a professor of mathematics in Paris. I may be allowed to quote what the author there says regarding the lantern, and we will show at the same time the picture of the lantern in the book.

"This is called magical with respect to the formidable apparitions that by vertue of light it shows upon the white wall of a dark room. The Body of it is generally of white iron and of the figure of a square tower, within which, towards the back part, is a concave looking-glass of metal, which may either be spherical or parabolical, and which, by a groove made in the bottom of the Lanthern, may be either advanced nearer, or put further back, from the Lamp, in which is oil of olives or spirit of wine, and of which the match ought to be a little thick, that when 'tis lighted it may cast a good light, that may easily reflect from the glass to the forepart of the Lanthern, where there's an aperture with a prospective in it composed of two glasses that make the rays converge and magnifie the objects.

"When you mean to make use of this machine, light the lamp, the light of which will be much augmented by the Looking-glass at a reasonable distance; between the forepart of the Lanthern and the prospective glass you have a trough made on purpose, in which you're to run a long thin frame with several little different figures painted with transparent colours upon glass or talc; then all these little figures passing successively before the prospective thro' which passes the light of the lamp will be painted and represented with the same colours upon the white wall of a dark room in gigantick monstrous Figure, which the fearful ignorant people take to be the effect of magick."

The concluding sentence explains how the term magical or magic came to be applied. Ozanam's book is replete with curious formulæ and problems, and the copy which I possess can be examined afterwards by those interested.

Connected with these early facts, I came across quite recently a reference to the original prototype of our lantern which I do not think has been elsewhere recorded. A French traveller of the seventeenth century, De Moncorrys, describes, in a volume devoted to what he had seen in England, a dark lantern, which, having a demi-globe (that is, I presume, a bull's-eye), could project objects, or representations of objects, painted on glass and inserted between the light and the lens. This he saw in the establishment of a Mr. Rives, a microscope maker of Long Acre. This was in the spring of the year 1663, eight years previous to the edition of Kircher's work already referred to which had the illustrations. It would be instructive to compare Kircher's two editions to see whether the lantern is actually described in the first edition, viz., that of 1646, seeing no illustrations of it have been furnished. I may mention that in Professor Ozanam's work, from which I have already quoted, Friar Bacon is credited with being the originator of the lantern.

De Moncorrys' volume is lying on the table, and can be inspected afterwards. The spelling of Longueker rather puzzled me at first. Before dismissing De Moncorrys and his travels, it may be interesting to mention the fact that in the accounts he gives us of his journeyings in Italy, and he appears to have visited it on three separate occasions he was several times in the company of Father Kircher. De Moncorrys may be described as a scientific Pepys.

From the end of the seventeenth to the beginning of the nineteenth century the magic lantern seems to have had an existence which can best be described as dormant. On the authority of Sir David Brewster, in his *Letters on Natural Magic*, we find that an attempt was made by one Philipstal in 1802 to awaken interest in the instru-

ent by the exhibition of effects which were known under the name f phantasmagoria. In these, by means of a transparent screen interosed between the spectators and the lantern, and the latter being ade to approach to or recede from the screen, the objects represented, enerally of the most gruesome nature, were made to grow larger and rger, or, on the other hand, to diminish gradually. The figures ainted on the glass had necessarily all the surrounding parts rendered paque, so as to heighten the illusion. It is instructive to read what rewster wrote in 1832: "Superior as the representations of the hantasmagoria are to those of the magic lantern, they are still liable o the defect which we have mentioned, viz., the necessary imperfecion of the minute transparent figures when magnified. Even Michael ngelo would have failed in executing a figure an inch long with ransparent varnishes when all its imperfections were to be magified."

Now, what the hand of man could not do, photography has been ble to accomplish. In the photographic transparency we have not nly the perfect picture which can bear amplification to almost any xtent but complete fidelity to the original, be it a scene in nature or he reproduction of a work of art.

The imperfect oil lamp of the lantern's early days has been replaced y improved methods of illumination. We may for a moment just efer to these, and we will consider first the limelight. When a nixture of oxygen and hydrogen gases are burned together from a jet a temperature is produced so intense that thick platinum wire is eadily melted, and iron and steel burn with vivid scintillations. The oxyhydrogen flame is but feebly luminous in itself, but when it is directed on to a ball of lime which does not itself fuse, a light of the greatest intensity is obtained. Formerly it was known as the Drummond light in consequence of a Lieut. Drummond proposing to utilise it in connexion with the trigonometrical survey of Great Britain. As an instance of what the light could do, it is recorded hat on the 31st December, 1845, it was seen across the Irish Channel rom the top of Slicoe Donard, in Ireland, by an observer stationed on he top of Mount Snowdon, a stretch of 108 miles. This was in daylight. In actual practice, as you are aware, the hydrogen gas is now eplaced by coal gas, that is, of course, in towns where gas is universally used. Gas, being a hydrocarbon, is, however, not pure ydrogen, but a combination of H. and C. The so-called hydrogen upplied in tubes is for the most part a volatile hydrocarbon made rom oil by what is known as Pintzch's process. The electric light as on several occasions been utilised for lantern work, but as it is not o readily available, we need do no more than refer to it.

In the Sciopticon, an American form of the lantern, the vegetable ils formerly made use of have been replaced by paraffin oil. On the uthority of THE BRITISH JOURNAL OF PHOTOGRAPHY, I find that his modification of the lantern was first introduced into our country y Mr. W. B. Woodbury in 1873, and the name associated therewith n the country of its birth is that of Marcy. It was originally a amp of two wicks, but it is now universally made with three. The orm of the Sciopticon is well known to all, and the picture on the creen presents it to you.

In the optical arrangements connected with the lantern of the resent day there are two essential components, viz., the condenser r condensers, and the objective. Taking the first-mentioned, its bject is clearly to cause the light of the flame to pass through every art of the transparency. The diagram thrown on the screen shows ery clearly what happens when a light from any source falls upon a lass picture where no lens is interposed. It will be seen that only he rays passing through the centre of the transparency can ultimately each the screen. Let, however, a lens be interposed, as in the diagram ow shown, and you will see how the rays are gathered together, and he picture in consequence duly illuminated. In actual practice the ondenser is not of the simple form shown in these diagrams. We ill pass through the lantern one or two of the leading forms adopted. erhaps the condenser most in vogue is that where two plano-convex enses are mounted close together where the light is received upon the at surface of the condenser nearest the light source. The light is rojected to where the object glass must be placed. What is known s the Herschel condenser, as shown in diagram, consists of either a lano-convex, or meniscus and a double convex. The plano-convex s made of flint, and the other of crown glass. Dallmeyer's form onsists of a plain convex in front, and is made of flint, while the econd lens has its two sides curved unequally in order to bring the ays of light to a point in front, which it is impossible to do by the ther form. This form of lens is what is known as crossed, and is ade in the present combination of crown glass.

In order still further to increase the illuminating power, triple ondensers have been devised where a smaller lens has been interposed etween the radiant and the condenser. Mr. J. Traill Taylor is credited with the suggestion. The diagram shown will show how the increased illumination is brought about.

It has to be noted that defects in the condenser are of much more account than similar defects in the objective, hence every care should be taken to avoid scratches, for these become magnified on the screen, and a perfect disc will never be obtained.

As we have a large collection of slides to put through our lantern to-night, in addition to those sent down by Mr. Pringle illustrative of his paper, I think it will be well for me to break off at this point, leaving the consideration of the objective of the lantern for another occasion, as also several other matters which would require a very considerable time indeed in order to go into them properly. With your permission, therefore, I will simply stop short in my remarks, and in doing so, I will come under the obligation to resume the subject of the optical lantern, it being of course understood that you should wish it, at another meeting. I would like myself personally to bring out in a manner, which I have been perfectly unable to do in the short time at my disposal, how very completely the optical lantern can be made to illustrate facts bearing on the laws which govern and regulate that marvellous manifestation of energy which we recognise under the name of light. WM. LANG, JUN., F.C.S.

AN UNSUSPECTED CAUSE OF DIFFERENCE IN NEGATIVES.

IT is not well to be too dogmatic, or too sure of having suggested a new idea, in matters photographic, as there is much probability that somebody else has worked on the same lines, even if their experience and knowledge has penetrated no further than the four walls of the room in which the processes have been conducted or their discoveries made. It is a very usual thing for a result of some particular kind to be thought quite ordinary, when it is, in reality, limited to a particular place or a particular worker, who has always found it so, and troubles no further about it. The subject of dark-room illumination has been pretty well threshed out, so far as the best light for the purpose is concerned; and until we get that ideal light that will flood the room from floor to ceiling, and corner to corner, and have no chemical effect, we must perforce be content with what we have, and utilise not only the good qualities, but, if possible, the shortcomings of the illumination. It is accepted on all hands that the mere inspection of a non-actinic medium will not afford any correct knowledge of its working qualities, unless the natural eyesight is supplemented by the spectroscope. The rough-and-ready way of "trying a plate" to test the amount of actinism passing through the screen is perhaps the most generally applied test, simply because the most easily available and fairly correct.

There is, however, something more than the mere matter of safety connected with dark-room lighting. Some time ago the faded material that had for some time done duty as a screen to a window that admitted daylight was renewed. Simultaneously with this, negatives developed by the new medium were found to be somewhat under-exposed, but no particular deductions were drawn at the time, as different makes of plates were being used, and a little longer exposure was given, and the slight under-exposure attributed to the light in the studio or variation in the sensitiveness of the plates. Now, the fact of the matter was, the old screen being unsafe, sufficient actinic light passed through to act as a supplementary exposure, the new material blocking it out. If the light of the workroom is a ruby light, the addition of yellow, orange, or green to it merely reduces the apparent luminosity; it still remains to ordinary eyesight ruby, duller or brighter, as the case may be, but very different indeed to its effect on the sensitive film.

It will be found that two plates of the same batch—one developed by the light of canary medium before a gas flame, and one by daylight transmitted through ruby glass—will, although they may be judged alike in the laboratory, be different when finished and examined critically by ordinary daylight,* even if developed one after the other in the same dark room. When immediate means of comparison are not available, as when working in different dark rooms and in different localities, this difference of light plays a very important part in the resulting work—very much more than could be anticipated—and necessitates the development of quite a different class of negative when judged by the dark-room light in which it is prepared.

Now, given a different light and also a different make of plate, we

* It must be understood in this case that the development is to be judged *entirely* by the appearance of the image, and not by giving it a certain time in the developer, a plan sometimes found expedient.

can easily understand the complications that arise and disappointments that ensue until the worker gets used to the new conditions, and which is not quite such an off-hand job as it is frequently considered to be. An uniform system of dark-room lighting would be an undoubted benefit to the profession, as much as uniform stops and uniform screws, tending to reduce the amount of bad work that, under the present arbitrary methods, is certain to happen.

EDWARD DUNMORE.

IODINE AS A DETECTIVE.

Translated from the "Revue Scientifique" of January 17, 1891.

M. G. BRUYLANTS recently communicated to the Académie de Médicine de Belgique the results of a series of interesting researches made on the means of recognising certain accidental or fraudulent alterations of paper and writings. Outside of the importance presented by these researches for legal chemistry, they show some characteristic and curious properties of certain papers' qualities, on which attention was not directed until to-day.

M. Bruylants had observed for a long time that dry paper exposed to the vapours of iodine takes a different tint to any other sample of this same paper dried after having been moistened. Having made preliminary experiments in this direction, the author demonstrated the following facts:—

When paper, sized and calendered, is partially moistened, then, after drying, subjected to the action of iodine vapours, the parts which have been wet assume a violet tint, whilst those which have escaped the water grow yellow or brown. The intensity of these colourations naturally varies with the time of exposure to the iodine. This phenomenon is again very clearly produced when drops of water are let fall on paper, and that, after having allowed the water to evaporate on the spot so as not to change the surface of the paper, this last is heated at 100° to thoroughly dry. If the paper thus prepared is saturated with water, the parts which were first wet become violet blue of great intensity, whilst the dry parts become blue.

When a piece of paper is completely wet, on to which some drops of water have been previously let fall and then evaporated, if it is then dried and next subjected to the action of iodine, one can still manage to distinguish, either on the dry sample or by wetting it again, the parts on to which the first drops fell.

In this last case, that is to say in wetting, as long as the paper remains damp the place of the first drops is hardly distinguishable, but when the paper is again dried their geographic outlines, very much faded, are clearly discernible on the darker surface, thus limiting in a marked manner the position of the first drops.

One can by means of this reaction produce a sympathetic writing: it suffices to trace characters with water on paper sized and rolled. These last will appear with perfect distinctness when the dried paper is exposed to the action of iodine vapour. The violet-brown shade on a yellowish ground will turn pale blue after damping; these characteristics disappear at once under the action of sulphurous acid. They again reappear after a first decolouration provided that the paper has not been wet, and that this decolouration has been made with gaseous sulphurous acid. One could then by means of this process trace characters which would become legible and disappear at pleasure to reappear again, or again which would serve a single time and disappear altogether.

Generally they examine, to see whether the paper has been rubbed, by transparency or transmitted light. If the rubbing has been strong, so as to take away part of the material, the paper presents, in this point, greater translucence; every one has verified this fact. When the rubbing has been carefully performed, it is sometimes also discovered, by examining it by transmitted light, the rubbed part is duller than the rest, which results from this that the work has produced a partial coating of the fibres of the paper. If instead of employing gum, bread crumb is used, if the rubbing is performed in the same direction, the result of this action may escape notice; most frequently it will be impossible to verify it when on paper thus treated characters are traced with ink or pencil.

Iodine vapour brings out the details of these manipulations in a marked manner; it limits the position with absolute distinctness. The parts rubbed turn brownish yellow or violet brown. When wetted after iodoration, a partially rubbed paper turns blue, the intensity of which varies with the time of exposition to the iodine, and when the paper is dry one sees that the parts rubbed are more or less dark than the others. When the paper has been strongly rubbed so as to produce the carrying off of a notable part of the material, the traces of rubbing appear after exposure to the iodine, damping and drying with less intensity of colouration, because in these conditions the mechanical action of the rubbing of the paper, by taking away a portion, has also caused a part of the substance (starch size) to disappear, which by combination with the iodine produces the blue tint, so that the greater or less intensity of the rubbing gives, under the action of iodine, quite opposite effects.

When a piece of paper partially rubbed is damped in the conditions in which this operation is performed, to copy with the press characters there found, if then it is allowed to dry thoroughly and subjected to the action of iodine vapours, the phenomenon is again produced, but the shades are less marked. If the paper thus treated is damped, the parts rubbed appear, after perfect drying, paler than the rest of the paper. It is then pretty much the same for rubbing and wetness. Iodine also permits, in certain cases, the detection of the nature of the substance employed for the abrasion—bread crumb or gum. The traces of rubbing with gum appear yellow or brownish yellow after iodoration, and more deeply coloured streaks are distinguished for rubbing; with bread crumb the paper sometimes takes a violet shade, and always more uniform. These phenomena are caused by the facing of the fibres of the paper produced by the rubbing; for an equal extent there is in reality, thanks to this facing, a greater absorbing surface; a greater proportion of iodine can then be fixed on the parts rubbed than on those which have not been.

When characters are traced with a soft point—for example, a glass rod with a perfectly rounded extremity—and the paper exposed to the action of iodine vapour, these characters soon appear brown on a yellowish ground, which damping turns blue. This phenomenon is again produced when the paper on which the tracing has been made is calendered. If one is careful not to wet the paper these characters can be made to disappear, and appear again by the successive action of gaseous sulphurous acid and iodine vapours. This reaction excels with writing with distilled water as ink, or rather as sympathetic writing. Tracing with the glass point is little apparent, especially when made between lines of ink writing. The reaction, moreover, is so sensible that one can still produce it by tracing the characters on a piece of paper under which a second has been placed; they then appear very clearly on the latter when physical examination would in no wise enable the establishment of their existence; it suffices for that to expose somewhat lengthily to the iodine vapour. To obtain greater intensity one can, by tracing the characters, place the two fragments of paper superposed on a hard substance—slab of marble, glass, or porcelain. The explanation of this phenomenon is to be sought for in the fact that under the pressure of the soft point a settling of the substance forming the sizing has taken place, so that in the presence of a greater quantity of this substance the iodine can produce a deeper colouration.

If the side of the paper opposite to the one on which the characters are traced is exposed to the iodine, these characters appear but topsy-turvy. This last verification has suggested the idea to M. Bruylants of endeavouring to reproduce with iodine characters traced with the pencil which have been rubbed out. In addition to the plumbago left by the pencil stroke, the latter has produced a settling analogous with that produced by a soft point.

When pencil characters are effaced with care, so as not to damage the substance of the paper, and the rubbed part exposed to the iodine vapour, these characters sometimes disappear. If the abrasion is made with greater force, so as to take away part of the substance of the paper itself, it is impossible to restore to these characters their primitive form so as to make them legible. But even in this last case, if one exposes to the iodine vapour the side of the paper opposite to that on which the characters have been traced, and on which the abrasion has been made, one sees the characters reversed which were taken away, and that in a sufficiently distinct way to read them easily, especially when the writing is turned by placing the piece of paper before a mirror. Sometimes even when the writing by a pencil is sufficiently marked, these marks are successfully reproduced by the copying press. For this the action of the iodine is protracted somewhat, a calendered and sized piece of paper is damped in the ordinary conditions for press copying.

The clearness of these reactions naturally depends on the species of paper employed; slightly sized and slightly calendered paper does not present them; in addition besides, by subjecting the imprinted paper to such manipulations which it seems superfluous to give here, one may prevent the production of the phenomena described. One should ask oneself also, For how long does the paper preserve the property of producing these reactions? According to M. Bruylants, one can still clearly establish that paper has been irregularly damped or rubbed three months previously, and one can at the end of the same time make characters legible traced with a soft point. These reactions are better produced when the imprinted paper is placed for three to six hours over a basin containing water. Nevertheless, although very characteristic, these re

ctions are much less intense than when the manipulations are recent, erhaps even they are no longer produced after a time more or less long ccording to the greater or less strength of the impression.

However it may be, for the expert who has to study forgery and fraud n writing or paper, meeting with very great difficulties most frequently, t is useful to draw attention to the reactions observed and described by M. Bruylants.

—*Revue Scientifique.*

PHOTOGRAPHY IN THE COLOURS OF NATURE.*

According to Captain Abney, the red end of the spectrum produces red by promoting oxidation; the blue end, blue, by its reducing action.† Professor Mendola‡ says: "It may at first sight appear improbable that the coincidence between the colours of the spectrum and the colours of the impressed film is a mere accident; but although this is difficult to believe, I venture to think that it is an accidental coincidence and nothing more. . . In the best specimens of these photo-chromatic spectra that I have seen, the colours were certainly nothing more than approximations to the pure spectrum colours; and even in these spectra, some of the coloured effect was due to the unaltered ground-colour of the film in regions where some particular colour had produced no action at all."

The progress by which such imperfect results have been obtained is too slow to be applied successfully to camera photography, and the results are not permanent.

In view of all these facts, it would appear that there is no scientific basis for a belief that any material improvement can ever be made in this process, and that all so-called progress along this line is a delusion. It is true that some distinguished photographic writers continue to regard every new modification of this old process, and every new result of experiment with it, as another step towards the photographic reproduction of the natural colours; but I have no doubt that if the same writers had lived 200 years ago, they would have regarded the production of new yellow-coloured metal alloys as steps towards the transmutation of the baser metals into gold.

In my opinion, the first step towards the solution of this problem was taken by Henry Collen, Queen Victoria's painting master, who, in 1865, invented a plan of composite heliochromy. His plan was based upon a false conception of the nature of colour, and means for carrying it out were then unknown; but it was a bright idea, and contained the germ of a successful process. Collen's original communication of his idea appeared in The British Journal of Photography, October 27, 1865, and reads as follows:—

"It occurred to me this morning that if substances were discovered sensitive only to the primary colours—that is, one substance to each colour—it would be possible to obtain photographs with the tints as in nature by some such means as the following:—

"Obtain a negative sensitive to the blue rays only; obtain a second negative sensitive to the red rays only, and a third sensitive to the yellow rays only.

"There will thus have been three plates obtained for printing in colours, and each plate having extracted all its own peculiar colour from every part of the subject in which it has been combined with the other two colours, and being in a certain degree analogous to the tones used in chromo-lithography. Now, it is evident that if a surface be prepared for a positive picture, sensitive to yellow rays only, and that the two negatives, sensitive only to blue and red, be superimposed either on the other, and be laid on this surface, the action of light will be to give all the yellow existing in the subject, and if this process be repeated on other surfaces sensitive only to red or blue, respectively, there will have been produced three pictures of a coloured object, each of which contains a primitive colour reflected from that object.

"Now, supposing the first great object achieved, viz., the discovery of substances or preparations, each having sensitiveness to each of the primary colours only, it will not be difficult to imagine that the negatives being received on the surface of a material quite transparent and extremely thin, and that being so obtained are used as above—*i.e.*, each pair of superimposed negatives to obtain the colour of the third—that three positives will be obtained, each representing a considerable portion of the form of the object, but only one primary of the decomposed colour of it. Now, if these three positives be received on the same kind of material as that used for the negatives, and be then laid the one on the other, with true coincidence as to the form, and all laid upon a white surface, it will not be difficult to imagine that the effect would be not only the representation of the form of the object, but that of its colour also in all its compounds.

* * * * * * *

"Although the idea I have endeavoured to express in words may be utterly worthless, I am unwilling to let it slip away without notice, as it may on the other hand contain a germ which may grow and bear fruit in due season."

The language of some parts of this communication is ambiguous; but, taken altogether, with due allowance for the writer's unfamiliarity with photographic technology, it clearly amounts to a suggestion to make three photographic negatives of an object—one by the action of red light, one by yellow, one by blue; to print from each pair of these negatives (superposed as one) a transparent positive having the colour represented by the third negative, and to superpose on a white surface the three prints thus obtained.

It was not possible to carry out Collen's suggestion at that time, because there was no known process by which plates could be prepared which were sensitive to single colours only, and no photographic plates were sensitive enough to red and yellow to admit of the production of such negatives by exposure through selective colour screens. Had it been possible to carry it out, the results must have been very imperfect, not only because the entire procedure is based upon a false and misleading theory of colour, but also because superposing two negatives to act as one would double the intensity of such parts as represented white, grey, or pale-coloured objects, with the result that if the colour prints were made to show all the details of the negatives, the finished heliochromes would show all bright colours as if mixed with equal parts of black pigment.

On November 23, 1868, Ducos Duhauron, of Paris, applied for a patent* for a process which differed from Collen's only in the manner of carrying out the same idea. Like Collen, he assumed that the spectrum is made up of three primary colour rays and mixtures thereof. He said: "My procedure rests on the principle that the simple colours are limited to three—the red, the yellow, and the blue—the combination of which in divers proportions produces the infinite variety of shades in nature." Like Collen, he expected to solve the problem by superposing red, yellow, and blue prints taken from negatives made by yellow and blue, red and blue, and yellow and red light. But, instead of using plates sensitive to single colours only, he proposed to use plates sensitive to all colours, and to prevent the action of colour rays not wanted by filtering them out with colour screens placed in front of the photographic objective or sensitive plate; and, instead of superposing two negatives to act as one, from which to make the colour prints, he proposed to make two colours (two-thirds of the spectrum rays) act to produce each negative, which amounts to the same thing, and would not obviate the defect I have mentioned as resulting from the doubling of intensity on uncoloured objects. He proposed to make one negative through on "orange" screen, calculated to absorb the blue light and transmit the red and yellow; one through a "violet" screen, calculated to absorb the yellow light and transmit the blue and red; one through a "green" screen, calculated to absorb the red light and transmit the yellow and blue.

It was no more possible to carry out this idea in Duhauron's way in 1868 than to carry it out in Collen's way in 1865. It is true, Duhauron tried to carry it out, and showed specimens of work, but the red and yellow rays did not act on his sensitive plates,† and he admitted, in a communication to the French Photographic Society,‡ that "the production of good results will . . . . involve the manufacture of compounds which have not yet been created."

Soon after Duhauron showed his first specimens, Charles Cros, of Paris, published another modification of Collen's plan.§ Like Collen, Cros proposed to make one negative by the action of red light, one by yellow, and one by blue; but by exposing the sensitive plates through red, yellow, and blue screens instead of employing plates sensitive to single colours only. Instead of superposing each pair of these negatives to make each colour print, he proposed to make a green print from the negative made by red light, a violet print from the negative made by yellow light, and an orange print from the negative made by blue light. He also suggested that ordinary positive prints made from these negatives might be illuminated each by the kind of light which it represented, and the three combined by the aid of suitable optical devices so as to form a single picture, showing all the colours. Cros's plan, although it could not succeed, because based upon the same false and misleading theory as that accepted by Collen and Duhauron, nevertheless possessed one important advantage over the preceding methods: it was free from the defect of doubling intensity on those parts of the negatives representing pale or uncoloured objects. But this advantage would be lost again in the production of green, violet, and orange-coloured prints, which will combine to reproduce yellows and blues only with a degree of degradation comparable to that produced by Duhauron's method.

* Continued from page 57.

† *Anthony's Bulletin*, 1890, p. 307. ‡ *Chemistry of Photography*, p. 324.

* Class XVII., Sec. 3, Serial No. 83 061.

† Yellow pigments were photographed by the green rays which they reflected.

‡ *Photographic News*, 1869, p. 319.

§ Described in *Photographic News*, October 8, 1869, p. 483.

On December 3, 1869, M. Poirée, of Paris, in a communication to the Photographic Society of France,* expressed doubts concerning the correctness of Duhauron's and Cros's theories, and suggested that better results might be had by making a greater number of negatives—a separate negative for each spectrum region. He said: "The process which seems likely to succeed best is that in which the colours are analysed by isolating successively each ray, or at least the rays of the same shade. . . . This analysis is difficult to make with coloured glasses; it might be done, as by Newton, by monochromatic lighting and successive exposures to simple rays of the same shade. . . . The synthesis is made by means of black positive images and rays of the same nature as those which produced the corresponding negatives. . . . It will then only be necessary to place one above another the coloured images so obtained, so as to form one virtually and really. It will be identical with the model, because it will be formed by the same rays, in the same relation of intensity." This also could not then be carried out because no photographic sensitive plates were sufficiently sensitive to yellow, orange, and red spectrum rays.

In 1873 Dr. H. W. Vogel discovered that bromide of silver can be made sensitive to the less refrangible spectrum rays by treatment with certain dyes, and the subsequent discovery of other and better colour sensitisers supplied the means for carrying out either Collen's or Poirée's idea.

Duhauron, one of the first to avail himself of these discoveries, made some practical progress, and, in 1876, abandoned Brewster's colour theory and patented a modified process,† based upon the observation that, while there appeared to be *seven* "principal" spectrum colours, three colouring substances would "serve to express them." The colouring substances he named for this purpose are blue, carmine, and yellow, and he decided that, in order to make such a process reproduce the colours of nature, the negatives should be made by the action of orange, green, and violet spectrum rays, which are complementary to the colouring substances. Some persons have thought that he had the idea of making negatives to represent primary colour sensations; but this supposition is negatived, not only by the absence of any declaration to that effect, but also by the fact that orange does not represent a primary colour sensation, either in fact or according to any theory recorded in the text-books, and the violet rays are not the ones which most powerfully excite the blue (violet) sensation. The plan was also utterly indefinite as regards the relative effect of intermediate spectrum rays, and Duhauron himself, owing to the fact that he never tried the method upon the spectrum, had no accurate knowledge of its capabilities. In his latest and "perfected" process (1878),‡ he employed no plate sensitive to either red or orange light; one negative was made chiefly by yellow light, another by green, and the third chiefly by violet and invisible ultra-violet rays.

Albert, of Munich, also took advantage of the discovery of colour sensitisers to try to carry out Collen's principle according to Duhauron's original plan. He was the first to make the colour prints by the collotype process, which led to the use of the term "chromo-collotype."

F. E. Ives.

(To be continued.)

TRANSPARENT FILMS AND ROLLER SLIDES PAST AND PRESENT.§

In his early attempts he tried a basis of paper, waxed, albumenised, and varnished with various gums; then mica films, sheets of gelatine, combinations, pure rubber solution, albumen and water, dissolved gelatine, various kinds of collodion laid layer upon layer, &c., the details of which will be found in Vols. I. and II. of the *Illustrated Photographer*, 1868–9.

Dawson's perfected process being simple as to manipulation and unhampered by any existing patent (as far as can be traced at the Patent Office) is well suited for amateurs or others who care to make their own transparent, flexible, negative films. It is probable that the tough transparent film uncoated with photographic emulsion might be found useful for other purposes, and so become a marketable article. As Dawson "*discovered*" his process by publication, and also taught his process publicly to his students at King's College, he cannot, unfortunately, derive any benefit from its future sale unless he can discover some important modification of it for special purposes. What I will call the "*supporting film*" was thus prepared:—A stout sheet of polished plate glass, about 20 × 15 inches, was converted into a very shallow dish by cementing narrow strips of Chance's No. 2 plate round the edges. This dish, after careful cleaning and polishing before each film was made, was placed on a large frame with levelling screws at each corner and very carefully levelled. To ensure absence of moisture the under side of the dish was slightly warmed. Into this dish was poured, till level with the thin glass edging, collodion made with long-fibered pyroxyline, prepared in acids at a low temperature. Thus:—

Pyroxyline	20 grains.
Highly rectified methylated ether	1 ounce.
,, ,, acholol	1 ,,

To every four ounces of this collodion one drachm of castor oil was added. After setting, the resultant thick, tough film was left to dry slowly in a warm room. When dry, a knife was passed round the edges; the glass dish, placed in an earthenware dish a size larger, was then covered with cold water, and in a short time the film floated off, or was eased off the glass by lifting, was then hung up to drain, and finally dried between sheets of white blotting-paper. When dry, patches of opalescence usually presented themselves; such were readily removed by placing the film between dry sheets of blotting-paper and rubbing over the entire surface with a hot laundress' iron. To some samples of his collodion he found it advantageous to add glycerine in the proportion of four to twelve minims to one ounce of castorised collodion to remove the evil of opalescence and greasiness. A perfect supporting film should be transparent, tough, and flexible, so that it can be folded backwards and forwards without leaving a trace of creasing when the fold is pulled straight. "Better still was a mixture of glycerine and castor, three minims each to the fluid ounce of collodion, than either singly" (see *Illustrated Photographer*, Vol. II., p. 153, April 2, 1869).

Having thus made the "supporting film," the next stage was to protect one side from the penetrating action of the emulsion by brushing it over with a mixture of equal parts of albumen and water, the film being laid upon a flat sheet of glass during the operation. After drying, this compound film was coated with collodio-bromide emulsion by the ordinary method of manipulation. After washing in water for a short time it was transferred to a dish of tannin solution and hung up to dry in a dark room. When dry, it was cut up into the required sizes and stored between sheets of blotting-paper in light-tight folios. The best methods for exposing in the camera was to place a film on each side of a pad of red blotting-paper, enclose the same between two sheets of Chance's No. 1 thin patent plate sheets of glass, and insert the same in a double back, such as was used for waxed paper negatives, or join the paper together into rolls suitable for Melhuish's (or any other form of) "roller-back." The negatives taken were developed with alkaline pyro in a flat dish, fixed with hypo, and washed in the ordinary manner, and then preserved in books made of thick blotting-paper. The addition of a little gum to the tannin was found to modify the colour of negatives favourably, and conduced to clearness of development.

But the *roller slide* also has its *pioneer* in the person of A. J. Melhuish, Secretary of the Amateur Photographic Association, who, as far back as April 21st, 1856, sent the annexed description to the Editor of the *Journal of the Photographic Society*:—

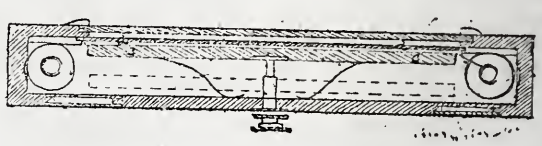


Fig. 1.—Plan in Section.

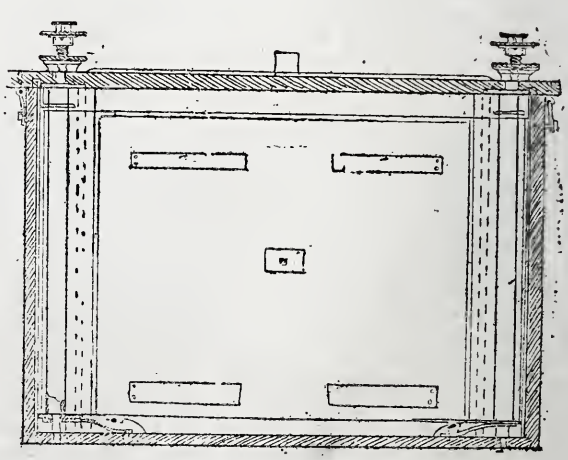


Fig. 2.—Longitudinal Section.

"The object of the slide is to enable a person to carry out any number of sheets of sensitive paper and change them conveniently in the open light. The slide is fitted up with two rollers, and the sensitive sheets are gummed together, making one long band, the ends of which are gummed to pieces of paper always kept on the rollers. The sensitive sheets are wound off the left or reserve roller on to the right or exposed

* The British Journal of Photography, 1870, p. 26.
† British patent, July 22, 1876, No. 2973.
‡ "Traité Pratique de Photographie des Couleurs," Paris, 1878, *Photographic News*, 1878, p. 115.
§ Concluded from page 88.

roller until all are exposed. The rollers are supported on springs to render their motion equal; they are turned by milled heads and clamped when each fresh sheet is brought into position by nuts; a board is pressed forward by springs so as to hold the sheet to be exposed and keep it smooth against the plate of glass; when the sheet has been exposed the board is drawn back from the glass in order to release the exposed sheet and allow it to be rolled on the exposed roller. . . . . The sheets need not be gummed together with *any particular care:* the pressure board ensures their being kept flat and even whilst being exposed. It takes about an hour to fix thirty-six sheets on the rollers. It takes *less than a minute* to change each sheet."

This arrangement both I and Dr. Dawson examined and saw in use when Mr. Melhuish had his studio at Holborn Bars.

I may conclude this reclamation on behalf of my friends Dr. Dawson and Mr. Melhuish by quoting the old proverbs, that "*There is nothing new under the sun*," and "*Let him who merits the crown of palms, wear it*," whether as "pioneer" or as "advanced guard."

SAMUEL HIGHLEY, F.C., F.G.S.

IN MEMORIAM.

SING a song of photographs, the focus all awry,
Four and twenty specialists can't tell the reason why
Figures in a landscape are only shapeless blurs,
Grasses in the background look a good deal more like furze;
Perspective, too, is treated in a very comic way—
A man at plough is seen at least half a mile away
From the horses which he steers, with half a mile of rein:
This may be a good impressionism, though it looks insane.
The Humpty Dumpty monarch of the realistic school
Was thought a sage by many when he sat upon a wall;
He came such a cropper—he looks more like a fool
(Though he isn't really more so) than he did before his fall.
Let's pity him and bury him, and thank our lucky stars
We've heard the last of ———, his fads, and wordy wars;
And that in merry England there's neither mules nor men
Enough to put poor wordy Humpty Dumpty up again.

Camera Club. F/SHARP.

THE LATEST "PHOTOGRAPHY IN NATURAL COLOURS."

HISTORY repeats itself, and on this subject is doing so with a fair degree of frequency. It seems only the other day since we had a good deal of Verescz's heliochromy; now the scene is shifted from Germany to Paris, and M. Lippmann, Professor of Physics at the Sorbonne, is the latest discoverer. For the details, or such of them as we have access to, of Professor Lippmann's discovery, we are indebted to the Paris correspondent of the *Daily News*, who on Tuesday night wrote as follows:—

The scientific world has been startled by the announcement made by M. Lippmann (Professor of Physics at the Sorbonne), at the last sitting of the Academy of Sciences, of a new process of photography discovered by him, by which colours throughout the whole range of the spectrum can be reproduced on a sensitive plate, just as accurately (since colours are but numbers of light-waves) as outline or shadow are fixed by the present photographic negatives and prints. M. Lippmann's first attempts to take coloured photographs have not gone beyond the experimental stage, and a long time must elapse before this branch of photography is brought to the perfection which its sister branch has attained. After a few weeks' attempts, M. Lippmann has succeeded in photographing a stained window in colours as brilliant as the original ones. His researches, however, quite apart from the magnificent possibilities which they bring within our view, claim the regard of every scientist as an illustration of the power of the inductive method.

M. Lippmann, whom I met yesterday at his laboratory at the Sorbonne, very obligingly showed me his coloured plates and gave me an account of his discovery, drawing on a sheet of paper, as he proceeded, a number of interesting diagrams, which unfortunately cannot be sent by telegraph. The plates were all photographs of the solar spectrum. All the colours of the rainbow were there, including the infra-red and the ultra-violet, invisible to our eyes. The plates, however, had registered them and kept an impression of them, showing themselves in this respect superior to the human eye. These two mysterious colours were represented in their proper places by two distinct stripes, apparently of a jet-black colour. I say apparently, because it was only our imperfect vision which made them seem so to us, their real colours, of course, being infra-red and ultra-violet. The other colours between these two—red, orange, green, blue, &c.—were as vivid as any objects in nature. As I was examining these plates an assistant came to say that a coloured photograph, the first of a stained window, had just been taken out of the developing bath, and was in splendid condition. The stained window, as I saw on proceeding to the dark room, was a most primitive affair, four pieces of coloured glass, green, yellow, red, and blue, soldered together. "This is all we could put together," explained M. Lippmann, "but it is quite sufficient for my purpose." The plate, which was not yet fixed, was taken out of its box for a few seconds only, as this plate was precious, and we were afraid of injuring it by exposure even to candle-light. To our great delight the colours were there, and rendered with photographic faithfulness. A second plate was undergoing exposure, the image of the stained-glass design being thrown upon it by means of a sort of magic lantern lighted by electricity. The plate was pressed against the opening of a trough filled with mercury, which formed a mirror in contact with the plate. The rays of light pass through the sensitive film as in the old process, but on reaching the other side of the plate, instead of being absorbed by a dark background, they are sent back by the even surface of the mercury. In this mirror the whole secret lies, for apart from it the entire process is exactly the same as in ordinary photography.

Before explaining why a mirror placed on the back of a sensitive plate during exposure causes the silver precipitate to assume all the colours thrown upon it by the camera, the reader must be assumed to have a slight acquaintance with photography, and also with the laws of light, which offer a striking parallel to the laws of sound. Light, like sound, is but a form of motion. Both appear to propagate themselves by a wave-like motion, similar to the ripples on a pond when a stone is thrown in. The only difference is that, owing to friction, the waves of a pond tend to lengthen out and to disappear, whilst the waves of light or sound preserve their original length throughout their whole course. For light the wave-length—or, rather, half-wave-length—is small beyond conception. It is for red light 0·0002 millimetres; for yellow light, 0·00025 millimetres; for green light, 0·0003 millimetres. In other words, there are five thousand waves of yellow light to an inch, &c. A curious property of sound or light waves is that when they meet another wave of equal length coming in an opposite direction the conflicting waves overlap each other, the continuity is broken, and a succession of dark and light, or silent and loud, intervals is produced. A French physician of the beginning of this century, Napoléon Savart, was the discoverer of the phenomenon called interference of sound. If the ear is placed at a short distance off a sounding or echoing plate and gradually drawn away, it will be observed that the sound alternately dies away and comes back with twofold intensity. The explanation of this is that the waves of sound, the direct and reflex waves, alternately neutralise and reinforce each other. The two conflicting waves of sound or of light might be represented by the two serpents of Mercury's rod, which form a dot at their intersection, and a wide space between each dot. Each is a wavy but continuous line, whilst the two combined give a sort of broken line or chain. It was Newton who discovered the interference of light, and was able to measure the wave-length of different colours.

Some time ago it occurred to M. Lippmann that if, instead of a continuous wave of light crossing the photographic plate, a broken line (produced by "interference") were sent across it, the silver, instead of being precipitated in one mass throughout the gelatino-bromide, would settle in layers (about the thickness of the soap-bubble). By placing a looking-glass behind the plate, the red light, for instance, caused the silver to be deposited in layers of half the thickness of a red wave-length. Blue light would cause the layers to be somewhat thicker wherever it passed, but these layers, coinciding exactly as they do with a length of a wave of light, can only let pass the same light which originated them. This is the whole principle of M. Lippmann's remarkable discovery, and practice shows that it will work in the case of the solar spectrum and of stained windows. Whether it may be applied to landscapes or portraits the future alone can tell; but there is nothing unreasonable in the hope that it will be so.

NOTES FROM NEWCASTLE.

THE Fine Arts Exhibition of the Bewick Club, opened on Friday evening, the 6th inst., at the galleries in Pilgrim-street, promises to be one of the most successful we have ever had. At the annual dinner on the previous evening (the Mayor presiding), many references were made to the new Town Hall *in posse*, and to the desirability of an art gallery as part of the scheme connected therewith. Should such an idea be carried out, our Photographic Society might claim some little attention from the authorities—at all events, in the direction of a room devoted to works appertaining to photography. The present exhibition was opened by the Earl of Carlisle, and consists of a number of borrowed pictures, as those from the proprietors of the *Graphic*, Yates Carrington's *Out-Patient*, examples and sketches by Sir F. Leighton, Alma Tadema, Frith, Mrs. H. M.

Stanley, John Charlton, Burton, Barber, and others. The local men of the first class are, of course, in evidence, and sustain their reputations, Mr. Emmerson (the President of the Bewick Club), Messrs. Jobling, Way, Hodgson, Campbell, Ralph Hedley, showing work worthy of careful study. There are many other exhibitors as usual, with work of variable excellence; but, taken altogether, the exhibition is a good one, and the photographer should certainly visit it.

The local Society had a field night, and of course the "inevitable lantern," at the lecture theatre of the Literary and Philosophical Society on the 6th, when a series of 150 slides were shown. It is only fair to say that the collection was a fine one, and the audience large and appreciative.

We are enjoying lovely weather just now, and the cameras and cycles are being dusted and cleaned up ready for another start. Business all round is good, both in the studio and the shop. Messrs. Hurman & Co. have a nice place in St. Nicholas'-buildings, and they look like business. A few good novelties they possess will take the wind out of the sails of some of the local trading craft. I believe the sale of optical lanterns this year has been exceptional, so possibly our local Society people are not far wrong in gauging the taste of those for whom they cater. I am curious to see the prospectus of the forthcoming Crystal Palace Exhibition of Photographs, and to know what they have to say about the "Societies' Competition." The last one was not, as everybody knows, like Cæsar's wife, above suspicion. D. D.

Foreign Notes and News.

The example which has for some time been set by the Berlin *Lette-Verein* in affording photographic instruction to women has recently been followed by a similar institution in Breslau. The course of instruction is completed in a year, and includes all the various branches of the art. A minimum age of fifteen and some knowledge of drawing are the only acquirements demanded from candidates for admission, and when dismissed they are supposed to be competent in all the mysteries of retouching, and even in painting and colouring photographs in water colours and oils.

A work on mercurography, by Mons. A. M. Villon, has recently appeared in Paris. The principle which lies at the bottom of the procedure is the capacity possessed by mercury for amalgamating with all the metals except iron and platinum, and the fact that the parts so amalgamated do not take up printers' ink. A drawing is executed with a certain kind of ink upon a zinc plate, on which it is allowed to dry. The plate is then amalgamated with mercury, which, of course, does not attack it where it is protected by the ink, and on removing the ink it may be coated with printers' ink and printed from.

Mons. Villon has also invented a development of his process by which drawings on paper may be copied by transferring drawings made on the paper in a certain ink to the zinc plate by pressure, and then proceeding as described above.

Dr. O. Lohse, struck by the chemical similarity of resorcine to brenzcatechin and hydroquinone, has been induced to undertake some experiments with a view to testing its capacities as a developer. The result showed that it had no action of the kind whatever. On the contrary, it displayed a restraining influence when added to the hydroquinone developer, but increases its capacity for keeping. As the result of his experiments, Dr. Lohse recommends the following:—

Water	1000	c.c.
Hydroquinone	7·5	grammes.
Sulphite of soda	20	,,
Soda	20	,,
Resorcine	0·4	,,

If more resorcine be added, the restraining effect becomes too prominent.

It appears that Professor V. Schumann has invented a new photographic plate, the maximum sensibility of which is situated in the ultra-violet. Professor Schumann has not yet given to the world the manner in which his new plate is made, and we consequently await the revelation with interest.

The Science of Colour.—The Council of the Society of Arts have arranged for a course of five popular lectures on *The Science of Colour*, to be given by Captain W. de W. Abney, C.B., D.C.L., F.R.S., on the following Friday afternoons at half-past four o'clock:—February 13, 20, 27, March 6, 13. The lectures will be of a popular and elementary character, and will be fully illustrated by experiments.

Our Editorial Table.

Sun Artists, No 6.

London: Kegan Paul, Trench, Trübner, & Co.

The four pictures in the January issue of this always elegant quarterly are by Mr. B. Gay Wilkinson, the descriptive essay being by the Rev. F. C. Lambert, M.A.

In *Prawning* we have a fisherman equipped in his professional costume, and stepping among the rocks at the ebb of the sea, making ready to ply his avocation. He might be a hundred miles away from a camera, so intent is he upon his work. *A Windy Corner* displays a group of cows taking shelter from the strong breeze, which from the bending of the top branches of some trees in the vicinity we know to be blowing. *A Pastoral* reveals to us a shepherd reposing on the side of a hill, and taking things wonderfully easy, secure in the knowledge that the eye of his faithful canine companion is upon the flock scattered about at no great distance—a truly pastoral scene. *Sand Dunes* is a picture of quite a different nature from the others, and represents a scene of much desolation on the South Devonshire coast. In composition, treatment, and as photogravures, all the pictures are of a high order of merit.

From Mr. Lambert's essay we learn that Mr. Wilkinson began photography twelve or fourteen years ago, when the wet process prevailed. When off on a holiday tour, he goes out prospecting for pictures, not necessarily having his photographic apparatus with him, and examines a view under various aspects of lighting, returning to take it when the best conditions have been ascertained. Mr. Lambert's remarks on the necessity for the photographer placing himself in sympathy with the live objects to be introduced in a picture are so valuable that we give an extract:—

"One other common-sense custom of his deserves careful attention, and in this respect actual imitation is not only pardonable, but highly commendable, viz., the very proper step of winning the confidence of the human element of the picture. If there is one characteristic which above all others may be said to characterise the great majority of so-called figure pictures, it is the painfully self-evident consciousness and 'gawkiness' of the figures. Nor is this to be wondered at in any measure, seeing that in almost every case the figure and the operator are brought together in this relation without any previous knowledge of each other. Not only are they unknown to each other, but what is still more disastrous, they are, in the majority of cases, out of all harmony with each other, with practically no aim in common, and not infrequently is the figure entirely out of harmony with his surroundings. What wonder, then, that the figures are betraying by every angular contortion of limb that for the moment they assume an attitude which is as strange and new to them as the operation in which their efforts are to form an essential element. They are instructed to pretend to do something which has no precedent outside the fertile brain of the inventive artist; what is more natural than that they should betray themselves to be as sham as the actuating sentiment? Well may one pardon such a victim were he to quote—

'Like a dull actor now
I have forgotten my part, and I am out
Even to a full disgrace.'

Much, if not all, of this can be easily avoided, or, at the worst, materially modified for the better, by following the common-sense method of first making the acquaintance of the proposed figures, and learning by means of patient ear what are their likes and dislikes, the way they follow the daily round of toil, the use of each tool of their craft, and the precise manner of using it; all this and much more in a similar direction can be quickly learned by one who has patience to listen, and be content to let a man do his work in a workman-like manner, instead of attempting to teach him a trade of which both teacher and learner are equally ignorant. By following the natural order of his proceeding when actually at work, a sympathetic and observant eye will quickly learn to select just those moments of transient rest where all the lines of the body by long usage have acquired a grace together with a suggestion of potential action. This being not so much the critical moment of the action as it is the characteristic moment, and probably the chief moment of transition wherein the spent forces of the past are being restored in a relaxation of muscular effort, together with a renewal for a more important part yet to follow. In a sense this may be called the self-interpretive or historic moment, and manifestly is the chief one for pictorial purposes, so that its discovery can only be made by those who throw to the winds any preconceived notion of how this or that *ought* to be done, being content, nay, rather preferring to observe how nature, custom, and convenience have decreed that it must be and *is* done.

"To secure this obviously important knowledge requires no great logical power for deducing the conditions of favourable acquirement. Clearly, any irregularities—strange clothes, tools, surroundings, &c.—are certainly well calculated to divert the thoughts of the worker (*i.e.*, the model in action) from his work. Still more the consciousness that he is being watched for some strange, uncanny purpose and process. This sets his

torpid imagination wondering, so that we often enough see photographs representing men performing with their hands some operation in a half-mechanical manner, while their eyes are fixed with a wondering and glassy stare on the operator or his camera. Again, any feeling of 'strangeness' between model and picture-maker is sure to find its way to the surface in some unfavourable manner. So that we may, without much risk of controversy, say that one important round of the ladder which leads to success is that of gaining at the outset the confidence of the model, in order that he may carry on his work in front of you with as much easy and natural movement as though you were non-existent as far as he is concerned. So far I find Mr. Wilkinson's recent practice in accord with what seems desirable *per se*."

From this extract will be seen the high order of the essay.

Office Calendar for 1891.

The *Photographic Times* (Scovill & Adams Company, New York) has presented us with a memento which it is rightly surmised will keep us in daily remembrance of our Transatlantic brother. It is an elegantly framed calendar, with twelve circles overlapping, one for each month, and an index finger to be set daily. The pictorial surroundings represent scenes in the colonial days of the Empire City, and historically follow the previous one we received, which took us back to the Knickerbocker period. In this one there is a happy combination of the *utile dulci*.

Cloud Negatives.

By Edward Dunmore.

Mr. Dunmore sends us specimens of his new "Unique" black and white cloud negatives. They are very delicate, and produce a charming sky in a landscape. Being on a very thin translucent medium, they print rapidly and from either side, this latter being of great advantage to suit the exigencies of lighting and subject. We give these cloud negatives a hearty welcome, especially introduced and prepared as they are by one who, like Mr. Dunmore, know so well the artistic requirements of a landscape.

Evening Work for Amateur Photographers.

By T. C. Hepworth.

Art of Retouching.

By J. Hubert.

London: Hazell, Watson, & Viney, Limited.

In *Evening Work* Mr. Hepworth starts by giving useful hints as to the use of the diamond, and gives a description of cutting-boards for the severance of glass plates into any desirable sizes. He then describes the apparatus for lantern-slide negatives, and the operations involved in the production of the slides. He warns against a tendency in some to use cloud negatives without due consideration, saying most truly that in our exhibitions a large proportion of the works shown are often spoilt by being wedded with incongruous clouds, and that many amateurs seem to think that if there is only a little patch of open sky it must have a bit of cloud pitchforked into it somehow, which is a mistake. Mr. Hepworth also treats of picture-frame making, with remarks upon the various styles of frames; discourses on photography by the magnesium light; and winds up a book of pleasant reading by two chapters on electric lighting. The book contains many engravings.

Mr. Hubert, in his handbook on retouching, commences by giving directions how to construct a retouching desk on economical principles, assuming the aspirant to be somewhat of a carpenter. He then speaks of the pencils and other appliances requisite in the art, and follows up with directions how to proceed. Without knowing very much of this department of applied art, the directions given seem to be plain, simple, and to the point, and which may be studied with advantage by the amateur, for whom the manual is mainly intended. It is illustrated by two Woodburytypes of the same individual (the editor of a contemporary) before and after retouching, the latter being a decided improvement on the former, while the likeness is well maintained.

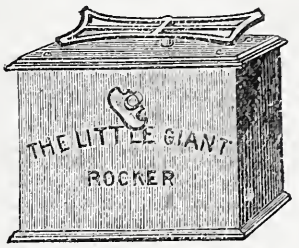
The Boy's Own Camera.

By the Blackfriars Photographic and Sensitising Company, 1, Surrey-row, S.E.

When we say that this camera is fitted with a lens, a double dark slide for quarter-plates, has a portable stand, and is made to sell *retail* for 7*s*. 6*d*., we shall scarcely be expected to indulge in a rhapsody over its transcendant qualities, and yet it is possible to take a landscape by its agency, and to focus it too, for it has a bellows body and sliding adjustment. One good purpose will it serve; it acts as a cheap species of tentative "finder" for the boy whose dubious ability of his own powers may not be proof against allowing 7*s*. 6*d*. to stand in the way of his making a trial, and who, when he finds that he can get a picture of some sort, will assuredly not rest satisfied until he becomes the happy possessor of an apparatus very much superior.

Hunter's "Little Giant" Clockwork Rocker.

This forms a means by which a dish containing developing or any other solution is kept in a state of motion for a lengthened period. The clockwork is contained in a little box, which serves as a stand, on the top of which is a skeleton platform, upon which the dish is placed. On pulling a knob at one end the mechanism at once begins to act,



the spring having been previously wound up, and the tray then moves with an oscillating motion, being always level. Its external construction is shown in the cut. It carries dishes from quarter-plate up to 12 × 10, and for a protracted development, during which the motion of the solution is desired, it answers a very useful purpose. The clockwork mechanism, devised by Messrs. Hunter & Co., Norwood-road, S.E., is simple yet quite effective.

We have received from Messrs. McGhie & Co., Glasgow, two neat table and desk calendars printed in gold bronze.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1856.—"Changing the Slides in a Single Magic Lantern so as to Imitate Dissolving Views, to be called 'The Ideal.'" W. J. Archer, F. W. Archer, F. H. Archer, and C. W. Huson.—*Dated February* 2, 1891.

No. 1933.—"A Portable Magazine Camera for Taking Photographs." C. R. Beaumont.—*Dated February* 3, 1891.

No. 1953.—"Improved Apparatus for use in Photographic Contact Printing, a Method of Preserving Sensitised Paper, and a Protective and Adhesive Solution therefor." Complete specification. R. J. Wynkoop and J. M. Kemp.—*Dated February* 3, 1891.

No. 2031.—"Improvements connected with Universal Photographic Cameras." A. Brooker.—*Dated February* 4, 1891.

No. 2042.—"A New or Improved Receptacle for use in Developing or otherwise Treating Photographic Plates, Papers, and Films Sensitive to Light." G. R. Miller.—*Dated February* 4, 1891.

No 2165.—"Improvements in Magic Lantern Slides." G. F. Luttickе.—*Dated February* 6, 1891.

No. 2190.—"An Improved Automatic Plate or Film Changing Arrangement for Photographic, Hand, or Detective Cameras." J. Watson and G. J. Johnston.—*Dated February* 6, 1891.

No. 2233.—"Improvements in Photographic Cameras." J. Collier.—*Dated February* 6, 1891.

No. 2248.—"Improvements in Preparing, Developing, and Fixing Photographic Films." F. W. Vérel and W. Hampton.—*Dated February* 7, 1891.

No. 2279.—"Improvements in Photographic Cameras." T. Miller.—*Dated February* 7, 1891.

PATENT COMPLETED.

An Improvement in Hand and other Cameras.

No. 19,143. Walter Horace Thompson, 22, Edmund-place, Aldersgate-street, London, E.C., and Phillip William Husbands, 29, Baroness-road, Hackney-road, London.—*January* 17, 1891.

Our improvement in hand or other cameras consists in the use of a box containing one grooved plate holder or travelling inner body with vertical grooves, divided in the centre by a horizontal groove, and with sliding partitions attached to each end of the outside box, dividing the unexposed from the exposed plates or films. The grooved plate holder is worked by a pair of racks and pinion fitted at the bottom of the grooved plate holder and attached to the outside box.

The pinion to have on its end either a square to be used with a key or a milled head, on turning which the grooved plate holder containing the plates or films (each in a suitable carrier) advances, and on reaching a given line a plate or film drops from the upper part of the grooved plate holder to the lower part. As the grooved plate holder travels forward, the back partition, fitted in horizontal groove of grooved plate holder, and attached to back of outside box, allows the exposed plate to drop, and by the same action the front partition attached to front of outside box covers the same.

The camera takes the form of a box of varied shape, as may be found most

convenient, and can be covered or not with leather or other material to suit the tastes of the users, and either carried by a strap or handle, or the like.

The claim is:—The use of one grooved plate holder or travelling inner body, with sliding partitions attached to each end of the outside box, dropping plates or films from upper part to lower, and worked by rack and pinion, as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 16.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 17.....	North London	Wellington Hall, Islington, N.
,, 18.....	Bury	Temperance Hall.
,, 18.....	Hyde	
,, 18.....	Manchester Camera Club	Victoria Hotel.
,, 18.....	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 18.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19	London and Provincial.....	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE annual meeting of this Society was held in the new rooms, 50, Great Russell-street, Bloomsbury, on February 10th, the President (Mr. J. Glaisher, F.R.S., &c.) in the chair.

The report of the Council having been read, its adoption was moved by Mr. A. MACKIE, who said that he did so with great pleasure, as it was entirely free from the inaccuracies that disfigured the report of the preceding year. The list of papers that had been read he was proud of. There was one thing that he would like altered in connexion with the reading of papers; it was that there should be more time allowed for the discussion of them. The discussion was often more important than the paper itself; and, indeed, but for the discussion, the paper might as well be printed only in the journals and not read at all. Another point was that he had noticed that members of Council were furnished with copies of papers that were being read, and he thought other members of the Society were placed in an unfavourable position by not having the same advantage. He thought that the cost of printing a sufficient number of copies of the paper to supply all those who attended the meetings would not be large, and might be properly incurred. The technical meetings, too, he thought, were not provided for so as to make them as interesting and instructive as they might be made. Compared with many of the suburban Societies, these technical meetings were neither so largely attended nor of so much interest as they ought to be. As to the exhibition, he noticed a regular annual falling off of the number of members who exhibited. He would like to know how that could be explained, as he looked upon it as a very serious thing. He was glad that the Society had at last a home, but sorry to think that that home only existed as a charity, since it depended upon a guarantee fund, and the existence of that guarantee fund, he thought, put poorer members at a disadvantage. He thought that the expenses of the Society might be reduced, and that they need not be dependent upon the guarantee fund to pay their way. As to the election of honorary members, he had no complaint to make as to the gentlemen who had been elected, but he thought that the Council were exceeding their powers, and that it would be better to go to the Society and obtain an extension of powers than to go at all beyond what they constitutionally possessed. A perfect set of laws could not be expected to be made at one meeting, and they might be revised as required. He thought that if the number of members of the Council were doubled, so that if every one who could be considered to be a representative man could have a seat on it, it would be better.

Mr. J. W. SWAN proposed a slight alteration in the wording in a paragraph of the report, to the effect that the meetings of the Society had been devoted to the scientific rather than artistic side of photography, and this amendment was carried.

Mr. T. E. FRESHWATER said that, as one of the most frequent attendants at the technical meetings, he had often been disappointed at finding no subject ready for discussion, and thought it desirable that the Secretary or Council should arrange subjects for discussion. The report was then adopted.

The Treasurer's report was read, and Mr. W. ENGLAND said that he thought the Society was paying a great deal more for printing the *Journal* than it ought to do, and proposed that estimates should be obtained from other firms.

Mr. G. L. ADDENBROOKE was of the same opinion.

Mr. MACKIE said there were rumours of some great photographic exhibition, and if that were properly carried out the Society's exhibition would be a failure. The Society's *Journal* was a net loss of not less than 160*l.*, and though it was improved during the last year or so, he did not think the improvement sufficient to warrant the expense of from seven to eight shillings each member, or about a shilling a copy, which was what it came to.

Mr. L. M. BIDEN thought that with a great many members the exhibition was the chief attraction, and the lantern evenings particularly so. He thought that these evenings might be made more frequent, and a charge made to members who attended them. There were many members who did not attend the meetings of the Society, and he thought that the *Journal* ought to be improved, particularly in the way of illustrations.

Mr. F. CLIFTON seconded the adoption of the Treasurer's report, which was carried.

Votes of thanks to the President, Treasurer, Secretary, Editor of the *Journal*, Auditors, and Secretaries were passed by acclamation.

The PRESIDENT, in acknowledging the vote of thanks, expressed his gratification at the Society now having a home of its own, and regret at hearing that the technical meetings were not altogether satisfactory; perhaps they would now make a new start.

Mr. BIDEN asked if something could not be done to federate the numerous Societies for various purposes, such as the obtaining concessions from railway companies for Society excursions similar to those enjoyed by anglers, and for interchange of papers and other purposes. He would ask if the Society would grant the use of its room for the purpose of holding a meeting to discuss this matter.

The PRESIDENT said that it had been under the consideration of the Council, and the use of the room would doubtless be granted.

Mr. L. WARNERKE said that, having been requested to give a demonstration of collotype printing, it had occurred to him that this would be best done on an extra night, and that a series of extra night demonstrations and papers might be arranged for, so as to commence, to a certain extent, the sort of work that the proposed Institute, when formed, would take up and carry on.

Mr. W. E. DEBENHAM, in supporting this proposition, supposed that it would be understood that lectures or demonstrations for these evenings might take the form of general instruction, and not be expected to refer to any fresh discovery by the authors.

The result of the election was as follows:—*President:* Mr. J. Glaisher, F.R.S., F.R.A.S.—*Vice-Presidents:* Captain W. de W. Abney, C.B., R.E., D.C.L., F.R.S., Messrs. T. Sebastian Davis, F.C.S., H. P. Robinson, and John Spiller, F.C.S., F.I.C.—*Council:* Messrs. W. Ackland, G. L. Addenbrooke, W. Bedford, V. Blanchard, F. Cobb, A. Cowan, T. R. Dallmeyer, Major L. Darwin, R.E., G. Davison, W. E. Debenham, W. England, J. Gale, F. Hollyer, F. Ince, Dr. L. Johnson, H. Chapman Jones, F.I.C., F.C.S., Captain A. M. Mantell, R.E., J. W. Swan, J. Traill Taylor, Leon Warnerke, and Sir H. Trueman Wood, M.A.—*Treasurer:* W. S. Bird.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 5,—Mr. C. H. Cooke in the chair.

Further presentations to the library by Messrs. T. Charters White and R. P. Drage were received, and it was announced that until further notice no books would be lent from the Association's library, so that members desirous of consulting the works therein could depend upon being able to do so at the meeting times and for half an hour beforehand.

The HON. SECRETARY then referred to a question he had put at a previous meeting as to the best plan to adopt when it was desirous to utilise rapid stripping films for printing by development. Mr. F. A. Bridge had recommended that they should be treated with a one per cent. solution of bromide before applying the oxalate developer. This had been done, and the results were now shown. There was very good gradation and a freedom from heaviness in the blacks, so common in bromide printing.

Prints were also shown on rough bromide paper, as said to be demanded by a certain class of workers.

The special business of the evening, the discussion of the propositions emanating from the Photographic Society of Great Britain with regard to a Photographic Institute, was then entered upon, and ultimately, upon the proposition of Mr. W. E. DEBENHAM, seconded by Mr. A. HADDON, it was resolved, "That the establishment of the Institute proposed in the communication from the Photographic Society of Great Britain is very desirable, and would be conducive to the progress of photographic science and industry."

A question from the box was read:—"What, in the opinion of the members, is the best means for preserving for, say, a week's use, a ten per cent. solution of pyro in distilled water, so as to maintain its developing power most nearly equal to that of dry pyro? and would any loss of developing power be compensated by the use of a greater quantity, and, if so, in what proportion would the amount require to be augmented?"

Mr. DEBENHAM habitually used a ten per cent. solution in a mixture consisting of equal parts of alcohol (methylated) and water. He did not find any noticeable difference in the action of the pyro from the slight discolouration that occurred in a few weeks' time, but if intended to preserve the solution at its best for more than a week or so he would use boiled water and keep the bottle full, or nearly so.

Mr. A. COWAN thought that even so small a quantity of alcohol as that solution would introduce into the developer would tend to produce air bubbles and mark the plate.

Mr. HADDON remarked that he had sealed up some tubes of pyro solution a year ago, and as yet could see no change in the contents except to a very slight extent at the top.

Mr. COWAN had some solution made two years since that had not changed. For practical use there was no perceptible difference for several weeks in a pyro solution if a little sulphurous or citric acid were added in the first instance.

It was announced that it had been decided to give an entertainment of a popular character, musical, with a lantern illustration in the interval, on Tuesday evening, March 3, and that the large hall at the Champion Hotel, capable of seating two hundred persons, had been engaged for the occasion.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held February 9,—Mr. W. Bedford in the chair.

Mr. Farrington was elected Auditor.

One grant considered and refused.

Report and balance sheet adopted, and the annual general meeting was fixed for the 27th inst. This will be held in the new rooms of the Photographic Society of Great Britain, 50, Great Russell-street, kindly lent for the purpose.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 3,—Rev. E. Healy in the chair.

This being a technical evening, Mr. W. Bishop exhibited a specimen of an excellent varnish which he had made. This varnish was useful either for negatives or positives. It was composed of amber dissolved in chloroform, and was much used in the old wet-plate collodion days. The amber was broken into small pieces, a bottle was about half filled, and then filled up with chloroform and left to stand for some weeks, or even months. The cork had a small glass tube inserted, which passed through the cork of another bottle, and the

bottle containing the dissolved amber was then turned upside down, and the varnish gradually drained into the empty bottle, then filtered through one or two thicknesses of white silk. If then any particles are found floating on the top, fill the bottle right up to the top and float the particles off. Silk is probably the best medium for filtering anything. When varnishing plates, never pour the extra varnish back into the same bottle, but pass through a filter stuffed with cotton wool into another bottle. The varnish is very hard, quickly dries, and can hardly be scratched with a hard point. If any gets on the back of the plate it can easily be cleaned off with a little methylated spirit.

Mr. J. DOUGLASS asked for a good receipt for making matt varnish, and was referred by Mr. Mackie to page 658 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1890.

Mr. W. T. COVENTON asked whether in making bromide prints it was better to have a bright light, and keep the negative at a distance suitable to its density, or to use a smaller and less powerful light, according to the negative.

The CHAIRMAN said that doubtless it was best to use a standard light for everything, and remove the negative, if necessary, to a greater distance.

Mr. TANNER said that he covered the negative with tissue paper when necessary, and removed it to a suitable distance.

Mr. GEO. A. POWELL asked whether the commercial ferrotype dry plates were sensitive enough to get good results from flash-light exposures, and whether the usual oxyhydrogen limelight would be powerful enough for these plates, and whether there would be any difference between the exposure of these dry plates and, say, Ilford ordinary.

Mr. BISHOP said that the only way to ascertain the rapidity of these plates was to give them any ordinary shutter exposure.

Mr. HART said that the limelight, as commonly used, was of no use, and Mr. Powell would find that he could take excellent wet collodion positives on glass by flash-light exposures.

Mr. COVENTON asked what was the best plan for preventing halation without backing the plates with any substance which was troublesome to clean off again before developing.

Mr. TANNER said that he backed his plates with red paper smeared with glycerine, as this was easily removable with a slight soaking.

Mr. GROVER had found that Thomas's thick-coated plates answered well without backing.

Mr. J. OAKLEY said that he could generally remove most of the halation by rubbing down with a piece of soft cork dipped in methylated spirit. He did not believe there was any specific against halation, which in his opinion was due to local over-exposure.

Mr. MACKIE said give a good exposure, and then you will not have to develop through to the back of the plate, where, no doubt, halation would always be found.

Mr. HART said that the best backing, to his idea, was burnt sienna and dextrine. Mix it thick, with boiling water, and then thin with methylated spirits. It soon dries. By the time the third plate is coated the first plate is dry. To get the backing off the plate, fill a dish with clean water, have a sponge, hold the negative face down, and wash off so that no particles will fall upon the negative.

Mr. COVENTON asked if this did not stain the film, and Mr. HART said that it did not.

The CHAIRMAN said that, in his opinion, the best remedy was to use old dry plates.

Mr. MACKIE said he believed the best backing was burnt sugar in gelatine, put on hot.

Mr. HART referred to some white lilies with a black background, which could not possibly be photographed without halation, even on orthochromatic plates without backing.

The CHAIRMAN said he did not get halation when using the ordinary negative paper.

Mr. MACKIE said that doubtless the reason for so much halation being seen in pictures with trees, &c., was that we under-estimated the necessary exposure in the shade under trees after photographing in the open air.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

FEBRUARY 9.—Mr. H. WALKER (in the chair) said that the subject for the evening was *The Best Treatment of Winter and Snow Scenes.* He thought that views in which there were no heavy objects in the foreground were best, and a developer weak in the reducing agent most suitable.

Mr. MUMMERY had found that when the sun shone in winter it was more brilliant than at first appeared, by reason of reflection from the snow. He used Thomas's hydroquinone developer, full strength.

Mr. NORRIS had given fifteen to twenty seconds with large stop, and developed with full-strength pyro and ammonia.

Mr. C. BEADLE had given fifteen seconds with *f*-32 on a hoar-frost view, and developed with pyro, Ilford formula, used full strength.

Mr. GILL showed some instantaneous pictures of figures in snow scenes, taken at half-past eight a.m. in December, and developed with ferrous oxalate, the iron weak at first, and strengthened as development proceeded. The prints were much admired.

Referring to the widely different exposures, Mr. COX had seen negatives taken under similar conditions, but with exposures varying from four seconds to five minutes, yield equal results in the hands of an experienced developer. He warned the members that lenses kept in a cold place and taken into a warm, moist atmosphere would condense moisture on the surface and give trouble, the cause of which might not be suspected.

Mr. W. T. GOODHEW recommended in cases of great contrast, as in snow scenes, that the plates should be flooded with the ammonia and bromide, and the pyro added by drops till the image appeared. When all detail was up, a new developer, strong in pyro and bromide, should be used to secure density and brilliance.

The SECRETARY had used eikonogen and ammonia with meta-bisulphite, as suggested by Mr. Secretan in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

Mr. F. L. PITHER had failed to get density with the weak pyro method.

Mr. GILL showed two hand cameras of his own invention. The construction was ingenious, and the method of changing plates simple and certain. They were much admired, particularly one for half-plates, which could be used on a tripod, and also for stereoscopic views.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

FEBRUARY 6,—Mr. John Weir-Brown in the chair.

Mr. J. HOWSON gave a demonstration on *Bromide and Alpha Papers.*

Several members took part in a discussion that followed.

This is the first demonstration of the kind that the Club has had take place in their newly acquired dark room, and by the crowded and appreciative attendance, showed that it was a decided success.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

THIS Society, whose numbers are steadily increasing, have now started weekly meetings (instead of fortnightly, as hitherto), at the "Greyhound Hotel," a more central and convenient location than their former quarters.

The first meeting under the new arrangement took place on Friday last, a lantern night, when Mr. F. P. Cembrano, jun., presided at the lantern, and slides by Messrs. Hunter, Faulkner, Richardson, Ardaseer, and Cembrano were shown and discussed; those of the last-named gentlemau, a series of views in Chester and North Wales, taken during last year's Photographic Convention, being specially admired for their technical and artistic excellence.

At the next meeting, Friday, February 13, Mr. C. Hussey will give a demonstration of the collodio-bromide process for lantern slides and transparencies. On Monday, February 16, Major J. Fortuné Nott, President of the Society, will give a lecture, will lantern illustrations, on *Wild Animals in Captivity,* at eight p.m., in the Lecture Hall, Hill-street.

SYDENHAM AMATEUR CAMERA CLUB.

"GREYHOUND HOTEL."—February 3,—Mr. Thomas W. Rumble in the chair.

Mr. H. H. GRAY (Hon. Secretary) read a paper on *Lantern Slides.* Having given a general description of lantern slide making by contact and reduction, he brought before the notice of the members Beach's single solntion eikonogen developer, and passed round a set of slides developed by this formula. These slides showed good detail in the shadows and clear glass in the high lights. Mr. Gray hoped that the reading of his paper would induce in many members who had not yet attempted this work beginning at once.

The next meeting will be held at the same place ("Greyhound Hotel," Sydenham) on Tuesday, 17th inst.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

SIDCUP.—February 4,—Mr. A. R. Dresser (Vice-President) in the chair.

A demonstration was given on *Flash-light Photography,* several photographs being taken and excellent results obtained.

The remainder of the evening was spent in a lantern exhibition.

The next meeting will be held on Wednesday, February 18, at the Board Room, Bexley. Mr. Willis on *Platinum Printing.*

LEEDS PHOTOGRAPHIC SOCIETY.

FEBRUARY 5,—Mr. Godfrey Bingley (President) in the chair.

Mr. C. H. BOTHAMLEY, F.I.S., F.C.S., delivered a lecture entitled *A Good and Bad Photograph.* In introducing the subject, Mr. Bothamley referred to the absolute necessity for every photographer making himself acqnainted with the leading rules of art. Althongh it was impossible for a picture to be made artistic by rigid observance of rules, yet, unless they were obeyed, except in a few exceptional cases, it was impossible for a picture to be pleasing; and in a very clear and interesting manner Mr. Bothamley pointed out the necessity of the rules of composition and light and shade, illustrating his remarks by diagrams on the blackboard and a large number of choice lantern slides thrown upon the screen; thus briuging in a most striking manner before his hearers the leading points in his address.

GLOUCESTERSHIRE PHOTOGRAPHIC SOCIETY

JANUARY 26,—The President in the chair.

Mr. GEORGE EMBREY, F.C.S., described the way to prepare micro-photographs. Before dealing with his subject he expressed the opinion, in support of that given by Dr. Emerson, and lately published in the photographic journals, that it is not in the nature of photography to produce really artistic pictures, and that probably it will be eventually recognised as a handmaid to science rather than to art; therefore he suggested micro-photography as a subject for the consideration of the members of the Society. Mr. Embrey proceeded to explain the principle of the compound microscope, and how an object presented to the eye by the microscope would appear larger if the eye were at a greater distance from the eyepiece; therefore to get an image suitable in size for a lantern slide, it is necessary to arrange the sensitive photographic plate at such a distance as will secure that result. This may be accomplished by taking a small camera, removing the lens, and passing the tube of the microscope through the opening from whence the lens is removed, making sure that the connexion is light-proof, when by proper focussing the image will be projected on the focussing glass. The focussing glass in the camera requires to be very fine, which is best obtained by the use of an exposed and slightly developed photographic plate in lieu of ground glass. The exposure will necessarily vary with the sensitiveness of the plates, the nature of the subject, and the power of the light; with an ordinary oil lamp and slow plates the exposure required would be about fifteen minutes; an inch of magnesium wire would give the same result. Mr. Embrey exhibited, by means of the Society's

oxyhydrogen lantern, a series of excellent micro-photographs of botanic and other subjects, many of which were prepared by himself, and contrasted them with natural microscopic objects enlarged by the oxyhydrogen microscope attached to the lantern, showing that although the latter gives the colours and natural appearance of the objects, micro-photographs of fugitive objects, such as blood corpuscles, can be produced and used as evidence in legal and criminal cases, and therefore that micro-photography may be a most useful servant to science and jurisprudence. Mr. Embrey pointed out that most arrangements previously used require that the objects photographed should be placed in a vertical position—this is inadmissible in the case of objects in fluids—and exhibited an arrangement by which the object could be placed horizontal. This consisted of a light wooden tube placed vertically on the eyepiece end of the microscope, and made to slide up and down for focussing; by this means bacteria, blood corpuscles, &c., could be easily photographed.

DERBY PHOTOGRAPHIC SOCIETY.

The annual meeting of the above Society was held on Tuesday last, at Smith's Restaurant, Victoria-street,—Mr. C. B. Keene presiding.

The Secretary read the annual report and balance-sheet for 1890, which showed the Society to be in a prosperous condition.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

January 29.—The second popular meeting was held in the Large Hall of the Philosophical Society's Rooms, 207, Bath-street,—Mr. William Lang, jun., F.C.S. (President), in the chair.

Mr. A. Lindsay Miller gave a very interesting and instructive lecture, entitled *Architecture from the Earliest Times till the Present Day.* The lecture was illustrated with limelight views of the chief buildings of ancient and modern times, the features and characteristic style of each being fully explained by the lecturer.

February 5.—The fourth general meeting, in the Philosophical Society's Rooms, 207, Bath-street,—Mr. William Lang, jun., F.C.S. (President), in the chair.

The following gentlemen were unanimously elected members:—Messrs. J. T. Bottomley, M.A., F.R.S., A. Neilson, J. Adamson, jun., and W. McWhirter.

Specimens of flash-light portraiture were exhibited.

A communication from Mr. A. Pringle (honorary member) on *Albumen Slides* was read by the Secretary, and a paper on *The Optical Lantern, its History and Development* [see page 100], was given by Mr. Lang.

A lantern exhibition of slides prepared by the method advocated by Mr. Pringle and a collection of Ferrier & Soulin's slides brought the proceedings to a close.

GLENALMOND PHOTOGRAPHIC CLUB.

February 5.—The following new officers were elected:—*President:* Mr. A. S. Reid, M.A., F.G.S.—*Keeper of Books:* Hon. Eric Lascelles.—*Keeper of Albums:* Mr. L. H. Maxwell.—*Treasurer:* Mr. H. Cunningham Craig.—*Secretary:* Mr. C. F. Scobell.

The following new members were enrolled:—Dr. D. Welsh, M.D., B.Sc., Messrs. J. Shiell, H. de Putron, and C. ap R. Pryce.

BERLIN PHOTOGRAPHIC SOCIETY.

January 22,—Dr. Stolze in the chair.

The meeting commenced with the exhibition of some not very important pieces of photographic apparatus, and with a discussion on the advisability of holding a photographic exhibition in connexion with the forthcoming Art Exhibition. The opinion of the meeting seemed to be that the neighbourhood of paintings did not conduce to render photographs of interest in the eyes of the public, and it was in addition pointed out by Herr Kühn that the available space was quite inadequate, especially when it was remembered that the London Photographic Exhibition had taken up nearly the whole of the Crystal Palace.

Professor Schirm's benzine-ether-magnesium flash lamp in its newest form then became the subject of discussion, the advantages attaching to which were stated to be (1), the absence of any free liquid in the receptacle; (2), complete absence of danger, saving of material, and increased photometric effectiveness; (3), if upset, the small ignition flame is extinguished, and the liquids are unable to escape. The particular lamp exhibited, however, only appeared to differ from the earlier forms through a different arrangement of the tubes.

A new lamp for igniting "blitz-pulver" by Herr Moh, of Görlitz, was then exhibited, the principle of which consisted in arranging smokeless "blitz-pulver" close to a small quantity of sugar and chlorate of potash. This mixture was ignited by squirting a drop of sulphuric acid upon it from a special apparatus, the combustion thus produced igniting the magnesium powder.

Herr Kiss and Dr. Stolze then exhibited a number of photographs taken with the Zeiss objectives. The meeting was unanimous in the opinion that the examples shown gave still further proof of the enormous capacity of these lenses.

Herr Christensen laid before the meeting a number of proofs on his new chloride of silver collodion paper. Similar productions by Herr Paul Grundner were also shown. These papers were said to give very good effects on toning, the negatives not requiring to be thin but only a little softer than for albumen. The bath recommended by Herr Grundner was as follows:—A. Water, 250; ferrocyanide of potash, 20. B. Water, 250; 20 grammes chloride of gold solution, 1:100. B is poured into A, and when one-third to one-half of the bath has been used it is replaced by fresh solution. After toning, the proofs can be put direct into soda, 1:20. Herr Grundner prefers a double washing.

After some discussion on "The Eastman Exhibition," which was regarded as somewhat disappointing, the proceedings terminated.

Correspondence.

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

RULED SCREENS.

To the Editor.

Sir,—Permit me to suggest to Mr. W. B. Bolton a process of obtaining a ruled screen which came into my head when reading his article. Let him take, say, a ream of good white notepaper—I say white, because the light reflected from it would be the more actinic—and some sheets of dead-black paper. He will find by experiment how to place a black sheet, and then so many white ones, and another black, and so on, so as to build up a series of black and white in which the blacks will be the desired fraction of an inch apart. When he has so done, let him take the pile to a printer and ask him to cut them through the middle in his guillotine, being particularly careful to press the pile as hard as he possibly can. The unpressed half can then be put into the machine and pressed hard, and a shaving taken off that. There will then be two blocks—for the paper will hold together pretty strongly if not deliberately separated—the face of which will show a series of *straight* black lines on a white ground. This can be photographed, and will, I fancy, give as true a screen as can be got, and at far less expenditure than he proposes to invest in. Of course, if one thickness of black paper be not sufficient, two or three can be used, but that is a mere matter of detail. I expect carbon duplicating paper would not be suitable, as it would probably smear in cutting.—I am, yours, &c., Henri Hillman.

40, *Chalcot-crescent, N.W.*

PAPIER MACHÉ ACCESSORIES.

To the Editor.

Sir,—For the information of your correspondent "Edwards," the best way to make *papier maché* accessories is as follows:—Procure some sheets of grey sugar paper, such as grocers use for small quantities of sugar, also some soft brown paper; make some paste, not too thick, and well paste some sheets *both* sides and pack them together; now take some of the grey paper, wet it, then paste only one side of this, taking care the paste does not get on the other side; now take your mould and fill in with the *one* side pasted paper (water side to the mould); all the straight edges of the paper *must* be torn off; tear the paper up in small pieces and *well* rub into the mould (this is important if a sharp cast is required). When partially dry, the paper which is pasted both sides can now be filled in same as first coat, but may be put in torn double instead of single (as in first coat), then allow to partially dry before filling in with next coat. The only object of different-coloured paper is to see that each previous coat is perfectly covered. When the required thickness is obtained, gradually but *thoroughly* dry before a fire before attempting to remove from mould. Should "Edwards" require any further information and will apply to me, I will give it him.—I am, yours, &c.,

Fore-street, Sidmouth, February 9, 1891. J. A. Bellinger.

PAPER ACCESSORIES.

To the Editor.

Sir,—In reply to "Edwards's" query, I presume the pulp is for accessories, such as imitation rocks, &c.

First make a rough wooden frame the shape of what is required—if large it would be more portable with four castors at the bottom. Now take a quantity of old newspapers, or, in preference, coarse brown paper, thoroughly soak this in water for about two hours, then carefully take them out and lay on a large board, and roll the superfluous water out with a round stick. Have ready one pound of glue dissolved in about two quarts of water, brush the framework well over with the glue, then take each piece of paper separately and lay over the framework. When covered, go over it again and again as before. In places it is better left roughish, or squeezed up with the fingers. Be careful to rub down well where the papers join. When finished, set away to dry, then it can either be painted the desired colour or washed over with plaster of Paris darkened with lampblack, or can be washed with glue and dusted over with sand, sawdust, or fine cork dust. Smaller rocks or boulders can be moulded on a rough lump of coal; of course, the smallest part uppermost to facilitate its removal.—I am, yours, &c., S. Walker.

Stroud, February 10, 1891.

ROUGH DRAWING PAPER.

To the Editor.

Sir,—Dr. Emerson in his renunciation refers to my use of rough drawing paper as a "revival," and Mr. Davison in his reply remarks that there is no novelty in the use of rough papers. I quite admit this, but papers vary greatly in the degree of roughness they possess. The paper I employ is the roughest drawing paper procurable, and the same effect cannot be produced on smoother paper. It is my impression that paper of the quality I employ was never used or suggested before the production of the photographs exhibited by me at the Pall Mall Exhibi-

tion. I may, however, be mistaken, and, if so, I trust that the gentlemen named will put me right. I enclose a sample of the paper I use for your inspection.—I am, yours, &c., W. L. Noverre.

Brighton, February 7, 1891.

[The sample enclosed is of a remarkably fine quality.—Ed.]

IVES' ETHER SATURATOR.

To the Editor.

Sir,—Following is a copy of my reply to a communication from Mr. Alex. Gunn, South Melbourne, Australia. Thinking that the instructions therein contained might possibly be of service to some of the readers of your Journal, I send this copy, in order that you may reproduce it should you desire to do so.—I am, yours, &c., Fred. E. Ives.

2750, *North Eleventh-street, Philadelphia, January* 24, 1891.

Mr. Alex. Gunn.

Dear Sir,—The reason why yourself and some others abroad have not got satisfactory results with the old-style Ives's ether saturator is that the London makers do not publish correct instructions for filling with ether. After filling full, only about *one-tenth* of cubic contents should be run out again—just enough to make a clear passage for the oxygen gas when the saturator stands level. To stand the tubes on end and drain out all that will run out, as many are led to do by the instructions published by London makers, is to drain out from *one-half* to *nine-tenths* of the contents, instead of *one-tenth*. The porous filling secures against possibility of a dangerous explosion if from any cause the ether supply gets *low*. When there is a good supply, no explosive mixture is produced under the conditions of use directed by me. The light has been used more than sixty times at the Franklin Institute with single lantern, and elsewhere nearly fifty times by me with dissolving lantern, without a single "snap" or "pop," using no pumice chamber or other "safety devices."

To use your saturator successfully with sulphuric ether, first unscrew the caps, remove the filling, and dry it out *perfectly*, finishing in an oven when it *appears* to be dry. Then replace the filling, and before screwing on the caps, fill the threads with bar soap, which will secure a tight joint. Now fill with *photographic* sulphuric ether, obtained from a reliable dealer, and drain only enough to allow the oxygen to pass through without producing a flickering flame. If your jets have not too large an aperture, and the temperature of the room is not below 70° Fahr., you will be able to dissolve without "snapping," if tubes are small *and dissolving key is properly adjusted for use with ether*. You should be able to run until you have used up six cubic feet of oxygen without any tendency of the flame to "snap" when you dissolve, although the American makers recommend a three-tube saturator for dissolving purposes. Only in a cold room should artificial heat be applied to the saturator, sufficient to keep the temperature of the saturator up to nearly 70°.

After using for five or six exhibitions, the filling should be dried out again. The new style of Ives' saturator, with zig-zag passage, is a decided improvement, and petroleum ether has also advantages over "sulphuric," such as not necessitating the drying out of the filling from one year's end to the other, *provided* that the petroleum ether is of the grade used and recommended by me. Gasoline should not be used, because it leaves a gummy deposit, which soon clogs up and spoils the porous filling.—I am, yours, &c.

Fred. E. Ives.

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the Editor.

Sir,—I notice a letter from Mr. H. E. Davis in your last issue. Allow me to take exception to a few of his statements.

I distinctly traverse the statement that our Union "will be little more than a benefit society." The unemployed benefit will be the least important branch of its work, and is instituted in order that distress arising from want of employment may not necessitate the acceptance of unfair terms of employment by our members. I will give an outline of our trade policy:—

I. To institute legal proceedings wherever necessary and likely to have a beneficial effect—(*a*) against the detainers of assistants' specimens; (*b*) to secure the fulfilment of agreements and contracts with assistants, and the observance of the terms of indentures of apprenticeship; (*c*) to secure compliance with the provisions of the Employers' Liability Act and other laws enacted for the protection of the worker; (*d*) in cases of unjust dismissal or illegal refusal to grant testimonials.

II. To attempt to secure a maximum working week of forty-eight hours, or payment of twenty-five per cent. extra wage for all hours over forty-eight per week; a weekly half holiday; promise from employers to submit disputes to arbitrators mutually agreed upon at starting of engagement; payment of newly engaged assistant's railway fare by the employer; fortnight's notice or salary on either side before terminating engagement. To attempt to secure a fair minimum wage in each class of work for all the members of our Union, extra remuneration to be a matter of special ability.

III. To provide those members with the unemployed benefit who shall (by and with the consent of their branch) withdraw from establishments which shall require them to leave the Society or to break the rules and agreements of its members.

Now it must be evident to H. E. D. that the above programme is entirely foreign to the objects and plans of a mere benefit society. It must be equally apparent that "A Photographic Artist" was not referring to our Union when he urged photographers to provide for the inevitable rainy day. And it is also evident that the attempt to secure any portion of the concessions (or the undertaking of any of the actions) indicated in our programme must result in an expenditure which throws Mr. Davis' 435*l.* into a "very considerable" shade.

The entrance fees which Mr. H. E. D. credits to the payment of expenses amount to less than sixteen per cent. of his estimated year's total receipts. But in a small Trade Union the working expenses are likely to be nearer sixty-six per cent. than sixteen per cent. of the total receipts. As the Union gets larger its percentage of expense gets smaller; but Mr. D. must remember that the entrance fees of members entering during the first year will not be forthcoming during subsequent years. Fresh fees will be forthcoming, but in constantly decreasing proportion to the whole membership.

As an offset to the inaugural year's crop of entrance fees, I place the cost of the branch books and the organizing meetings, the printing of rules, and other expenses which are greatest at the start of a society.

It is impossible to say what will be the percentage for working expenses until we know our membership. The percentage will be high if few join, and low if many join. We do not hope to secure such a membership as Mr. Davis mentions, viz., 1000. The strictness of our rule for the admission of applicants, requiring as it does that applicants shall prove their competency, will naturally tend to restrict our membership, and we only reckon on numbering 400 members in five years from now.

Dismissing the question of entrance fees for the reasons named above, we will consider the actual contributions received. We will place twenty-five per cent. to the payment of branch expenses (rooms, postage, stationery, advertisements, &c.), not reckoning just now the salaries of officers, as all are working "for love." Next, we will place aside twenty per cent. for district and central management (executive and delegate meetings, offices, clerical aid, fares of delegates, central postage, poundage, stationery and printing, halls for public meetings, and interviews with employers). Next, ten per cent. for benefit paid to members unemployed through causes over which they have no control. Legal expenses will consume at least another ten per cent. Trade action and payment of trade benefit to members withdrawn from employment by the branches, at least thirty per cent.

This leaves five per cent. to pass to the credit of the Society as a balance. It will be seen that even in the clerical expenses of the Society is included much work that never comes within the scope of a benefit society, which type of society can therefore work at less expense.

On the management and the work detailed under Paragraphs I. and II. (that is to say, without the "strike pay," which is the main expense of that Society), the "Dockers' Union" spent over forty per cent. of its receipts during the half year ending June, 1890.

Mr. H. E. D.'s "810*l.* balance" is getting badly damaged; but I intend now to show that it would be far from exceptional to hold 810*l.* in hand as balance from 1000 members' contributions. The Amalgamated Society of Engineers arranges by its rules for a balance of 3*l.* per member, the London Society of Compositors for a balance of 2*l.* per member (these are the types of *national* and *local* Unions respectively). If the balance falls below these sums it is restored by an increase in the rate of contribution, the Engineers having paid as high as 2*s.* 6*d.* per week per member. Turning to benefit societies pure and simple, it will interest H. E. D. to learn that, in consequence of the recent valuation according to law, all lodges have had their subscriptions raised from the commencement of this year one penny per month, although the particular lodge to which I belong had over 3*l.* 13*s.* balance per member at the commencement of 1889, and nearly 4*l.* at the commencement of 1890.

Out of the average weekly subscription of 5$\frac{3}{4}$*d.*, our members will pay, roughly speaking, 1$\frac{1}{2}$*d.* for branch expenses, 1$\frac{1}{4}$*d.* for central expenses, $\frac{1}{2}$*d.* for legal protection, 1$\frac{3}{4}$*d.* for trade protection, $\frac{1}{2}$*d.* *for unemployed benefit*, and $\frac{1}{4}$*d.* to strengthen the cash balance.

I must ask pardon for encroaching so far on your space, and will ask you to take that old proverb as my excuse which says something about the relative length of thoughtless questions and satisfactory answers.—I am, yours, &c., Arthur Field.

Exchange Column.

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

Valuable dissolving lantern, safety jets, and belongings, in exchange for microscope or other apparatus.—Address, Wyles & Co., Photographers, Southport.

I will exchange half-plate, camera, portrait lens by Burr, and tripod stand for 12×10 wide-angle rectilinear lens. Any difference adjusted.—Address, F. Simco, Chemist, Wellingborough.

Wanted, a wide-angle quarter-plate lens and instantaneous shutter in exchange for five years of The British Journal of Photography, 1885–89 (unbound).—Address, G. A. Bennett, 6, Melbourne-place, Cambridge.

Wanted, Euryscope lens, whole-plate or larger, also wide-angle lens, showcase, plate and print washers; give in exchange, lecturer's complete dissolving-view apparatus, Lancaster's half-plate International camera set, and Stirn's secret detective camera.—Address, A. D. Clarke, Pailton, Rugby.

Two backgrounds in flatted oils on rollers; landscape with trees, eight feet by seven feet, nearly new; seascape with clouds, eight feet by six feet four inches, new. Exchange for violin, quarter-plate rapid rectilinear, or studio stand.—Address, William Hare, Windsor Studio, Sutton, Surrey.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

A. B. C.—The price of the JOURNAL was reduced to 2*d.* on April 5, 1889.

LUX.—Without an examination we cannot say what is the focus of the lens.

E. DEBENHAM.—1. Tone with platinum.—2. Bleach with mercury, and after washing, immerse in a solution of cyanide of silver in cyanide of potassium.

W. B., NEMO, and one or two others this week have not conformed with our rule by sending their names and addresses; therefore their queries remain unanswered.

B. BOOTHROYD.—1.—Try the effect of a plano-convex lens in front of the anterior combination of the objective.—2. We purpose having an article on the subject soon.

G. WARNER (Liverpool).—If what you sent is a sample of the "bulk," the "sulphite of soda" is useless. By imperfect storage it has become converted into the sulphate.

ARTHUR E. WHITING.—The Eastman Company are the only agents in this country, of whom we are aware, for the Quadruplex burnisher of Messrs. Smith & Pattison, of Chicago.

W. DREDGE.—The sample of pyroxyline enclosed is not at all suitable for making collodio-bromide emulsion, or, indeed, for any other purpose, as it is almost insoluble in ether or alcohol. It seems to be of the kind used for explosive purposes.

A. GRAHAM inquires if a zinc-lined trough is to be recommended as a suitable vessel for fixing prints in if they are afterwards washed in a stoneware pan.—Zinc is not at all suitable for the purpose, as it is quickly acted upon by hyposulphite of soda.

WEEKLY SUBSCRIBER.—1. Messrs. Sprague & Co. have not published the details of their ink process.—2. Use the starch fresh, and the sugar will have no deleterious effect.—3. In enlarging, the posterior element of the combination should be placed nearest the negative.

HERBERT FRYER, C. B., G. F. BROWNE.—An ordinary typographic press answers all requirements in collotype printing, and is the most convenient to use. Inks for this purpose may be obtained from any dealer in printing material, such as Hughes & Kimber and Winston & Co., London.

G. MICHELL (Cornwall).—The phantom, or second image in the negative, is no doubt due to a minute hole in the camera, probably in the bellows near the front. In fact, it has acted as a pinhole camera while the negative was exposing. A close examination in strong sunlight will doubtless prove the fact.

WARDEN.—The frilling was no doubt brought about by the use of the "warmed water." Although during the late inclement weather the tap water was too cold for washing the negatives, "luke-warm" was too much of a good thing, as the result proved. The plates cannot reasonably be charged with the trouble.

SETH.—Some kinds of gelatine keep in a state of solution, or, rather, as a jelly, much better than others. When gelatine has to be kept after it is dissolved an antiseptic should always be added. A few drops of carbolic acid or of thymol will preserve a pretty strong solution for a long time. The stronger the solution, as a rule, the longer will it keep without decomposition. Weak solutions of inferior gelatine, even in the presence of an antiseptic, often deteriorate very rapidly.

X. X. X. says: "I sent a number of negatives to a printer, when I was busy, to be printed and mounted on cards I supplied. Although scarcely six months old, several of them show signs of becoming spotty. The printer says it is the fault of the mounts; but I don't think it is, as I got them from one of the leading dealers."—The only way we can see of settling the question is to place some of the mounted pictures in the hands of an expert for examination and report.

ENAMELLER is in a difficulty with his collodion. He says it works very well at first, but when it gets thick, as it always does by contiuually coating from the bottle, and he thins it with equal parts of ether and methylated alcohol, it does not work so well as it does at first. It does not flow so readily, and seems to dry in wavy lines or markings, and asks if we can account for this. —In use, the ether, being more volatile than the alcohol, evaporates in larger proportion; consequently, in diluting, more ether than alcohol should be used—say, twice the quantity, or in some cases even more.

ROBERT (Chelmsford) says: "I have a large lead tank in use for washing prints. I want to paint it with some solution, as the solder used in joining the lead, I think, might have an injurious effect. Is this so, and is the lead itself bad? Any information as to what would be best to cover it with I should be glad to know."—We do not imagine that the solder will have any more injurious action on the print than the lead. As a coating, good Brunswick black is as good as anything. Aspinall's enamel we have heard well spoken of for similar purposes.

A. W. HERRINGTON complains that he cannot get fine, rich, purple tones with a paper sold to give them when toned by the formula issued with the paper. On complaining to the dealer, he says it is the fault of the negatives. "These are all on the plates which I consider the best in the market. What ought I to do in the matter? Ought I not to have some recompense?"—We cannot say. One thing, however, is certain, and that is that unless the negative is suitable, rich purple-black tones are an impossibility with any paper. The mere fact that the negatives were made on a certain brand of plates is not the slightest criterion of their quality. As well might it be said that because the colours and brushes were bought of a leading artists' colourman the painting must be an artistic one.

W. C. BAX.—*Apropos* of the employment of copper as an adjunct to gold in the toning bath, Mr. Bax writes: "I send you what I imagine to be sulphate of copper, which you might be the better able to tell by seeing it. Beside the stock toning solution you have a strengthening solution of the acetate of soda in one bottle and another for the copper, which you add to your stock once a week. The gold must be added to the bath twenty-four hours before using. My employer engaged a German printer a few weeks before Christmas, but he has now gone back to his own country. He made the bath and obtained first-class tones. I thought you might have heard about the bath from Germany."—The enclosure is undoubtedly sulphate of copper.

W. J. ALLISON says: "I beg to enclose a few prints, and should be pleased if you could tell me the cause of the spots. We have had several batches spoiled, and think the spots are caused by the hypo, which is a new sample. They do not make their appearance for three or four hours after fixing, and no amount of washing will prevent them. When this particular sample of hypo is not used they do not come on at all."—The spots are very similar in appearance to those sent by another correspondent ("Spots"), though much more numerous. We can scarcely imagine that they come from the "hypo." We advise our correspondent to make more tentative experiments on this point, and to give consideration to the answer to "Spots."

SPOTS writes as follows: "Find enclosed prints with spots, which I presume is 'hypo,' but how they got these I will be grateful to know. They have only been subject to ordinary process of washing, toning, and fixing. They remain in still water all night, and are washed by hand night and morning, giving them in all about two dozen changes of water; the spots appear as soon as they are mounted. If you can advise me I shall be much obliged." —The spots are of the kind we have received so much correspondence upon during the past few months. We can only surmise that they are caused as suggested in an article some short time ago, namely, by pernicious matter, in fine particles, settling on the prints while in a moist condition, either after fixing or, possibly, while the paper is drying after sensitising.

A SUBSCRIBER writes: "Please recommend some inexpensive material to make a cover for a temporary studio I wish to erect in my garden? On the back wall of my house, which faces north, I have a box fixed, which contains my background, on a roller, which, I may mention, is eight feet wide and seven feet long. I enclose a rough sketch, showing four posts I am about to put up, with three pieces in the top. Until noon it is shaded from the sun by the house, but after that time shadows gradually creep round the corner, until the side is in full sunlight. Will you kindly say what you would recommend for the sides and top light, and say whether I ought to have more than one set, *i.e.*, a set when fairly bright without direct rays from the sun, and the other when sun is full on."—We suggest that a fifth pole be placed horizontally three feet above the top of the background box, supported at the other end by a piece from the front top piece. Then a large sheet of common unbleached sheeting thrown over will practically convert the whole into a ridge-roof studio. If the sheeting be large enough to reach to the ground, so much the better.

AUCHTERMUCHTY writes: "Enclosed find rough sketch, which I hope you will understand. It is a makeshift chimney or pipe for carrying away the smoke from an enlarging lantern. I use a magnesium lamp that pays out the ribbon by means of clockwork. I must get the smoke from it to the top of the house outside by putting the pipe through a window. The diameter of pipe is about 6 inches at bottom or over the lamp, and it tapers to about 3½ inches where it joins the pipe outside. What troubles most is a back-draught or blow-down. I have tried a revolving cowl on top, but no use; then changed for another patent cowl, but no use. Got a Bunsen burner to heat the cold air in pipe. It helped a little in calm weather, but the least wind filled the room with smoke. Your advice is always my last shift."—The sketch does not show where the Bunsen burner was placed, but it should be outside the room, so as to thoroughly heat the air in the pipe throughout its length. If one burner does not do this it should be supplemented by another higher up. From the sketch it appears that the outside pipe is not carried to the top of the building. If this be the case, the wind striking on the side wall will account for the downward draught in windy weather. It will be advantageous to increase the size of the pipe over the lamp to, say, twelve inches.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 18, *Blisters*. February 25, monthly lantern meeting.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—February 19, technical evening. March 3, lantern and musical entertainment.

THE Fry Manufacturing Company announce a demonstration of lantern slide making at their rooms, 5, Chandos-street, W.C., on Friday evening, the 20th inst., at half-past eight. Mr. A. R. Dresser will lecture and demonstrate, and will doubtless give an interesting evening. The demonstration is not intended to clash with the meetings of existiug societies, but, rather, to provide an opportunity for beginners to obtain practical information and advice. All are invited.

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PHOTOGRAPHY IN COLOURS.

The usual period of time that, for the last score or two of years, as separated the announcements of the discovery of "photography in colours" has been from eighteen months to a couple years; but M. Lippmann's paper, read at the meeting of the cademy of Sciences on the 2nd inst., has departed from this recedent, and has closely followed an announcement of the scovery in Germany. For the premature description of M. ippmann's investigations and results it is possible that national alousy is responsible. Be that as it may, the accustomed fever as seized the newspaper press, but, it must be said, in a less tense form than usual. Enthusiasm cannot be manufactured ntinuously on any one particular subject, especially in view the continued remoteness of what is always said to be a ear, a present actuality.

Turning to the process itself, let us examine it, and see what as been done. At the best there is a photographic representtion of the spectrum, which some persons state to be excellent, hile others can believe it to be such a representation when it explained to them what is intended. How has it been done? thin photographic film is spread in the usual manner upon a eet of glass. This plate is then, with the aid of a plain piece glass, converted into a bath or cell, the two sheets being parated by a piece of indiarubber bent into a U shape, and e whole pinched together by clips. The next step is to pour rcury into this cell. It must he said that the prepared or n side of the sensitive tablet is placed inside, so that the ercury is in contact with the film, and not, as has been deibed, with the glass side of the tablet. As to how the film made, we are given to understand that this is not a matter of ich importance, but it must be fine and transparent, and ist not be granular like ordinary emulsion; in other words, ought to be opalescent, but not creamy.

All being now ready, an image of the solar spectrum is proted upon the prepared plate, and an exposure of from thirty nutes to two hours given, according to whether it is desired t the red end of the spectrum should show or not: so we y understand that an exposure of four times what is otherwe necessary would not appear to injure the violet end of the d of colour. Developing and fixing are performed just usual, and the negative when dry is said to exhibit the ctrum with its seven colours. When seen as a transparency effect is a negative, that is to say, each colour is represented its complementary.

Next, we have to consider "why" it is done, or, say, give an lanation of the theory. Here we have to state that whatr, so far, has been brought forward in the shape of theocal explanation is incomplete almost to absurdity. The mercury, forming a mirror before the sensitive film, reflects the rays upon themselves; they conflict, or, as it is technically termed, "interference" takes place between the incident and reflected ray. The result is the production within the substance of the film (let this be marked) of a series of interference fringes, that is to say, of luminous maxima and dark minima. The former alone impress the plate, and are indicated by a deposit of silver in the form of strata, or layers. From the most exact accounts published these layers are inside the film. Where then lies the cause of the "interference?" Clearly not within the film, because for these strata to exist at all such a thickness of film is predicated as at once to negative any idea of the existence of interference associated with thin plates, such as soap bubbles, &c. And, further, a film thin enough to produce interference colours, or bands, would do so without the intervention of a mirror at all. The surface of the mercury itself acting as a mirror would not produce interference phenomena. There are only two hypotheses remaining: first, the chemical action of light upon the film might produce such vibrations as communicated to the mercury would cause extremely small waves on its surface, which might act like ruled gratings or iridescent buttons; second, the mercury might not be in actual contact with the film. A layer of air acting as a cushion for the whole surface would, if existent, be a potent interference effect producer. Let the interferences be granted, it remains to be explained what becomes of the effect of the light incident upon the film and passing through it before being reflected. Are we to understand that this is nullified? This is impossible, and its effect would be to very greatly degrade any colours arising from interference phenomena, so no brilliancy could be obtained.

Finally, admitting everything claimed, in actual result or in theory, we are met at the outset with the fact that, though the monochromatic colour of each particular part of the spectrum would produce bands of dark and light, the moment the colours of nature, or of a painting, were tried under M. Lippmann's plan the special interferences would vanish, for any particular part of the plate would receive in effect wave-lengths of all sizes, and the interference fringes would coalesce into a grey. We are afraid that with the facts so far before us this new "photography in colours" does not bring us one step more forward than we were forty years ago.

PREPARING FOR THE COMING SEASON—DARK-ROOM ARRANGEMENTS.

Having dealt with the principal details of the dark room, it now remains to deal with that apartment as a whole, for the choice of arrangements will greatly depend upon the space

available for the conduct of the various necessary operations. If a dark room pure and simple is the object, that is to say, a room to be devoted solely to the development and (or) preparation of sensitive plates and films, it will generally be more satisfactory to fit up the place with a permanent sink, having supply and waste pipes connected, and also to have a well and carefully fitted window provided with the necessary means for admitting white light when occasionally needed, and for ventilation. It is not necessary in this chapter to deal with the arrangements required in a room ordinarily applied to domestic or household purposes, as these will be of such a purely makeshift character that sufficient has been already said to enable any amateur to decide what his individual requirements are when he has a few plates to develop.

Between the two extremes, however, there is the "den" or apartment set aside for the general requirements of photography, and as we assume that this will be what is most generally required by the average amateur, we may deal at some length with what may be at once the enlarging, developing, printing, and toning room, and in which all the operations and appliances incidental to photography may be concentrated.

In most suburban houses, of whatever class, there is to be found a room of a nondescript class, sometimes called and used as a bedroom, sometimes as a smoke room or a nursery, and not unfrequently employed merely as a lumber room. To this the amateur photographer is usually relegated by the domestic authorities if he be fortunate enough to secure an apartment to himself, and this is the room which the wise amateur should in most cases select if the choice rest with himself. Usually in a portion of the house built off from the main erection, and probably over the kitchen or "offices," as the house agent is pleased to term the business-domestic portions of the establishment, it is conveniently near to the water supply, and affords ready facilities for the necessary connexion of water and waste pipes without any serious amount of structural alteration or breaking of walls. The main cistern is generally close above the ceiling, and as two sides at least usually are outer walls, there is no difficulty in disposing of waste. We shall assume then that this favourable chance is seized.

In view of the multifarious duties to be exacted from the laboratory, it is in every way desirable that the dark room proper be partitioned off from the rest of the room, and if, as is very often the case, there are two windows, this plan will in all cases be adopted. It is not absolutely necessary, though it is difficult to advise how to combine developing and enlarging with any degree of comfort otherwise. Even when no enlarging is undertaken, or even lantern-slide productions, it is not comfortable to have to perform all the general work of photography in a chamber provided with a permanent or practically permanent ruby window. True, a movable frame may be fitted to the window to darken the room when necessary, but there are many occasions on which it is necessary to use the dark room and the open window simultaneously, hence we strongly recommend the partitioning off of a small portion of the space to form a permanent developing room.

If, however, it be decided to act otherwise, it is advisable to leave the space before the window clear of everything except a mere bench level with the lower framework, and to place the sink a little to the right so that the light falls from the left front when developing. The window itself may then be fitted with a frame provided with a door which may be opened when required for enlarging purposes or the exposure of lantern slides, and either closed after each exposure or else provided with an arrangement by which extraneous white light can be temporarily shut off from the developing sink. The clear bench facilitates this, which would be a practical impossibility if the sink occupied the window frontage.

Assuming, however, that the developing room proper is to be partitioned off, the question arises as to its dimensions, and also the material of which it is to be constructed. The ordinary amateur mind will imagine all sorts of trouble and expense in this part of the undertaking, but there is really no cause for alarm, since at the cost of a few shillings and the expenditure of a few hours' work, if endowed with moderate mechanical ability, he may himself do all that is necessary and find himself the possessor of a thoroughly efficient dark room, altogether independent of the remainder of his space, which may be left fully light or "darkened up" when required.

First, as regards the dimensions of the dark room. It is a mistake to imagine that any benefit accrues from devoting a large amount of space to the mere purposes of development. Where such is the case there is always a tendency to untidiness, and to lumber up the place with all sorts of things entirely needless in the proper execution of the work for which the place is intended. Except in very warm weather, not the least inconvenience need be felt in working in a space covering a square yard of floor; indeed, it is only the question of comfort and ventilation that deters us from more strongly recommending the employment of one of the several handy forms of portable tent obtainable when it is compulsory that one room should be used for all purposes. But a floor space of the dimensions named, though we do not give these as the best or even as desirable, with a height of seven or eight feet, or whatever the room will allow, will provide sufficient cubic space, when aided by judicious ventilation, to render development tolerably comfortable in the very hottest weather. The precise dimensions may, however, be left to choice, or indeed may, perhaps, be determined by the general form of the room and other circumstances.

If the room contain two windows, then of course one will be selected to light the dark room, and a sort of sentry box containing the sink and a shelf or two for necessary bottles can be built round that. Or, if the two windows be on different sides of the room at right angles to one another, a strip may be partitioned off the full length of one side of the apartment, and say, three or four feet wide, leaving the rest of the room available for general work. The extra space thus enclosed will prove useful, as it will enable a separate bench or table to be devoted to the one purpose of changing plates and paper away from the sink, and consequently unexposed to the danger of contamination with the chemicals. It will also provide room for the fixing and washing of negatives to be carried out away from the sink, little details which add materially to the production of clean work as well as to the general comfort.

In the absence of a second window the same arrangement of partitioning will answer, but in this case the light must be taken from the room itself, or, in other words, the partition must be provided with a window. In this instance the dark room should be located, if possible, to the right of the window where circumstances permit, and the sink placed at the end near the window, the operator sitting, at work, facing the wall in which the main window is, with a glazed aperture in the partition to his left. Here he will secure the greatest amount of light, and from one of the best directions. If, however, it is impossible to arrange thus, the best must be made of circumstances, always bearing in mind the requirements—plenty of light (at least to be used when required) and proper direction

The coloured window should be as near as possible to the main light, or the illumination of the developing room will be at the best of times but poor, and in dull weather practically useless.

We are pleased to state that the establishment of our "black list" of defaulters in the return of assistants' specimens is having a salutary effect. A correspondent writes that, a few weeks ago, he sent some specimens of his work, in answer to an advertisement, but could not obtain their return, although they were repeatedly written for. Finally, he wrote saying that if the pictures were not returned forthwith he should communicate with us, and at the same time enclosing a sub-leader cut from our issue of a fortnight back. The specimens came back by return of post, with the excuse that they were "overlooked by the showroom attendant." This, we have found, is a very general excuse when pressure is brought to bear, and the specimens have to be returned, or exposure follows. As we have frequently said before, when specimens and copies of testimonials are not returned within a reasonable time, the senders should not delay in communicating with us, that the names of the delinquents may be entered on the register as a warning to others. As a rule, this step ensures the quick restoration of the pictures to their owner.

According to an American contemporary, the Department of Justice of Canada is about to set up a newly devised apparatus for the detection of crime. Its object is to photograph the image in the retina of the eyes of murdered people when there are no other means of obtaining a clue to the perpetrator of the crime. We had surmised that the idea of the image of a murderer being retained in the eye of the victim was exploded years ago. It has been, at least, on this side of the Atlantic.

A paragraph is once more "going the round" to the effect that photography is to be used in medical diagnosis. A German lady was having her portrait taken, when certain spots on the face showed in the negative which could not be seen in the original, and in a week the lady died of small-pox. It is no unusual experience with portraitists to find in the negative appearances not to be detected in the sitter, notably in the case of incipient freckles. These were more marked in the days of wet collodion than they are now, particularly if the negative were a little under-exposed.

A question was put in the House of Commons one day last week as to whether, seeing the large profit annually made by the Patent Office, it would not be advantageous to reduce the fees. The answer was in the negative. In England the fees on a patent for the full term of fourteen years is 154*l*. In America for seventeen years they are considerably under 20*l*. Here a patent for four years can be had for 4*l*., and the remaining 150*l*. may be paid by instalments for the next four years of 10*l*. annually, the following two years of 15*l*., and for the remainder of the period of 20*l*. a-year. Many a poor inventor, particularly in connexion with photography, who takes but a trifling royalty on his patent, can often ill afford the fourth year's fee, and therefore allows it to lapse; whereas, had he sustained it, he would have received an adequate reward for his ingenuity. However, English inventors are not quite so bad off in the shape of fees as the Germans. In Germany the fees for the full term of a patent—fifteen years—is 265*l*.

The prospect of obtaining more snow and winter pictures this season now appears very remote. It will probably be many years before there is again the opportunity of securing such a variety of winter pictures and studies as there was during the past two or three months. It will be pretty safe to predict that in the next exhibition of the Photographic Society, indeed in many other forthcoming ones, winter pictures will be a greater feature than ever before. Those who intend to turn their winter studies to commercial account should lose no time in the matter if they intend them for Christmas or New Year's cards. The producers of these have long been at work on next season's stock.

Although there may not be many more chances of obtaining photographs of snow effects, there may yet be some as regards hoar frost. During the late winter or early spring months hoar frosts are often very prevalent. But the photographer need be on the alert, as when the sun makes its appearance the sparkling crystals quickly disappear. Often, within a few minutes, what was a series of jewel-decked trees and shrubs is converted into a dripping mass. Lantern slides of hoar frost are some of the most effective that can be projected on the screen, and the early spring is the best time for taking them in perfection.

The marked improvement in the actinic quality of the light during the past three or four weeks is very unusual for this time of year, particularly as compared with what we had for a month or two previously. Spring light seems to have arrived before its time this year, and has been the cause of many over-exposures with the inexperienced. The actinic quality of the light has apparently improved in even a greater degree than its luminosity.

Apropos of photography in natural colours. It is interesting to note the different classes of people who have made this very desirable discovery. Sometimes it has been a learned professor, sometimes a struggling artist, often an obscure and poor student, and not infrequently, as the results prove, by a charlatan. The majority of these loudly heralded "discoveries" have been the preliminaries to the formation of a "limited company" to work the process, and with what result too confiding shareholders know to their cost. When a *bonâ fide* (?) process of taking photographs in natural colours *is* found out the investors in any company formed to work it may rely upon good dividends. Of that there is little doubt.

Last week, when commenting on the projected Copyright Bill, we alluded to the point where a photograph was taken without the consent or the knowledge of the original. This question was forcibly brought to our mind on Saturday last when travelling home by rail. In one corner of the carriage sat, snugly ensconced, a gentleman who was evidently much fatigued with the morning's work, and possibly slightly affected by a little stimulant taken to enable him to undergo it. He was reposing quietly, with the exception of now and then a sonorous sound. The light from the carriage window on the face was all that a photographer could desire for a grotesque picture. Now, supposing we had one of our detective cameras with us, and had taken a shot—and we certainly should have done so if we had—could the somnolent have prevented its publication in the form, say, of a lantern slide, or, indeed, in any other form?—a thing, of course, we should not for a moment think of doing. In the present Act, so far as we are aware, there is nothing to prevent the publication of such a picture, although it would be nothing less than an offensive caricature of a private individual. In the proposed Act, as it stands, there is nothing to meet such a case.

RULED SCREENS FOR PRINTING PROCESSES.

The ruling apparatus for use with the perforated tinfoil ribbon described in my last article may be simple in the extreme or may be made as complicated as the mechanical mind may desire, and half a dozen methods will readily suggest themselves. But for practical purposes, and to secure perfect results, the following constitutes all that is really necessary.

A long, shallow, and perfectly flat trough, something after the style of a printers' "galley," is the first requirement. This may be of thin wood, planed perfectly true, and having fillets of wood or metal screwed or otherwise attached to the edges to form the sides. The length will depend on the size of plate to be ruled, and should be something over three times the length of the latter. If the ruling is to be done on a glass plate it will be as well to provide a recess in the centre of the trough into which the plate will sink so that its surface is almost

level with the bed of the frame; the width of the trough is equal to that of the plate to be ruled.

Next, a sheet of glass a little over twice the length and of the same width as the screen is provided, and should have its edges ground in order to permit it to slide freely and smoothly against the side or sides of the trough, which act as guides. This sliding plate must be pasted smoothly over with opaque paper with the exception of a narrow slit an eighth of an inch wide across the centre at right angles to its greater dimensions, and over the slit is next pasted the perforated ribbon which is to admit the pencils of light. In attaching the latter, care must be taken not to apply any frictional pressure, or the minute apertures will be partially closed, owing to the smoothing down of the slight "burr" raised in punching them out. If the edges of the slit be touched lightly with paste or gum, and the perforated slip stretched longitudinally along it, it will almost attach itself, very little careful pressure with the finger tips sufficing to cause it to adhere, and the thickness of the paper intervening between it and the glass will prevent its subsequent damage under ordinary treatment. To ensure even greater immunity from this danger, a couple of strips of paper pasted along the extreme edges of the glass, *over* the perforated strip, will protect it from contact with the sensitive film in sliding, and the loss of sharpness will not be appreciable if the exposure is made under proper conditions. As an additional protection against extraneous light reaching the plate, a mask of cardboard the size of the frame, and having a central slit corresponding with the perforated strip, may be hinged along one side by means of a slip of leather or linen, and the apparatus is complete.

To use it, a sensitive plate is placed in the central well or recess, and the sliding plate carrying the line of perforations is placed at one end of the frame, with the tinfoil strip downwards and the hinged cardboard flap closed. In this position the sensitive film is entirely protected from light, and the apparatus may be taken out into daylight, care of course being exercised that the sliding plate is not allowed to move until the moment of exposure.

The exposure is made by gently inclining the frame in the direction the plate has to slide, allowing it to list also a little to one side, so that the glass may guide itself against one side. The length of exposure may be varied to a considerable extent by increasing the angle of inclination, a fact that will be found useful in working with plates of different rapidities or in different lights. As the plate slides, the line of perforations traverses the whole length of the sensitive film, which is then again cut off from the light, and in its passage describes a series of fine lines. If a screen of *cross* lines is required the apparatus must be taken back into the dark room and the sensitive plate turned at right angles to its original position and the exposure repeated; but so far as my experience goes, a better result is obtained at this stage by a single ruling. If a cross-ruled screen is a *sine quâ non* it is better made by subsequent reproduction, either by contact or in the camera, then of course making the double exposure.

As regards the light to be employed, if daylight is used the exposure should be made from the far side of a room opposite the window, in order to make the rays that reach the sensitive film more nearly parallel, and also to avoid too strong a light. A small length of magnesium wire burnt at a distance would seem to be a better means of lighting, or where the plate is sensitive enough, a paraffin or gas flame. The quick exposures made by simply allowing the sliding plate to move by its own weight are better suited for gelatine plates; if slower collodion plates are used, it will be found preferable to adopt means to give a slow and regular motion.

This is only one plan, and that the simplest I can imagine of operating upon glass plates; but if sensitive *films* are to be used, the arrangement can be considerably modified. For instance, the perforated screen may then be a fixture, and the films, if flexible enough to be rollable, be passed across it by means of rollers. In the case of celluloid, or for glass plates, when a slow, regular motion is required, the sensitive surface may be actuated by tapes passing over rollers, or the perforations themselves may be made in a flexible band passing over a roller or rollers, as in one of the numerous forms of instantaneous shutter introduced some years ago. But, as I have already said, there are numerous methods by which to secure the result which there is not space or time to describe in detail.

And now with regard to the sensitive films best to use. I have spoken mainly of glass plates, though for most of the purposes for which these ruled screens are required, a film screen is preferred. The glass plate, however, forms a convenient method, perhaps the most convenient, for producing a "master screen" from which others of any sort may be reproduced at will. Gelatine plates, moreover, possess for this purpose the double advantage of great sensitiveness and sufficient toughness to resist the friction that occurs in making the exposure, points in which collodion films fail. However suitable or unsuitable gelatino-bromide screens may be for the actual printing operation, there can be no doubt as to their thorough suitability when used simply as negatives from which to make duplicates of any degree of delicacy or density. The chief requirement, it should always be borne in mind, is transparency of the clear lines; the density may vary according to the negative and the class of subject, but there can be no half measures in the matter of clearness. For this reason it is doubtful whether gelatine plates or films can be satisfactorily applied to the actual purposes of process work, though they may be utilised as steps in that direction.

In my previous article I spoke of the desirability of making the original or "master screen" coarser than is required, and reducing it to the necessary degree of fineness by reduction in the camera. This is due, I dare say, solely to the peculiarities of gelatine plates and their great proneness to "blurring," "halation," or "lateral spread" of the image in development. Whereas a screen no finer than forty to the inch may be satisfactorily got out of a gelatine plate, the same cannot be said with certainty when we have to deal with eighty or a hundred. Again, with gelatine plates it is almost impossible even at the degree of coarseness first mentioned to judge exactly when to stop development, for it must be remembered by those who have never attempted this sort of work that the "image" as it appears in the dark room is at best only an even tint resembling fog. With collodion plates which show more surface contrast than gelatine, and which permit some idea of density to be formed from the colour or intensity of the veil that is apparent, it is difficult enough to follow what is going on, but with gelatine it is almost hopeless; indeed, for fine work it is purely guess.

But if gelatine plates are to be used for making the coarse screens on a proportionately large scale, the process would seem to promise to be rather an expensive one, for plates at least twice as large as the ultimate screen will be needful. There is a way out of the difficulty, however, though it must not be hoped that such screens can be ruled for nothing. Fortunately, the class of work executed in this style is as a rule small—possibly on account of the great expense of the large screens; but if a 12×10 screen is required it may be had at a cost of less than twice the market value of a plate of that size. The way to proceed is this:—Gelatino-bromide paper is vastly cheaper than similar plates, and it is also capable of giving greater clearness and contrast; therefore, let your "master screen" be ruled on *smooth* gelatino-bromide paper, and if not finer than thirty or forty lines to the inch it may be copied *as a positive*, and will be sufficiently clear to reduce well to one-third, which would be quite fine enough for any 12×10 work, and the sensitive paper can be procured thirty inches wide.

For small screens I much prefer this plan as giving a better result than direct work, and in making the reproduction I invariably use collodion. With a proper arrangement for giving a slow, regular exposure, it is comparatively easy to make direct screens on collodion films, especially if these be stained to prevent the spread of the light; but the best plan of all is to employ the reversing process with nitric acid or iron-alum, in which case any fog or veil resulting from such spread tends only to greater clearness and delicacy. In employing collodion films—I speak of dry plates of course—in order to enable them to resist the friction it will be necessary to apply an albumen or gelatine preservative in order to protect the excessively tender film. For purposes of reproduction this is, of course, not necessary. Another advantage of the collodion plates is the easy manner in which they are stripped from the glass and converted into films for insertion between negative and print. All that is necessary is to treat the glass before coating with powdered talc, and after fixing and washing the image to apply to the plate a thick solution of gelatine and allow it to dry, when the whole may be stripped with the greatest ease.

If it should be necessary to use the wet collodion process in the ruling operation, the whole plan will have to be altered. In this case a screen carrying the perforations may be provided on a large scale and arranged to move smoothly either in a horizontal or vertical direction between the camera and an inclined illuminated screen, when a similar result will be produced to that of the contact apparatus. One thing, however, must be observed, namely, that the lens covers *well* the size of plate required, and that it is sufficiently "stopped" to allow the lines at the margin to be as sharp as those in the centre of the screen.

W. B. Bolton.

IMPRESSIONISM IN PHOTOGRAPHY.—ON MR. DAVISON'S PAPER.

Mr. George Davison's paper, read before the Society of Arts, has, we suppose, by this time been read, marked, learned, and inwardly digested by most of our readers. It forms the latest manifesto of the party of which he is the able and enthusiastic supporter and exponent; and whatever we may think of it, it is not likely that Mr. Davison thinks he can say much more.

Although the paper is a very long one, its main propositions are included in a very short compass, and so is—will he excuse us for saying it?—the fundamental fallacy which underlies them. Mr. Davison declares himself the apostle of materialism. "Matter is the storehouse of every possibility." The supernatural, of course, is abolished, and "wonder" reigns in its stead. In the same breath we are told that "a basis of material fact and proof is demanded for every principle that is sought to be established," that "matter is the storehouse of every possibility, and the observation of its *infinite* functions the only source of true and useful knowledge and progress." Should the very latest intelligence from the storehouse of science upset the present calculations of the naturalistic student, he will cheerfully try another tack, "make a readjustment of his principles, and modify his methods in accordance." This, by the way, is good news at any rate; for it is quite on the cards that "science," having told the impressionist to trust to "impressions," may end by telling him that nature is such a complicated machine, and his means of viewing it so imperfect, that it would be better to give up the whole thing as a bad job, in which case we shall once more have a clear field left to ourselves.

Then, again, naturalism, knowing perfectly well that all fine art, hitherto (symbolical, historical, and religious), from the Egyptians downwards, has managed to develop and maintain its forces and powers totally independent of science, makes a clean sweep of them all, as "a tyranny of previous great names and works" which has trammelled us by conventions and chained us by dogmas. After a long paragraph disputing the claim of past fine art to anything more than a mere tickling of the senses, we are told, with strange inconsistency, that, "even in historical pictures, mythological subjects, and the like" (notice the careful avoidance of religious subjects), "there may be something of the natural character, and this may captivate the æsthetic sense." And then again, harking back to the "direct reference to nature," we find with reference to such pictures that "the common criticism of the public in a gallery, 'Oh! that's not natural; nothing like that was ever seen,' when quite unconventional and not the product of hearsay, is generally the ultimate verdict upon such an imaginative picture, and coincides with the more completely cultivated and scholarly discrimination which discerns where and why the thing is not true." So that in his haste to condemn, this naturalistic, scholarly discriminator is, we find, quite content to bracket himself with the ignorant Dick, Tom, and Harry, gaping at pictures in a crowd.

Now, we do not think we much understate the naturalistic position when we say that it is quite content to limit itself to landscape work; at any rate, the illusion of reality due to the imaginative power of original genius finds no place in his method. The landscape, and what may happen to be in it, is the only kind of nature that Mr. Davison seems to have any eyes or any room for. We have seen how he treats the masterpieces of past times. They are not germane to the subject, and therefore are ruled out of court. Of course, we know from Dr. Emerson "that it is the instinct of genius to find beauty and holiness in new and necessary facts, in the field and roadside, in the shop and mill," and we also get some inkling of the matter from the Americans, who, with more dollar capacity than any other, gave over 22,000*l.* for Millet's picture of a French clodhopper with his hat off and his ungainly companion in a ploughed field. But most men of "culture" would "yearn" for a more congenial companion on their walls, and a more refined illustration of the teaching power of fine art; and the naturalistic scholar with his severe regard and entire repudiation of imaginative power seems unable to provide it.

And here we come to what we think the fundamental mistake in naturalism, and that is, that it makes the spiritual world—the world of causes—antagonistic to the natural world—the world of effects. The scientist approaches nature so closely, and is so absorbed in watching the processes by which she is sustained, that he can see nothing beyond what is evident to his senses. They bear a witness to the truth of his ideas, for all the appearances of nature are in his favour. He can see all the facts, facts, facts; why should he trouble himself about an unknown Factor?

Now, we are quite willing to accept the premises of the scientist and his facts, but we deny his conclusions. There is no reason for any conflict between true science and the spiritual world. They are a light to each other if we are to have a correct understanding of both. Science without God is only half the truth, and God without science is the abstraction of superstition. Science should be the *Ancilla Domini* to art, and it is only owing to the stubbornness of both the scientist and the theologian that she is not. For man in this world is a compound of the earthly and the spiritual, and no attempt to divorce the two that has been made, or ever can be made, will be successful.

A suspicion that there is a weak point somewhere in naturalistic formulæ seems to haunt the minds of those who find it necessary to banish nearly all modes of pictorial representation except their own. But there is no necessity for this, and the "tyranny" over fine art must surely begin and end where science is so merciless as to shut out the light of infinite wisdom. We cannot imagine anything more interesting to the painter than the study of sight, the theory of its sensation, the colour waves, the production of tints, and so forth. But there is something beyond and above all this, and to make a stringent rule for the representation of natural scenes out of a scientific theory of eyesight would never have occurred to anybody not wedded to a materialism so blinding as to shut out all imagination and all the higher and nobler attitudes of the human soul.

The erroneous judgments due to the testimony of the eye are continually corrected with increasing vigilance by the conceptions of the mind. The way in which the ciliary muscles of the eye contract and expand the vision belongs to science and materialism; the way in which the mental message is received and used by the brain does *not* belong to science, and has nothing to do with it. The first impressions of external objects hardly amount to perception at all. A baby has impressions of things around it nearly as accurate as the naturalistic philosopher has, and equally without any intelligent perception derived from the deliberate operation of the mind. To accurately comprehend things in fine art requires a further reviewing and introspection of them from the fulness of the mind in thought and emotion. What is in nature to one man cannot be seen by another for want of that intuition which seizes the fullest impressions and retains them, striking out new paths of its own, and revealing powers of which the guiding impulse lies in the individual mind. Every mind has not this power of measuring truth. Even in such a mechanical process as photography the individuality apparent in the best work is irrefragable proof that something has taken possession of the mind of the artist of a higher mental quality than is granted to another; "that is to say," says a great critic, "some quality of the mind into which the quality of the object sinks deepest. The imagination gives out what it has first absorbed by congeniality of temperament, what it has attracted and moulded to itself by elective affinity, as the loadstone draws and impregnates iron."

There is no part of the naturalistic creed so melancholy to contemplate as that which denies a didactic or teaching power of a salutary character to imaginative art, and which necessitates a cutting adrift from all the influences for good which it includes. We consider ourselves only one out of a multitude of those who find a perennial source of gratification and enjoyment of the keenest and loftiest character in the contemplation of the imaginative work of past and present great artists. We know of no impulse and stimulus to thought more direct and convincing than that which such pictures suggest. Whatever may be the effect of literature on the mind, it is emphasised and accentuated a hundredfold by these illustrations of it from the agile fingers of genius. Mr. Davison alludes more than once to the feeble interest aroused by symbolism and imaginative creations. We do not believe it. The true love of such paintings arises not from the criticism of the connoisseur, but from the feelings they awaken as the mind grasps the spirit and meaning of them. Mr. Davison says it is not æsthetic pleasure, whatever that may be. But the question is, Is it pleasure, is it a reasonable pleasure, is it refined pleasure? Then it is a pleasure which teaches. Did the symbolism of the Egyptians teach nothing? A great writer has said of them: "They consecrated fountains, turned their faces towards the East in

their adoration of God, and also made themselves carved images of horses, oxen, calves, lambs, even birds, fishes, and serpents, and placed them in their houses and other places in a certain order according to the spiritual things of the Church to which they corresponded or which they represented. They placed similar things in their temples that they might recall to their memories the holy things which they signified." Egyptian symbolism, then, was evidently a serious business. Its didactic power was of no mean order, for it kept constantly before the mind, what in these days we may well remember, how nature may speak to us in another language than that of science.

Were those effeminate ages with feeble interest in them which produced Raphael, Michael Angelo, Fra Angelico? And is the literature of mythology, or symbolism, or religion, or history, quickened or not into being and palpable form by the genius of a Titian, Rubens, Poussin, Holman Hunt, or Millais? And just as surely as noble art refines and purifies, so ignoble art lowers and pollutes the mind. To cut the matter short, do Rabelais exhibitions teach nothing? Do the frizzled dames and fine gentry who have flocked there—apt scholars in their schooling—learn nothing from the contagious power of a sympathetic sensuality? Is that teaching, and if it is, don't they saturate their minds with it from the pictures and not from "another man?"

"Every naturalistic artist must be a scholar." Yes; but he must take the "classic" as well as the "modern" side of the school, and then he will find that there is no necessity to separate either science from the imagination or the imagination from nature. "To be true, and living, and moving to our sensibilities," says Mr. Davison, "the scenes and subjects depicted must be studied directly from nature by the artist." What is there in, say, Hunt's *Claudio and Isabella* that is not "true, and living, and moving to our sensibilities;" and what is there in the scene that is not "studied directly from nature by the artist?"

True art will never be degraded by the searching probe of science, nor will she ever cease to stir the loftiest emotions, to attain the highest possibilities, and exercise the most persuasive power, so long as the gulf be kept bridged between science and the supernatural. We believe that every intelligent and poetic mind will protest against the threatened destruction of this connecting arch. The supernatural may be losing its power to command worship, and what is called "a nobler wonder" may try to supplant it; but how if Dr. Johnson be right after all when he said, "Wonder is the effect of novelty upon ignorance?" VINDEX.

COPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY ARTIFICIAL LIGHT.—III.

In my last article I offered some suggestions anent the working up of certain kinds of cartoons or pictures by means of an ordinary lead pencil and brush charged with Indian ink. This improvement of the pictures to be copied is a very essential part of the operation we are considering, and not only is such mending applicable merely to the rougher class of illustrations so often now met with, but it may also be extended to and applied with good effect to ordinary photographs, such, for instance, as portraits in which some portions are lacking in detail. How often do we meet in with such, where by an injudicious mode of lighting the sitter, one side of the head has a snowy appearance and is lacking entirely in detail. Such examples are much improved by a few judicious touches with the brush and a suitable tint of colour. Dark eyebrows also can be worked up nicely where they are wanting in force and vigour, and many other little additions made to the shadows so as to bring up contrast. This working up in no way destroys the original or detracts from its value, for any touching up is very easily removed from the surface with a damp sponge or handkerchief after a satisfactory negative has been procured, when no traces of the working up will be left. When working on some classes of illustrations, of course any working up or dodging of the original would simply be absurd when such are of a class as to make the same inadmissible, such as in legal documents and cases where an absolute facsimile is to be produced; but in a very great number of ordinary every-day subjects a little working up of the original is always appreciated, and therefore permissible, and not only does this modelling apply to the picture, but the negative itself should come in for a share of attention. It is only by attention to these by-paths in photography that really excellent productions of a kind are turned out.

Having, therefore, bestowed as much labour as possible on the picture to be copied, the next step is to endeavour to obtain as perfect a negative as possible from the same. If as it has been said that in portraiture the sheet anchor is modelling or retouching, so in the production of negatives from such subjects as are black and white, intensification is hardly less important. Of course I am now referring to where the work is being undertaken with the aid of gelatino-bromide dry plates; and such plates as yield good plucky negatives only should be employed. Once an operator gets into a certain groove of working with any special developer or brand of plate it is not good form for him to begin chopping and changing about, and when he can with ease produce negatives from black and white objects that show virtually clear glass and dense blacks, so dense, as when held up at a distance of about two feet from a gas flame the latter is just hardly visible through the dense parts, then he has overcome one of the difficult problems in photography. With some classes of plates and proper system of development, at times followed with a good smart intensification, such negatives are easily obtained. Nor is it by any one special formula that such are got. I know in my practice I work one way and my son works another, yet we somehow generally arrive at the same end. I use a soda developer, as described recently by me when writing an article on stereoscopic work, and when I have to take recourse to intensification I employ the ordinary mercuric chloride and top up with a solution of ammonia.

One very important point, however, is to look thoroughly well after the complete washing of the negative before it is attempted to intensify. When such is neglected, failure in some respects is sure to follow. When working with the aid of two Argand burners, as described by me, a very few trials will suffice to enable an operator to learn what is the correct exposure for the particular class of subject and form of developer he is using. In this matter I can only say that with my formula for development I have to give about double the exposure that my boy gives; of course, he uses a formula of his own.

I generally take my gas from two gas jets, and this gives me a good blaze of light in the Argands, in fact, quite as much as they can take up, and when using them in this way and copying, say, a cabinet photograph, and using a plate of about nineteen on the sensitometer, with lens stopped down to *f*-11, an exposure to gaslight alone of about six minutes just suits my style of development. I rather prefer to under-expose and box well up in developing. Of course, my formula does not stain the plate, and as a rule I intensify. When developing, it is not advisable to carry the same to such an extent as causes the shadows to veil over. When all detail is out it is best to stop and get density by intensifying; by this means clear glass is more easily obtained. Of course, I am now treating of such subjects as are merely black and white. There are many other classes of subjects where the middle tints must be looked after with the utmost care, but in such subjects as printed matter, hymns, &c., the chief aim is to obtain clear glass and dense blacks, and in my opinion this is best obtained by not carrying the development too far so as to veil over the transparency of the blacks, and finally to obtain density by a good smart intensification.

In some classes of subjects I find it very useful to employ a camel-hair brush, charged with a solution of alum and hydrochloric acid, to stop development in any particular part; but of this I shall have more to say when I come to treat of the development of positives on lantern plates from negatives obtained by artificial light. A beginner must, however, pay strict attention to his exposures, and make this dovetail with the particular form of developer he is best acquainted with. It will also be found that in copying photographs a very different state of matters exists than is the case when merely copying black and white subjects, such as printed matter, &c. Here a more prolonged exposure will be found necessary, but once a beginner makes a few exposures he will soon feel his way, and hit off to a nicety the right time for the different subjects.

To my mind there is a great fascination in being able to copy by means of artificial light some of the numerous interesting book and other illustrations which are so often met with; and when lantern slides are produced from such subjects as are suitable in many ways for private exhibition, the charm of this branch of photography is much enhanced. T. N. ARMSTRONG.

PHOTOGRAPHY IN THE COLOURS OF NATURE.*

In 1879 Cros† abandoned the idea that red, yellow, and blue are primary spectrum colours, but still held that there are three primary colours and mixtures thereof, and that these primary colours are orange, green, and violet. Like Duhauron, he decided to make negatives by light of these colours and prints in blue, red, and yellow.

In 188-, Dr. F. Stolze, of Berlin, made a series of investigations, and tried to solve the problem by devising a procedure more in accordance with Young's theory of colour.‡ He said: "Although the colours correspond with certain external processes in nature, there is also no doubt

* Continued from page 104.
† *Bulletin of the French Photographic Society*, 1879, p. 23.
‡ *Anthony's Photographic Bulletin*, 1888, pp. 516, 555, 588, 647, 678.

that colour as such is nothing objective, but a subjective sensation, based upon the peculiar irritation of the visual nerves by those external proceedings. We can, therefore, only hope to produce a picture in natural colours when we are enabled to reproduce upon the same the proceedings which furnish to us the colour impression." "The general idea of all colours being based upon the three principal colours—red yellow, and blue—is an erroneous one." "Theodore Young . . . assumes that there are three kinds of nerve fibres sensible to red, green, and violet. Objective homogeneous light excites all three; but with red the first is excited strongly, the second and third weakly; with blue, the second and third moderately strong, the first weakly; with violet, finally, the third strongly, and the first and second weakly. If all three kinds of nerve fibres are equally strongly excited, the impression of white light will take place."

This theory, in accordance with which Dr. Stolze tried to devise a theoretical solution of the problem, is only partly correct, measurements by Clerk Maxwell and others having shown that the "red" sensation is neither affected by blue-green, blue, or violet rays, nor the "blue" (violet) sensation by red, orange, or yellow rays, nor the "green" sensation by red or violet rays. Neither is it the red rays that chiefly excite the red sensation, nor the violet rays that chiefly excite the blue (violet) sensation.

As a result of elaborate calculations, which, it must be said, could just as well have been made without any reference to Young's theory of colour, Dr. Stolze came to the conclusion that if three suitable selective colour screens were used in connexion with colour-sensitive plates, three negatives of the spectrum might be obtained, from which prints in cyan blue, carmine, and yellow, if superposed, would reproduce the colour effect of the spectrum. He did not show how to make selective colour screen calculated to secure the right kind of negatives to carry out this idea, nor state what should be the form of the intensity curves in such negatives of the spectrum. He merely gave a table, showing on what parts of the spectrum each negative should fix colour, and said: "If successful . . . . in selecting the colour screens in such a manner that they will let the colour pass through which are called for in this table, one will indeed be able to reproduce a pure spectrum in this way." By further calculations, he was able to show that this plan, even if successfully carried out, would not ensure the correct reproduction of mixed colours. He said: "All pure saturated spectrum colours will also be obtained quite satisfactorily in the reproduction, but the mixed ones only partly." "Oftentimes they have to become more or less impure." "But the clearest lights and a number of mixed colours appear very unsatisfactory." He added: "The ntelligent support of the artist can lend improvement," and recommended also the production of a fourth (ordinary) negative, to be used in combination with the others, to modify the effect, especially in the high lights.

This plan cannot be said to definitely represent the application of Young's theory of colour, but it may be practically better than anything that that theory would indicate, if we leave out of account the suggestion of a fourth negative.

In 1885 Dr. Vogel published a plan, which is a modification of Poirée's.* Like Poirée, he proposed to make a separate negative for each spectrum region; but, instead of using plates sensitive to all colours and exposing through selective colour screens, or illuminating the subject by monochromatic lights, Vogel proposed to sensitise plates specially for each spectrum region, which would amount to the same thing, and instead of projecting the pictures with coloured lights, he proposed to make as many pigment prints as negatives, each in a colour complementary to the light which acted to produce the respective negative, and to superpose them as in the Collen method.

There are no known dyes with which this plan could be carried out, and even if there were, it is, I believe, too complicated to be practicable.

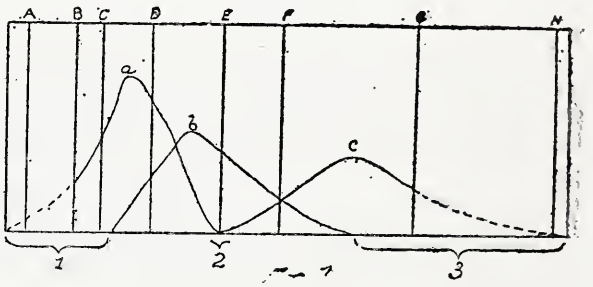
In February, 1888,† I demonstrated a procedure based upon the assumption that, although there are more than three or five or seven primary spectrum colours, all of them—and in fact all the colours of nature—can be counterfeited to the eye by three type colours and mixtures thereof. This was not a new observation, and my plan did not differ very materially from that of Dr. Stolze, minus the complication of a fourth negative, except that it was more definite; and instead of merely publishing it as a suggestion, I found means to carry it out, and made a practical demonstration of it. I proved the process by photographing the spectrum itself, employing compound colour screens carefully adjusted to secure definite intensity curves in the spectrum negatives, so that they would make colour prints which counterfeited the colour effect of the spectrum when superposed. The adjustment of plates and screens to secure *spectrum negatives having definite intensity curves*, which, I believe, had never before been done, made all the difference between an indefinite and uncertain method and one definite and precise.

Promising results were obtained by this process, but I soon came to the conclusion, already reached by Dr. Stolze, that a process might reproduce the colour effect of the spectrum, and yet not be capable of reproducing perfectly the compound colours. The solution of the problem was incomplete until I discovered a new principle, according to which such a procedure can be made to reproduce not only the spectrum, but also all the hues of nature.

This new principle, first stated by me in a communication to this Institute on November 21, 1888,* is that of making sets of negatives by the action of light rays in proportion as they excite primary colour sensations, and images or prints from such negatives with colours that represent primary colour sensations.

In order to understand this principle, I must explain that although the spectrum is not made up of three kinds of colour rays and mixtures thereof, the eye is only capable of three primary colour sensations—a distinction of the utmost importance, for the reason that the spectrum rays, which most powerfully excite a primary colour sensation, are not the ones which represent the character of that sensation. The primary sensations are red, green, and blue (violet); but it is not the red, green, and violet spectrum rays that most powerfully excite these sensations. According to Clerk Maxwell, the orange spectrum rays excite the red sensation more strongly than the brightest red rays, but also excite the green sensation; the greenish-yellow rays excite the green sensation more strongly than the purest green rays, but also excite the red sensation; the yellow rays excite the red sensation as intensely as the brightest red rays and the green sensation as intensely as the purest green rays. Maxwell's diagram is a graphic representation of the result of careful photometric measurements of the effect of the spectrum upon these primary sensations.

1, 2, 3 are spectrum colours, which represent primary colour sensations,



because each excites one primary colour sensation exclusively, and a, b, c are curves, showing the relative power of spectrum rays to excite the respective primary sensations.† These conclusions are stated and indorsed in all recent text-books on colour, and that eminent physicist, Lord Rayleigh, goes so far as to say that the theory is as well proved as the law of gravitation.

I emphasise this, because another theory of colour has recently been proposed, which, although it has been circulated in the newspapers as if it had high scientific indorsement, is really inconsistent with established facts, and cannot, therefore, be true.

The carrying out of my new principle, according to Maxwell's measurements, therefore, involves the production of one negative by the joint action of the red, orange, yellow, and yellow-green rays, in definite proportions, to represent the red sensation; one by the joint action of the orange, yellow, green, and green-blue rays, in definite proportions, to represent the green sensation; and one by the joint action of the blue-green, blue, and violet rays, in definite proportions, to represent the blue sensation.

Negatives of the required character can be made by exposing a cyanine-stained gelatine-bromide plate through a double screen of chrysoidine-orange and aniline-yellow of suitable intensity for the red sensation, a cyanine-erythrosine gelatino-bromide plate through a screen of aniline-yellow of suitable intensity for the green sensation, and an ordinary gelatino-bromide plate through a double screen of crysophenine-yellow and R R methyl-violet for the blue sensation. The plates and screens are correct when they will secure negatives of the spectrum showing intensity curves substantially like the curves in Maxwell's diagram. The negatives

* *Annalen der Physik* (N.S.) XXVII., p. 130; *Photographic News*, 1887, p. 568.
† *Journal of the Franklin Institute*, **125** 345.

* *Journal of the Franklin Institute*, January, 1889.
† Taken separately, each of these curves is probably correct; but the three do not compound to represent accurately the relative visual intensity of different parts of the spectrum, because the curve of the green sensation is relatively too low, and that of the blue sensation too high; if the curve of the green sensation be drawn as high as that of the red, and the height of the blue curve be reduced one-half, they will compound to represent fairly a photometric measurement of the visual intensity of the spectrum.

can also be made on certain makes of ordinary commercial gelatino-bromide plates of the most rapid kind, by the use of quite different colour screens for the first two, but only with exposures of from five to fifteen minutes on well-lighted landscapes, aperture of objective, *f*-12.*

In photographing objects in a changing light—landscapes, for instance—it is important that the three sensitive plates be exposed simultaneously; and in order to accomplish this, I devised a triple camera, having three lenses so arranged in connexion with reflectors as to bring all the points of view within a one-inch circle. With this camera, the production of sets of negatives of the required character is a simple and easy matter, it being only necessary to insert the plates, raise the flap until the exposure is made, take the plates out again, and, when convenient, to develop them together in the ordinary way.

There are two ways of making the heliochromic pictures from these negatives. The first method does not produce a permanent picture, but a screen projection.

Lantern slides made from the heliochromic negatives and exactly reversing their light and shade must also represent the effect of the object upon the respective colour sensations. One lantern positive, when seen by transparency in red light, reproduces the effect of the object upon the primary red sensation. Another, viewed in the same manner by green light, reproduces the effect of the object upon the green sensation. The third, viewed by blue-violet light, reproduces the effect upon the blue sensation. Evidently, the combination of these three images into one must form a reproduction of the object as seen by the eye, correct in form, colour, and light and shade. Such a combination is effected by projecting the three pictures with a triple optical lantern, so that they exactly coincide upon the screen. The result is what we have been led to expect.

F. E. Ives.

(To be continued.)

* I claimed that the production of such a set of negatives as I have described represented the application of a new principle in composite heliochromy. Some photographic *littérateurs* were disposed to sneer at such a claim; but after leaving the matter open for discussion for nearly two years, I applied for a United States patent, and, in view of all the evidence, was granted exclusive right to make such sets of negatives.

DR. EMERSON'S REPLY TO MR. DAVISON.

Dr. Emerson sends us a communication bearing the title "Mr. Davison's Misrepresentations," which we subjoin, with the exception of certain parts of a strongly personal nature that we have felt it necessary to excise:—

"There is an old adage that weak men hate none so much as those who have done them favours or taught them how to shoot. The truth of this adage is pleasingly exemplified by Mr. Davison's 'reply.' Mr. Davison, an 'audit clerk,' has found time after or between office hours to perform good secretarial work for an amateur photographic club, to write 'drivel' (his own word), peppered with a grain or two of other people's property, and to take, at most, *four* photographs having any claim to artistic merit. In each of these the 'clouding' is false, but what of that to a man who *talks* of values? Having done these great deeds, and had his vanity flattered by a couple of portraits published in the photographic press, he begins to think himself some one, and poses *in public* as an authority. He has, now that his master—myself—has seen fit to abjure certain philosophical doctrines, been ungrateful enough to try and belittle me. Well, so be it. But in so doing he unwittingly belittles himself, for he has written me that I alone of photographers was an artist or knew what art was, that my book (*Naturalistic Photography*) was most original (*vide* his review in *Camera Club Journal*), and he, a little while ago, brought his pictures (?) down to me to select the good ones for reproduction, and he wrote me afterwards that he had yet one he thought I should approve of. He told a friend he was taking 'pinholes' *for me*, but when I wrote asking him for them I could get none, and so on, and so on. It did his insight credit to recognise his master, but now his master has thrown him up *as unworthy*. For art one must give his skin, and learn to labour and to wait. . . . .

"As to the question or originality of naturalistic photography, the photographic press and the chief photographers have allowed that. That certain vague ideas on naturalism were current in the studios in certain circles I know, for I have the pleasure of the friendship or acquaintance of nearly every member of what is called the 'modern school,' and what they think of my originality and work shall one day appear. It is not surprising to find the plagiarist who has lined his pockets with guineas taken for re-writing other's ideas—belittling that other. But to one who is thinking and working day and night at art, and has the knowledge, new ideas are not uncommon, and one day I shall offer a philosophy of art that will be, I venture to think, generally accepted and original; but that is a matter for ten or twelve years' more constant study and work. My plagiarist must not tell me I have no right to kill the goose that laid the golden eggs—it is too amusing.

"The limitations of photography are all I have said, I regret it. I have been in correspondence with those able investigators, Hurter and Driffield (who have said, if they are proved wrong, they will withdraw ten years' work), and understand the matter thoroughly. I have confused nothing, the *control of the values* is most limited, and by development there is *no control*. I leave all scientific photographers to laugh at 'the power to alter relative values by exposure, development, and other purely photographic means is *infinite*' (more 'drivel')!

"Mr. Davison's art knowledge is shown by the words, 'What on earth has "dexterity" to do with it?'—a little knowledge is really a dangerous thing.

"It may take Mr. Davison more than a *few weeks*, doubtless, but then he can only dabble in art after office hours.

"As to claims of novelty* for rough papers, I refer readers to the trash written by Mr. Davison on this subject in the *Photographic Art Journal*, a few months ago. I tried rough paper some eight years ago, and the fact is recorded in *Naturalistic Photography*. Others tried it before me, and Mr. Mostyn Clark made a series of elaborate experiments with printing papers *some years* ago. (Results exhibited at Pall Mall.)

"I have no doubt certain members of the Camera Club *of the Davison type* felt my presence there a satire, and will feel more comfortable now they can pose undisputably as authorities to those who are silly enough to heed them. But I seldom trouble that institution, although I was one of the original founders, which Mr. Davison was not. Now that I have left, it will not be out of place to ask a few pertinent questions of Mr. Davison.

"I once asked to see the minutes of the first meetings of the Club before Mr. Davison's accession to office. I was informed they had been destroyed. I should like to ask Mr. Davison if that was a fact, and, if so, *who* destroyed them?

"Again, the old company broke faith with its shareholders. I took twenty shares on certain conditions, and afterwards those conditions were altered—certain rights were taken away. This was, from the commercial point of view, a *breach of faith*.

"Again, I am informed a steward absconded as a defaulter to a considerable extent a year or two ago. Is this true? and, if so, why was the matter not stated in the accounts supplied to the shareholders?

"Again, is a Director of a public Photographic Trading Company (Mr. Davison is that) a fit and proper person as Secretary for an *amateur* Club?

"One thing the Club has done—brought into notoriety vain persons who had far better have, for the interests of photography, remained in obscurity.

"The pupil's opinion of his master's work is laughable and pitiable. Does he think he can ever grip what he thinks is 'sadly wanting' in my photographs? I am sure he never will grip it—that requires hard work.

"He talks of competing with me. Being at times sportively inclined, I will set up a head in clay against my old pupil for 100*l*., I will photo-etch a plate against him for 100*l*., I will teach him how to print photogravures for 500*l*.; as for competing against his *four pictures* (my, what laughter his last 'work' caused to some of us!)—well! well! my old wherryman Joey picked up a few crumbs of knowledge with me, and he talked one day of 'taking a pictur' agin me.' Poor Davison is of the same blood as Joey.

"Referring to the quotation from Mr. Davison's letter, I was willing (not anxious) to *gratefully* acknowledge Mr. Davison's words on behalf of 'Naturalism,' as I was willing to acknowledge everybody else who supported me.

"Mr. Davison speaks of my 'treating' with him to write for a journal I had in view. I may say I had a promised staff of artists stronger than that of any *artistic journal* in the world, but the capital to do the thing as we wanted was too great. I asked Mr. Davison (chiefly out of gratitude) to write a few *historic* memoirs for me, beginning with Sir J. Newton, the miniaturist. I felt I should like to find some work for my old disciple, and knowing Mr. Davison to be perfectly incapable of writing upon art or technical photography, I bethought me of the 'historic' corner. It was a little work to dig out these matters, but too much work for this *flâneur*.

"I submitted the 'expostulating' letter to Mr. Graham Balfour—a gentleman and a scholar—before I sent it. Mr. Balfour approved of it, and he has watched the development of Naturalistic Photography *ab initio*. He will, no doubt, tell Mr. Davison what he thinks of him when they next meet. I never 'wheedled,' or tried to wheedle any one, and if Mr. Davison would keep his personalities to say face to face to me, I should know how to act.

"The reference to the Society of Arts' report of the 'discussion' is a quibble. The emphasis given by my friend as to the leadership and origin of Naturalistic Photography was distinguished by its absence. The remarks referred to were made from headings of a speech previously prepared and at once furnished to the Society. If your readers are not already bored, I could print them side by side, also the letter of 'expostulation,' which I am content should be seen by all *gentlemen*.

"Mr. Davison, to whom I gave a copy of *Pictures of East Anglian Life*, wrote me a most effusive and grateful letter for it, praising the notes 'To

* Colonel Nuam claims originality for degree of roughness, which claim, so far as I know, is legitimate.

the Student,'—alas, for human nature, that he should now talk of this deed as 'advertising myself extensively!'

"With that charming sense of delicacy and uprightness (?), which, together with modesty and gratitude (?), are such distinguishing traits in Mr. Davison's character, he has accused me of '*vindictiveness*,' because I now find photography is limited. I have not even said I was going to give up photography. Whatever I do, my readers may rely upon this, that the upholding of truth (however unpleasant) will be my only desire.

". . . . If Mr. Davison has any more unmanly and spiteful things to say, let him say them to me personally, when I will . . . .

"P. H. Emerson."

PHOTOGRAPHY IN COLOURS.

We translate from *La Revue Scientifique* the article which, on the 2nd inst., M. Lippmann presented to the Academy of Sciences *in extenso* :—

At the beginning of this century, Lubeck, and in 1841, Herschel, observed that the solar spectrum projected on a coating of chloride of silver, leaves a more or less bright or distinct image imprinted on the sensitive layer.

In 1848 M. Edmond Becquerel entered upon the study of the question with the experimental precision and capacity which characterise the labours of this *savant*. By receiving the spectrum on a sheet of silver covered with a coat of subchloride of silver, he obtains a veritable photograph of the spectrum. The works of Poitevin and other experimentalists added nothing essential to the results already obtained.

These results present an important *desideratum*—the image obtained was not *fixed*, as photographers say; it could only be preserved in darkness; exposed to daylight for a certain time, the sensitive layer, which has preserved all its sensitiveness, whitens over all its surface and the image disappears.

I proposed to myself to obtain colours in photography *completely fixed* capable of being indefinitely exposed to the light. I attained this end by a general method which permits the employment of the various sensitive substances, as also the developers and fixing agents current in photography.

There are only two essential conditions to fulfil :—

Firstly. The sensitive coat must be continuous; that is to say, that the sensitive matter (bromide or iodide of silver, &c.) must be distributed in a state of division as it were infinite, in a transparent support such as gelatine, albumen, collodion. In general the bromides of commerce form much too heavy an emulsion for employment.

Secondly. The sensitive coat must be placed against a reflecting surface. For this purpose it is fixed during the exposure in a hollow frame containing mercury, which forms a plane mirror in contact with the sensitive coating. The exposure is made, then the development, finally the fixing, followed by washing in the ordinary manner with hyposulphite of soda or cyanide of potassium. The plate has been exposed dry, and the colours appear there when it again becomes dry.

The theory of the experiment is very simple—the incident rays forming the image in the camera interfere with the rays reflected by the mercury; there results on the interior of the sensitive coat a series of fringes of interference, that is to say of maximums of light separated by entirely obscure minimums. Only the maximums imprint the plate; the photographic operations terminated, they are marked by a series of transparent coats of silver reduced, separated by the interval itself which separated two maximums, that is to say, equal to a half-length undulation. In definitive, the sensitive coat is subdivided into several hundreds of thin slices of precisely the necessary thickness—a half-length of wave—in order to reproduce by reflection the incident colour, in virtue of this phenomenon of the thin sheets which produce the well-known colours of soap bubbles.

As here the layers reflected superposed are very numerous, the brightness of the proof may be very great. Seen by transparency, the *cliché* is negative, that is, each colour is replaced by its complementary—green by red, red by green, &c. I have already found that the colours of the *cliché* may remain with impunity exposed either to the light of day or to the concentrated rays of a powerful electric arc.

To sum up: we see that in this method the luminous vibrations of each kind are inscribed, then reproduced almost like the sonorous vibrations of the phonograph.

In the discussion which followed the above paper Mr. Ed. Becquerel made the following remarks :—"I wish to point out the difference which exists between the purely physical process of M. Lippmann for reproducing the colours of light by photography, and the photo-chemical process which I discovered in 1848 for obtaining the coloured images of the luminous spectrum, as well as the images of objects in their natural colours. I attained this end by means of one chemical substance—viz., the subchloride of Ag formed on the surface of silver plates, the preparation and curious modification of which, under various influences, and notably under that of heat, I have already pointed out.* Moreover, during the preparation of the sensitive substance one can determine with precision the thickness of the layer required to produce the best possible results. This thickness may vary between one-four-thousandth and one-six-hundredth of a millimetre. These images are absolutely permanent in the dark, and I still possess reproductions of the solar spectrum made forty years ago, as well as images coloured by light waves, which were the base of Regnault's report to the Academy in 1849. They are only spoiled when exposed to the action of light, because the sensitive substance with which they were obtained was not completely transformed, and is still liable to be acted on by various coloured rays. M. Poitevin used the same substance in 1865 to obtain on paper the coloured images which were produced by me on metallic plates.

"When one submits photographic images thus coloured to the reducing action of one of the solvents of silver chloride, such as ammonia or hyposulphite of soda, the coloured shades disappear, and on the spot where the luminous rays have exerted their action a light trace formed by a thin layer of metallic silver remains on the surface of the silver surface, which, as long as it is still moist, shows feeble tints, the complementary colours of which had existed previously in the same spots. These effects, which *à priori* are difficult to explain, show perhaps that the thickness of deposited films plays some *rôle* in the production of colour phenomena.

"This material, when duly prepared, enjoys the peculiar property of not only being sensitive to the action of various colour rays, varying from red to violet, whilst reproducing their proper tints, but also of receiving an impression which appears in a marked manner to be proportionally to the intensity of the corresponding luminous impressions on the retina.

"At the moment when the chemical reaction takes place this photo-chromatically sensitive substance produces an electro-chemical current whose intensity and electromotive force can be measured with my electro-chemical actinometer.† This current may be utilised for comparing accurately the intensities of the different active coloured rays—*e.g.*, the red and blue rays—whilst the optical methods based on the impressions produced by these very same rays on the retina do not allow of being made with anything like the same accuracy."

To the foregoing we append the latest from the Paris correspondent of the *Daily News*, who, writing on Sunday night, says :—

"I have had another conversation with Professor Lippmann, of the Sorbonne, in which I called his attention to the points raised in your leading article of February 11, on his discovery of how to photograph colours. The colours are permanent—he made use of the word 'fixed'—and they are only seen by reflection in looking at the plate, and not through it. One sees the colours well in daylight or lamplight, but better in reflected than in direct artificial light. Thus the professor covered the back of a glass plate, on which he photographed a spectrum, and held the face towards the white side of a paper lamp-shade. In the light it threw back on them, the colours took such a brightness as to be only comparable to the prismatic hues in a well-cut Golconda diamond. When he held the plate between my eye and the light, I did not see a trace of colour on it. He said his method had nothing in common with the so-called chromo-lithograph photography invented by two Frenchmen, M. Charles Cros and M. Ducos de Hauron. Their colouring system is a printing process. If they wanted, for instance, to do a red robe, yellow turban, and green sash, they would have three different plates—one with the turban done in a yellow pigment, another with the robe in a red one, and a third with the sash in green. These would be successively stamped upon a photograph, but the colouration would not be due to the direct and sole action of light on the negative. M. Lippmann has the modesty of a *savant*, and is cautious in making assertions. He thinks that he will be able to reproduce composite hues, such as are found in the human complexion or a landscape, but said he had never tried, and therefore can assert nothing. Scientists, however, despaired more of getting the bright than the subdued colours, the former of which he has been able to catch and fix. I never saw any effects more neat and perfect than those he has obtained. M. Lippmann has been at the Sorbonne five years. He was thrown in the way of his discovery in preparing a lecture on Newton's theory of light."

NOTES FROM SCOTLAND.

Among the things that ought to be specially noticed here are those which by some hocus-pocus are judiciously hushed up. One of these little notes of warning—*accidents* they are sometimes called—took place the other evening in Kirkcaldy, and as it has received little or no attention save as being a gas explosion, I thought it proper to investigate the matter, and this is what it turns out to be, and a solemn note of warning it gives.

* *Comptes Rendus*, tome xxvi., page 181, and tome xxvii., page 483 (1848).

† *La Lumière, ses Causes et ses Effets*, tome ii., page 121.

An amateur or semi-professional operatic company had taken the principal hall in the place—the Corn Exchange—for an evening's entertainment, and the place was well filled. During the course of the performance a sudden explosion was heard; at once all the gases were blown out, and also several windows of the hall. Some portions of the scenery near the seat of the explosion took fire, but were at once extinguished. There was, of course, considerable shock and disturbance among the audience, but no physical damage was done. Several ladies old and young fainted, and many left the hall; but with praiseworthy promptitude and coolness the gases were relit, the pipes having fortunately been uninjured, and the performance was, although shortened, brought to a proper close without any further mishap.

The results of the explosion, on being investigated, show that a couple of bags of oxygen and hydrogen had been used to get the effects of the limelight upon the performers and the stage. These had been put in an unused corner and loaded with a half hundredweight (fifty-six pounds) each. They were connected with the burner in the usual way with flexible tubes, and no one was near the bags when the explosion took place—the bag burst itself, and this being the oxygen one, it "opened out like a book." Why or how the oxygen bag could have exploded is the question which, if ever the explosion should be inquired into, will be the crucial question. The only kind of reasonable answer seems to be that, the bags being in a corner, something had interfered with the equal pressure, and the oxygen bag being partially empty and not under the proper pressure, the hydrogen had been pressed into it, and so after a time the mixed explosive gases were, being in the one receptacle, in the condition for ignition, and were burst up by the flame being in some way driven back.

We happen here to be in a peculiar position in relation to art and artists, those who officially speak in name of the latter occasionally giving the official photographer a bit, and a very nasty bit, of the artistic mind, as the P.R.S.A. did in speaking of the recent photographic exhibition; but when it comes to the actual need for help, and the help which only photography and the aid of the optical lantern can render, then we find the official artist—in this instance G. Baldwin Brown, Professor of Fine Art to the Royal Scottish Academy, &c.—on January 28 last, in his lecture to the Philosophical Institution on *The Mediæval Monastery as the Home of Art-culture*, showing that the men who did the delightful art-work of the Middle Ages—more especially the copying, designing, and illuminating of manuscripts—did this work more for its own sake than for the sake of the wage that was got for it. These were shown through the aid of photographic transparencies and the optical lantern, and they seemed to be the best-appreciated part of the lecture.

This was followed a few days later by another official connected with the same body, Mr. Gray, the Curator of the new and, I might add, magnificent Scottish Portrait Gallery, gifted to the country by a living, not a dead, donor, Mr. R. John Findlay, of the *Scotsman* newspaper, a building which, in addition to providing for a Scottish Portrait Gallery, provides also for the immense number of *reliques* in the possession of the Royal Antiquarian Society, which had outgrown their limits in the old quarters, the Royal Institution. Neither of these receives a penny of public money, *that* is reserved for the omnivorous maw of the capital of Great Britain. The sum donated by Mr. Findlay is stated at 50,000*l.*, but before the building and accessories are completed this sum will probably be considerably exceeded. May his example become contagious, so that some of the many who have made fortunes out of, or through, or by aid of, photography may think the idea worth a thought of giving, if not so splendid, yet a modest home to the art-science which has been so helpful to them, and which is so much needed in the capital of Scotland.

Mr. William Neilson, last surviving member of his family, died on the 2nd inst. Thus another of the early members and well-known workers of the Edinburgh Society has passed away from among us at a ripe age, having entered his seventies. A many-sided, versatile man, and widely travelled. When he applied himself to photography, he did so enthusiastically; and his larger direct works in portraiture, 24 × 20, taken upwards of twenty years ago, were then, and would now be, considered most creditable examples both of photography and of artistic skill and taste. The many papers which he read before the Society and published in the columns of this JOURNAL show great literary ability and keen experimental research, combined with artistic culture. He was predeceased a few years ago by his brother Andrew, who was also a member and an enthusiastic amateur in landscape work in the early dry collodion processes, of which he produced many fine examples.

Apropos of the newest method of producing photographs in colour by the aid of a mercurial mirror by M. Lippmann, would it not be easier to use a silvered, polished plate on the surface of the glass on which the emulsion could be spread; and after being dried, exposed, and developed, the mirror would be attached to the photograph, and so show in any light, if that is the only secret in the process? W. H. DAVIES.

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

IT has been decided by the Council and members of the Glasgow and West of Scotland Amateur Association to hold an International Photographic Exhibition in Glasgow during September next. A very influential Committee has been appointed, and they have fortunately been successful in securing what are perhaps the finest suite of rooms available for such an exhibition in the United Kingdom—*i.e.*, the Fine Art Institute, Sauchiehall Street, Glasgow; the entire suite of which have been engaged. Those members who visited Glasgow when the Convention met will remember how admirably those rooms are suited for such an exhibition, being most central in their situation and well adapted for limelight displays, which it is intended shall form part of the programme for the entertainment of visitors. Mr. Morison, the newly elected President of the Glasgow and West of Scotland, and Mr. Goodwin, the old and well-tried Secretary of the Association, are working most assiduously in the matter, and before long a very wide and liberal prospectus will be issued, showing that both professional and amateur interests have been considered in the various classes for competition. Already a very large guarantee fund has been subscribed, and the amateurs and professionals of Glasgow are alive to the importance of the event, which is to be a big thing, and will include some new features in the way of classing, &c.

The Paisley Association have this week opened their annual exhibition in the Fine Art Gallery of the Museum. The members must be congratulated on the number of their exhibits, which show a distinct advance both in number and quality over any of their previous shows. This year they have called in the services of Messrs. T. N. Armstrong, W. B. Smith, and J. Fullerton, as judges. These gentlemen met on 12th inst. and gave their awards. Mr. Morison shows a very fine platinotype, which in its way is quite a little gem, and the judges could hardly go beyond it in the Landscape Class. Several new members exhibit for the first time, and in the outdoor groups one of such takes first prize. Mr. H. H. Smiley sends a large and exceedingly fine collection of pictures. Mr. Smiley's portraits are quite a feature of the exhibition, and we question very much if anything finer than his portrait of Miss Boyd has ever been seen on the walls of an exhibition.

Foreign Notes and News.

ONE of the principal events of the last fortnight has been the communication to the French Academie des Sciences, by M. Lippmann, on the ever-recurring subject of colour photography. M. Lippmann appears to have obtained some remarkable results, among the most important of which may be reckoned the *fixing* of the colours reproduced, which he claims to have effected.

M. LIPPMANN appears to make use of *grainless* emulsions, or, to speak more correctly, of emulsions the grain of which is invisible with microscopes of ordinary powers, and he says—his account is not very lucid—that he commences proceeding as if he were going to take a "black" (*noire*) negative of the spectrum. This negative is then exposed to light reflected from a basin of mercury underneath it, after sufficient exposure over which the colours are in some mysterious manner produced and fixed by hyposulphite of soda.

M. LIPPMANN explains that the image produced on the plate by the lens interferes with the light reflected by the mercury giving rise to luminous maxima and minima, and producing consequently the "colours of thin plates" with which we are familiar. Finally, it appears that the silver salts in the film are decomposed proportionally to the luminous intensity at different points, the result being to produce a number of thin layers of precipitate inside the film which show the colours of thin plates, for the best of all possible reasons, namely, that they are thin plates.

WE feel quite sure that colours may be produced upon the photographic plate in this manner, but the point which does not seem very clear in M. Lippmann's account, and of which we await the further elucidation with interest, is whether the colours so produced correspond with the colours of the object. In the case of the spectrum they do so, according to M. Léon Vidal, who has seen some of the results. Very well; will the process be ever able to tackle a landscape? That is the question.

WE learn from the *Photographische Rundschau* that the testing of photographic objectives is undertaken by the Photographic Institute of Vienna, under the management of Professor Eder, at a cost of from three to four florins. This is a charge which it will be readily admitted is sufficiently reasonable, and we may therefore rely on Professor Eder when he states that the work is undertaken by the Institute solely with the view of raising the general standard of apparatus and materials supplied to the trade.

THE following method of obtaining a reversed negative for collotype or other purposes is recommended by M. Max Jaffé. A glass plate is coated with plain collodion to which a certain amount of glycerine has been

added. The film is cut round the edge and the plate given a coat of a solution of gelatine and glycerine. After drying, it is moistened in water and the paper negative squeegeed on. It is then again dried, laid horizontally upon a table, moistened with a mixture of spirit and water, and the paper then carefully rubbed off with the finger, pains being taken to prevent injury to the underlying gelatine film. After the third and last drying a cut is made with a penknife round the edge and the film stripped off.

A translation of Mr. Sherman's article, "The Father of Photography," has recently appeared in the *Photographische Nachrichten*. Dr. Stölze, in an addendum, makes some important criticisms upon it. He shows that the article in question was indubitably correct in drawing attention to the claims of Talbot, but that nevertheless, that though his process was different, Daguerre was much in advance in point of time in producing a passable portrait. He further points out that recent discoveries in producing positives direct in the camera and reversing negatives render it to some extent doubtful whether photography will ultimately establish itself upon the foundation erected by Talbot, or upon that set up by Daguerre.

Some of the chemists and photographers of Germany have been recently thrown into a state bordering on panic by the depredations of a scientific *chevalier d'industrie* hailing from Vienna. This "Artist," who has betitled himself *Dr.* Morgan, recently invaded the laboratory of the Charlottenburg Polytechnic. There he appeared to have engaged the assembled *savants* in a highly interesting scientific discussion—the interest deepening when, after the departure of the visitor, a number of platinum utensils to the value of upwards of 30*l.* had disappeared likewise, to be rediscovered on the premises of a neighbouring goldsmith, to whom the scientific gentleman had disposed of them. This enterprising individual then betook himself to Breslau, where he made excellent "business" with a sensitiser for red, which was to be dusted on to gelatine plates, but which, on being tested by Professor Cohn, was found not to produce the slightest result. Naturally! Nevertheless, numberless photographers, both professional and amateur, paid twenty marks, which was the sum demanded for the "valuable" receipt. It appears that this gentleman carried on a very successful swindle during the summer of 1890 with an alleged fluorescing liquid, which he sold to a variety of Berlin scientists at the rate of one mark per c.c. This fluorescing liquid, of course, did not fluoresce. Its talented manufacturer is, however, still at large.

Our Editorial Table.

As usual the *Figaro Illustré* (Boussod, Valadon, & Co.) stands well to the front as a truly artistic monthly. We note a marked improvement in the January and February issues, the pictures on the covers now being fully printed out instead of confined as heretofore to the limits of a small oval in the centre of the page—a fact, too, which often caused the principal figures to appear out of drawing, owing to the absence of the background, which in the original gave them their proper proportion. In this way the picture of a lady crossing a road, presumably during the late frost, is in every way a successful picture, whereas if the principal figure were to be put in an oval of the former numbers it would appear quite impossible. Now it is worthy of a frame. In this month's the coloured picture of *A Halt* is very fine. It represents some soldiers resting and making a meal under the trees, the effect of the soldiers and followers being admirably realised. What comes nearest to ourselves is the reproduction in typogravure of a set of ten photographs of the younger Coquelin. They show how he was taken to suit the various tastes and requirements of those for whose pleasure he was taken. There was one for his barber, another for the general public, a third where he poses as a *strong man*, and in each of these the original photograph is most carefully reproduced. We next have him photographed as though haranguing his electors; this is followed by one playing "bank," and another proudly pointing to his decoration for bravery. The next is as he appeared driving in the park, followed by a representation of the morning after a spree, and as an officer of the Academy, and as Henri IV. The series is complete. They are all admirably conceived and artistically reproduced.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2390.—"Improvements in or connected with Photographic Spotting and Retouching." F. C. D. Beacham.—*Dated February* 10, 1891.

No. 2466.—"Improvements in Shutters for Photographic Cameras." J. W. Smith and J. Watson.—*Dated February* 11, 1891.

No. 2491.—"The Storing and Repeating the Discharge of Magnesium Powder through a Gas, Oil, or Spirit Lamp, for use in Flash-light Photography." Marion & Co.—*Dated February* 11, 1891.

No. 2616.—"Improvements in Magazine or Detective Cameras." A. J. Buncher.—*Dated February* 13, 1891.

No. 2632.—"Improvements in Photographic Cameras." M. A. Wier.—*Dated February* 13, 1891.

No. 2663.—"Improvements in Detective Cameras." J. Collier.—*Dated February* 13, 1891.

No. 2725.—"Improvements in or appertaining to Photographic Cameras." Complete specification. W. Sanders.—*Dated February* 14, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 1394.—"Photographic Cameras." Heaton.—Price 6*d.*

No. 3446.—"Photographic Camera." Riley.—Price 8*d.*

No. 20,876.—"Photographic Camera." Stirn.—Price 6*d.*

PATENTS COMPLETED.

Improved Levelling Instrument, Particularly Applicable for Photographic Cameras.

No. 1394. George James Heaton, 2, Coburg-villas, Albert-road, Old Windsor, Berkshire.—*January* 24, 1891.

The object of this invention is to produce a levelling instrument which shall show at a glance whether or no the surface to which it is applied is level in every direction, such instrument being specially suitable for testing the verticality of the "swingback" in photographic cameras, the said instrument being attached to the camera or otherwise. According to this invention I take a metal pillar, preferably square in section, having each face thereof accurately perpendicular to the adjacent faces, and its ends accurately parallel to each other and at right angles to the sides of the pillar.

I next bore a hole longitudinally through the centre of the pillar, which hole is of two different diameters. In the lower fourth part or thereabouts of the length of the pillar the hole is about one-eighth of an inch in diameter and the remaining three-fourths of the length of the pillar has the hole through it about three-eighths of an inch diameter.

In the larger hole I insert a piece of glass tubing, in the centre of which is suspended by a few fibres of silk or other suitable material a small rod, preferably of metal, and about one-eighth in diameter, having the lower end thereof cut off at right angles to the length of the rod.

I also firmly fix in the smaller hole, concentric with the glass tube, a similar rod cut off at right angles to the length thereof, the upper face of which is just clear of the lower face of the suspended rod.

The metal pillar is cut away, except just at the corners, for about three-quarters of an inch, so as to form sight holes, the contiguous faces of the two rods coming in the centre of the "sight." On setting the instrument on a flat surface, if the surface is level the two rods will appear as one, but if the surface is not level the upper rod will project beyond the lower one on that side of the surface which is below the horizontal. Similarly, if the instrument is held vertically against an upright surface, say the focussing screen of a camera, the position of the rods will indicate if the surface against which it is placed is vertical.

Although I have specified the use of two parallel rods, I do not bind myself to these, as I may use two rods with their contiguous ends pointed, or other equivalent means, such as two cups with their mouths nearly touching each other, the lower cup being fixed and the upper one suspended.

An Improved Photographic Camera.

No. 20,876. Rudolf Stirn, 34, Sebastian-strasse, Berlin, Germany.—*January* 24, 1891.

The present invention relates to the construction of photographic apparatus, and its object is to construct the camera in such a manner that the front part of the same in which the lenses or objectives are mounted is adjustable, by which a threefold purpose is attained, viz., the employment of the camera for stereoscopic purposes; (2), for the production of large photographs (cabinet size), and for the production of two smaller photographs (*cartes-de-visite*) side by side. The manifold employment of one and the same camera, without having to remove the films, and by simply adjusting the lens box, offers the photographer many advantages. First, the apparatus may be employed for various purposes; and, secondly, it enables the photographer to change from one style of photographing to the other without causing any further inconvenience whatever. Through the displacement of the lens box one of the lenses is brought into a central position with the exposing chamber, the partition necessary for taking stereoscopic photographs is folded down in the empty part of this chamber, and simultaneously shades for limiting the size of the cabinet photograph are automatically brought into position.

In taking *cartes-de-visite* both lenses are employed one after the other, whilst the lens box takes the same position as when used for taking stereoscopic photographs. For this the lenses, besides being provided with the necessary shutter mechanism for instantaneous or time exposures, have extra covers.

The claims are:—1. In a photographic camera, an adjustable lens box in combination with the automatically operated partition, side shades, and slide, all parts acting in combination with each other in the manner and for the purpose substantially as described. 2. A photographic camera having the various mechanisms arranged and operating substantially as hereinbefore described and illustrated in the accompanying drawings.

The Quadruplex Burnisher of Smith & Pattison, Chicago, can be obtained from Mr. Jonathan Fallowfield, 146, Charing-cross-road, London, W.C.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 23.....	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 24.....	Great Britain (Technical).....	5A, Pall Mall East.
,, 25.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25.....	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 25.....	Burnley	Bank Chambers, Hargreaves-street.
,, 26.....	Burton-on-Trent	The Institute, Union-street.
,, 26.....	Halifax Photographic Club	Mechanics' Hall.
,, 26.....	Liverpool Amateur.....	Crescent Chambers, 3, Lord-street.
,, 26.....	Oldham	The Lyceum, Union-st., Oldham.
,, 26.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 12,—Mr. T. Bolas in the chair.

A memorial was received, sent by the West London Photographic Society, and intended to be forwarded to the various railway companies having termini in London, asking for facilities in the shape of reduced fares for photographic club and society outings, similar to those enjoyed by angling clubs. With the exception of a paragraph at the end, which was deleted, the memorial was signed by the Chairman on behalf of the Association.

Prints from cloud negatives, by Mr. E. Dunmore, were handed round.

A specimen of a print upon "Thuja" paper was handed round. It was stated to be toned with gold, and to possess the "warm artistic tone now so much admired."

The HON. SECRETARY had obtained a similar colour by toning with uranium.

A large number of samples of photographic products by the Fry Manufacturing Company were distributed amongst the members.

A demonstration by Mr. A. J. Newman of a high-speed shutter, and a paper, illustrated by slides, of *The Position of Objects in Producing Photographic Pictures*, by Mr. P. H. Newman, were promised for early dates.

Abney's *Treatise on Photography* was presented to the library by Mr. G. W. Atkins, and other works were offered as loans.

Mr. ATKINS showed some lantern slides, his first attempt at the use of collodio-bromide for the purpose. They were made from directions given in THE BRITISH JOURNAL OF PHOTOGRAPHY in September last, and, on being put in the lantern, were considered about right for ordinary lantern work, although scarcely dense enough for use where, as in the case of the Association's lantern, the limelight was used for a small disc. He had so far found no difficulty in the process. He had developed to get a thin image and intensified with acid silver. He had made the pyroxyline himself, and found the theoretical proportion come very nearly exact from the cotton used. He had followed Hardwich's directions for high-temperature cotton.

The CHAIRMAN had found that by following Hardwich's directions very carefully the results had been uniformly good. It was necessary, however, to make sure of the strength of the acids by an accurate hydrometer or other means, and not to trust to the label on the bottle as indicating the specific gravity with sufficient exactness.

Mr. A. HADDON agreed that when people did not succeed in making pyroxyline it was because they did not attend sufficiently to the strength and the temperature.

Samples of eikonogen developer prepared nine months ago by Mr. A. Cowan, and of pyro dissolved recently in boiled distilled water without preservative, were produced by the Curator, and appeared to be unchanged. They were taken charge of again for re-examination at a future time.

Mr. HADDON strongly advocated the keeping of strong solutions of this character in sealed tubes. If ammonia were used in the dark room a plain pyro solution would suffer very considerably by the mere opening of the bottle for occasional use.

A collection of lantern slides, sent by Mawson & Swan, was then passed through the lantern, and was followed by series of others contributed by Messrs. Atkinson, Pemberton, Wellington, Kellow, and Chang.

THE LANTERN SOCIETY.

FEBRUARY 9.—Mr. J. TRAILL TAYLOR on *Lenses and Condensers for Lantern Work*. Mr. Taylor commenced by saying that in his remarks on condensers the light was assumed to be small and intense. At present there were no perfect condensers on the market, and the subject was one that might profitably be worked out further than it had yet been. Mr. E. M. Nelson was the only Englishman who had as yet tackled the matter. In America they had given much more attention to the matter. The back lens of a condenser should be fairly large, so as to include as wide an angle as possible, and as thin as possible, on account of the heat, the edges being ground thin for the same reason. The effective diameter of the back lens was considerably less than the diameter of the lens itself, and in the ordinary commercial condensers the margin of the lens to the extent of about half an inch inwards was not utilised. Mr. Taylor showed a drawing of a theoretically perfect condenser to transmit absolutely parallel rays from a small luminant. It was of triple form, and five inches in diameter. He also described Professor Morton's triple condenser, which included an angle of ninety-three degrees, and he gave the curves for both these condensers. In a perfect lantern the third lens of the condenser (the one furthest from the light) should be removable and of different focal lengths. The first two lenses would be arranged to give parallel rays, which could then be conveyed more or less, according to the purpose for which they were to be used, by the third lens. With reference to lenses, Mr. Taylor said that the Petzval portrait lens was the best form, and he explained how the flatness of field could be improved by increasing the negative aberration of the back lens.

In the discussion which followed, Mr. G. R. BAKER referred to the focal lengths of lantern condensers, and Mr. E. M. NELSON mentioned Professor Abbe's theories that the intensity of the light at different distances from the condenser varied as the square of the size of half the angle included.

WEST LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 13,—The President in the chair.

A circular from the Photographic Society of Great Britain, asking for the opinion of the members as to a Photographic Institute, was handed round, but discussion was deferred until members had had an opportunity of studying it.

The PRESIDENT then announced that he had forwarded a circular *re* cheap railway fares to photographers to forty-nine London and suburban photographic societies for their consideration, requesting them to fill up the same with number of members, and to bring it before their next meeting, and say whether their names might be added to the memorial which was to be lodged with the several London railways. A favourable answer had already been received from two societies.

The question from the question box which was held over from the previous meeting, as to whether ammonia fumes injuriously affected the lungs, was answered by Dr. F. H. LOW, who thought that, considering the extent to which the ammonia was diluted before use in the developing bath, no harm could be caused to the lungs, but it might perhaps have an effect on the eyes.

The PRESIDENT then introduced Mr. WILLIAM SCHOOLING, F.R.A.S., to the meeting, who gave a lecture on *The Application of Photography to Astronomy*, illustrated with slides from photographs taken at the Harvard and other large observatories. Mr. Schooling said that photography had not helped them much with regard to the detail on the surface of the moon and the spots on the sun; in fact, more truthful effects were got with sketches; but that with regard to distant stars, some of them were rendered with great exactitude on the photographic plate when they were not visible to the eye through the most powerful telescope in use.

Mr. C. WHITING thought that astronomers might with advantage turn their attention to the discovering of some emulsion that would give a less granular image than that given by gelatine, and suggested slower plates, and thought that at the present time albumen would be the best thing to use.

Mr. SCHOOLING said that, owing to the movement of the planets, it was necessary to use as rapid a plate as possible.

HACKNEY PHOTOGRAPHIC SOCIETY.

FEBRUARY 12.—Mr. HENRY STURMEY gave an interesting lecture on *Norway*. He described his trip there fully, and many of the slides shown were exceedingly pretty; some were rather humorous, as the hand camera having been frequently used, many of the passengers fell victims to it. About one hundred slides were put through the lantern.

At the close of Mr. Sturmey's lecture, Messrs. Dean, Gosling, Barton, and Herbert Smith showed slides.

The Society is now just on the century as far as members go.

EALING PHOTOGRAPHIC SOCIETY.

FEBRUARY 5.—The PRESIDENT (Mr. H. W. Peal), who was in the chair, announced the gift to the Society of a cabinet for storing their books, &c.; he also presented several books.

It being a technical evening, Mr. W. B. Wright commenced by showing some negatives taken on films and developed with eikonogen, six grains to the ounce.

Mr. Whiting exhibited three shutters, both for time and instantaneous, of his own manufacture, and also a broken negative, with a print from it after it had been repaired.

Dr. Clifford Gibbons showed a developing dish which he used for films and entirely prevented them cockling.

Mr. Winter exhibited two camera stands, and also a hand camera made in Holland.

The President showed a new stand for supporting flash lamps so as to reduce the trouble in placing them.

CROYDON CAMERA CLUB.

FEBRUARY 16.—This was a lantern night for members' slides, the most noteworthy being the microscopic photographs shown by Mr. C. F. Oakley, taken with polarised light.

The anniversary dinner will be held at the "Greyhound Hotel," Croydon, on Monday, March 9, at eight p.m. Members wishing to attend should notify the Secretary without delay, as the number of tickets is limited.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

FEBRUARY 13.—Mr. Cembrano presided. A discussion on *Exposure and Exposure Tables* took place, to which most of those present contributed, from the tyro who confessed that he had no ideas on the subject which could be of the smallest use to any one else, to the veteran of wet-plate days who looked upon exposure tables much as a man looks upon swimming corks who has learnt swimming without them.

Two new members were elected.

BRIGHTON PHOTOGRAPHIC SOCIETY.

FEBRUARY 10.—Annual meeting.—Mr. Slingsby-Roberts in the chair.

The report and balance-sheet were adopted. The subscription for Brighton members increased to 10*s*.

The officers for the ensuing year are:—*President:* Mr. J. P. Slingsby-Roberts.—*Vice-Presidents:* Messrs. W. H. Rean, D. E. Caush, and H. D. Warne. *Committee:* Messrs. Bedford, Ford, Graham, Hardcastle, Mitchell, Tate, Webling, Wicks, and Williamson.—*Treasurer:* Mr. D. E. Caush.—*Secretary:* Mr. A. H. C. Corder.

The awards in the print competition (adjudicated by Mr. H. P. Robinson)

were announced. Class 2, Messrs. E. J. Bedford and A. H. Webling (silve and bronze medals), for best sets of six prints. Class 3, silver, F. Tate; bronze, E. J. Bedford, for best sets of three prints taken on the outings. Mr. Hardcastle's competition, Taylor's half-plate rapid rectilinear, E. J. Bedford.

CHELTENHAM PHOTOGRAPHIC SOCIETY.

FEBRUARY 5.—There was a large show of apparatus by various makers, and pleasant evening was spent in examining them and in hearing their merits and demerits explained by their various owners.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

FEBRUARY 11.—This was a lantern evening. The exhibits included slides kindly lent by Messrs. J. B. B. Wellington, Fry & Co., Sands & Hunter, &c.

Next meeting will be held on the 26th inst., when papers on *Shutters* and *Instantaneous Photography* will be given.

BOLTON CAMERA CLUB.

FEBRUARY 11.—A demonstration was given by Mr. T. Parkinson, sen., on *Enlarging on Bromide Paper*. From a half-plate negative of the President a beautifully clear collodion transparency was made; from this an ordinary Ilford plate was used in producing the negative, which was developed and used in the Sciopticon lantern. To make the 15 × 12 enlargement on Eastman's slow paper, ten minutes' exposure was given with lens considerably stopped down.

At the next meeting, 25th inst., Mr. T. Parkinson will give his thirty-five years' experience on *Stereoscopic Photography*.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

THE first meeting was held on February 12, 1891, at the Colonnade Hotel, Birmingham, and was attended by a numerous gathering of photographers from all parts of the kingdom.

The chair was taken by Mr. H. J. Whitlock. Apologies for absence through illness and pressing business engagements, but expressing sympathy with the objects of the Association, were read.

After a speech from the Chairman, the meeting discussed and adopted (with slight alterations and a few additions) the code of bye-laws proposed by the Provisional Committee, the amendment reducing the annual subscription to 10*s.* 6*d.* being ultimately unanimously adopted.

The following gentlemen were duly proposed and seconded as members of the Council, viz.:—*President:* Mr. H. J. Whitlock, Birmingham.—*Vice-Presidents:* Messrs. J. Fall, London; A. Lafosse, Manchester; Robert Slingsby, Lincoln; John E. Shaw, Huddersfield.—*Committee:* W. Barry, Hull; W. Bedford, London; T. Birtles, Warrington; Warwick Brookes, Manchester; J. E. Bruton, Douglas, Isle of Man; W. Chancellor, Dublin; F. Storey Davis, Halifax; W. E. Debenham, London; J. E. Eddison, Barnsley; J. Elliott (Elliott & Fry), London; J. Fergus, Largs; — Guy, Cork; W. Gill, Colchester; R. P. Gregson, Blackburn; — Lafayette, Dublin; Abel Lewis, Clifton; Donald MacIver, Leeds; John Moffatt, Edinburgh; C. Pettingall, Liverpool; Frank M. Sutcliffe, Whitby; — Vandyke, London; H. Van der Weyde, London; F. M. Whaley, Doncaster.—*Hon. Treasurer:* John Crosby, Rotherham.—*Hon. Secretary,* Charles P. Richards, Barrow-in-Furness.

The appointment of a General Secretary (with salary) was left to the next meeting of the Council.

The Hon. Secretary writes as follows:—"In forwarding you the above abridged account of the proceedings at Birmingham on the 12th inst., will you allow me space to add that it is my intention so soon as the amended bye-laws are printed to forward a copy of the same to all those gentlemen who have written me since the first meeting held at Leeds. The reason I have not done so earlier is that until the details, such as subscriptions, &c., were definitely settled, it was impossible to reply with certainty to those who were anxious to be enrolled as members."

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 12.—General meeting.—Mr. J. D. Cox (President) in the chair.

This being a lantern evening, the meeting was open. The members and their friends, through the kindness of Mr. A. R. Dresser, had a rare treat in viewing a large number of slides illustrating Brittany. The general excellence was very high, and a great many deservedly applauded. Several of Griffith's hand cameras were sent for exhibition, and seemed excellent value for the moderate price. Two of the cameras had been tested before the meeting, and found to give exceedingly good results.

SOCIETE FRANCAISE DE PHOTOGRAPHIE.

FEBRUARY 6.—The proceedings were commenced by M. Janssen (the President), who dealt with the recent communication by M. Lippmann to the Academie des Sciences, the nature of which he explained at some length to the Society, and, in addition, exhibited some of M. Lippmann's results.

The so-called "electro-photophore" of M. Radignet then formed the subject of exhibition. It consists of a portable apparatus for producing the electric light at will. The incandescent lamp is surrounded by a red globe, and will give its light for three hours consecutively. The battery, is a bichromate of potash one, and the whole apparatus, is said to be very handy for dark-room work.

A number of plates were received from the firm of Monkhoven, with the request that the Society would undertake to test them, and a certain number of examples of M. Tisseron's sensitive silk were distributed amongst the members.

An account was then given by M. VALLOT of his new carbon process, some examples obtained by means of which were exhibited, which made an extremely agreeable impression.

M. CH. GRAVIER then showed a chromo-collotype which had appeared in the *Petit Journal*, and which had been prepared from four negatives and printed in three colours and in black. It was pointed out that it would have been impossible to produce such a result so cheaply and with such rapidity of execution without the aid of photography.

A number of micro-photographs by Messrs. Lumière were then exhibited, and the proceedings closed by the reading of a paper by M. Reeb on *The Employment and Importance of Alkalies in the Hydroquinone Developer.*

EASTMAN'S PHOTOGRAPHIC MATERIALS COMPANY.

THE first annual general meeting of the above Company was held yesterday at Winchester House, Old Broad-street, under the presidency of Colonel James T. Griffin, Chairman of the Company.

The SECRETARY (Mr. Arch. W. Rider) having read the notice convening the meeting,

The CHAIRMAN said: It is my privilege, in moving the adoption of the report, together with the balance-sheet up to December 31, 1890, to address a few words to you. Very little need be added to what has been so briefly stated in the report of the directors, but I may add a few words by way of explanation and encouragement. About the year 1884 the Eastman's patents were taken up by a company which was formed on the other side of the Atlantic. Very shortly they were found to be a great practical success. Towards the close of the year 1885 an agency was opened on this side of the water. The business on both sides of the water continued to increase to such an extent that it was found impossible for the company in America to supply the demands made upon it from this side of the water. This led to a suggestion to form a company in England and over Europe. The result was that in the fall of 1889 a company was organized on this side. All the shares were immediately subscribed for, and we as shareholders have met to-day to report upon the success attending the efforts of the first thirteen months. Inasmuch as we have not the facilities here for producing the goods required, what might be called the parent company supply us with goods until we are in a position to manufacture for ourselves. However, the demand upon the other side of the water has so increased that they have found it very difficult, indeed, to supply us with what we require, and to meet the demands made upon them. The consequence is that we have oftentimes been short of articles to fulfil the orders which were falling in upon us. Meantime, your directors, at once upon the formation of the company, proceeded to make arraugements here for the erection of suitable buildings and the supply of machinery necessary. After careful research, we selected a locality in the immediate neighbourhood of Harrow—seven acres of freehold land. We purchased, plans and estimates were secured, and buildings were erected which were now practically completed. Some portions of these buildings are now ready for occupation; others will be ready shortly, and I only wish that every shareholder could enjoy the privilege of a visit to Harrow and inspect the works, which are now so nearly ready for our use. Every possible care has been taken. The plans were all provided by Mr. Eastman, who has been over here, and who will soon be with us again: and under his direction, and aided by a proper architect, we have secured buildings which we think in every respect suitable for the wants of a company like ours. It will be some months yet before we shall be in complete occupation and ready to manufacture our own articles. But some portion, and that a very important portion, will be ready almost immediately, and this is what is called the Bromide building, in which the printing is done, or rather will be done, a branch of work which is now done by contract by others outside. Therefore we hope to be very soon in a position to meet the demands which are made upon us, demands which are growing month by month, and in order that the shareholders may have some idea of the growth of the business, I should like to state a very few facts. In the first fifteen months after the agency was established on this side the sales amounted to 7595*l.*, for the next twelve months 12,900*l.*; for the succeeding twelve months 15,807*l.*; for the next twelve months, ending August 31, 1889, the sales amounted to 26,576*l.* Then our present company was organized to take possession of the premises. The result is that for the thirteen months ending December 31, 1890, the sales have reached the sum of 50,387*l.* As stated in the report, very frequently we have been obliged to decline orders, as it has been impossible for us to get the goods to fulfil the orders. Therefore, under the circumstances, we feel a very great pleasure to-day in meeting the shareholders and reporting to them the marvellous success that has attended the efforts during the first year of the company's history. With the new buildings, with the increased experience, with the facilities which we shall enjoy, we hope next year, if we are spared, to be able to report to you at least double what we have accomplished during the year just past. I do not think I need enlarge any further. Any questions that friends may desire to ask in connexion with the report and balance-sheet I will answer to the best of my ability. I may perhaps call attention to one or two items in the balance-sheet. Some friends may consider that the item under the head of expenses is rather large. Under the head of "trading expenses" you will find the sum of 10,775*l.* 3*s.* 10*d.* This seems to be a very large sum to expend in this direction. However, it may be stated that during the year we have been opening a good deal of new territory. While we were unable to meet the demand made upon us, yet looking to the future we thought it desirable to anticipate efforts which might be made by others. Therefore, money has been expended in establishing agencies in different parts of Europe, and we are now receiving very satisfactory reports from those agencies. These expenses will not be repeated, or not repeated to the same extent, or, if repeated, will be spread over a much larger return than we have received during the past year. Therefore, we shall endeavour to economise on the one hand and extend our business on the other. The other items in the balance-sheet are, I think, scarcely open to criticism. The directors are pleased to be able to recommend a dividend of ten per cent. on the preference shares and five per cent. on the ordinary shares, and to carry forward to the next account 1635*l.* 15*s.* 11*d.* I will now conclude by moving the adoption of the report and balance-sheet.

Mr. SPILLER said he had very great pleasure in seconding the Chairman's motion, and he was very gratified with the hopeful statement that had been made by the Chairman, and he hoped that his anticipations would be realised.

Mr. JAY congratulated the Board on the success they had attained on the year's working. He took it that when the company had their own premises they would be able to manufacture their own goods, which were now brought across the water. There were only one or two questions he wished to ask. In the first place, the Chairman had mentioned Mr. Eastman's name very frequently, but he (the speaker) noticed that in the list of directors there was no mention made of Mr. Eastman.

The CHAIRMAN: We shall ask the shareholders to alter that at this meeting.

Mr. JAY, continuing, said that they had already expended 1400*l.* in the purchase of freehold land. Was there anything more to be paid on the land?

The CHAIRMAN: No; all the land is paid for.

A SHAREHOLDER remarked that the directors were very much to be congratulated upon the result of the first year's working, and it was a great exception that such a report and statement of accounts should be presented to a meeting of a company only in existence for a year. It gave the shareholders very great hopes of what was to come, and he thought they all must be satisfied —exceedingly satisfied—with what the directors had done.

Another SHAREHOLDER: Are the dividends to be paid yearly or half-yearly? I might suggest that the time when the dividend warrants are sent out might be printed on the report.

The CHAIRMAN, in reply to the last speaker, read from the Articles of Association an article to the effect that it was optional with the directors whether they should pay yearly or half-yearly dividends.

A SHAREHOLDER said he noticed that they had written-off nothing for depreciation of the patents. He thought that was rather an important thing.

The CHAIRMAN replied that under the advice of their auditors and solicitors, and by their own good judgment, they felt that the patents were as valuable, or, in fact, more valuable, than when they took them over. Most of them, he reminded the shareholders, were recent patents, and some of them had only been attained last year, and had scarcely yet been developed sufficiently for use. Therefore they did not feel justified at the present moment in writing off anything under that head for depreciation.

A SHAREHOLDER: Is there likely to be soon another call upon the preference shares?

The CHAIRMAN: At the present moment we are in no want of money, and from what we can see it is not likely we shall make another call. Should the business develop, however, and additional capital be required, the shareholders will receive due notice.

The CHAIRMAN then put the motion for the adoption of the report to the meeting, and it was carried unanimously.

Mr. JAY moved the re-election of all the directors, and said that the fact of all the directors retiring proved that the Board were not afraid of the shareholders.

The motion was carried.

Mr. Eastman was elected a director of the Company, and the proceedings terminated after the passing of the usual vote of thanks.—*Financial Times, February* 18.

Correspondence.

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

PROJECTED COPYRIGHT ACT.

To the EDITOR.

SIR,—Your leader on this subject has brought me some communications from photographers, especially in relation to Clause 41, which prohibits a photographer "without the consent in writing of the person for whom the work was executed, to sell, or for sale exhibit in public, in any shop window or otherwise, any copy of such likeness." This clause is part of the Copyright Bill of 1886, bearing the names of Messrs. Hastings, Gregory, and Agnew, but which failed from press of public and party business to come before the House of Commons.

This Copyright Bill of 1886 was carefully considered by the Photographic Section of the London Chamber of Commerce. The reasonableness and justness of Clause 41 could not seriously be questioned, and the Section was unable to see its way to frame any amendment that stood the least chance of being favourably considered by the Commons.

This clause is not so severely prohibitive as may at first sight appear. It forbids the exhibition of likenesses taken to order *in public* in any shop window or otherwise, but a photographer's reception room could scarcely be considered "public" under the Bill.

Your editorial reading of this clause, stating it would be illegal to supply a child with a copy of the portrait of a parent without the latter's written consent is of no particular practical importance; and in your case of a suspected murderer or thief it is quite certain a photographer might supply the police with copies of the portrait without any ill consequence to himself. It would not be publication under the Act.

I take leave to second your final recommendation that photographers should send to the Queen's Printers for a copy of the new Bill, which has been read the first time in the House of Lords, at the instance of Lord Monkswell.

Copyright Law Amendment has been for years in a state of agitation. A Royal Commission was appointed to redress the grievances of authors, artists, composers, &c., with regard to Copyright, fifteen years ago, and presented an elaborate report in 1878. The following year a Bill was introduced into the House of Commons by the Government of that day, embodying the recommendations of the Royal Commission, but nothing was achieved. Lord John Manners, now Duke of Rutland, who introduced that Bill, has done nothing in the matter since 1879.

This new Copyright Bill is distinguished by simplicity and comprehensiveness. It compresses into a single measure some eighteen previous Acts, each more or less obscure and incomprehensible. It accepts all the best suggestions proposed by the Royal Commission in 1878, and it adopts, with very trifling alteration, the carefully considered Bill bearing the names of Messrs. Hastings, Gregory, and Agnew. As Chairman of the Photographic Section of the Chamber of Commerce, I shall be pleased to receive suggestions from photographers, and if thought necessary a meeting of the Section will be summoned, with probably an invitation to all photographers interested in the matter to attend,—I am, yours, &c., W. S. BIRD.

74, *New Oxford-street, W.C., February* 17, 1891.

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—As an assistant of some experience I am prompted to say a word or two on the above. Now, although I have no doubt Mr. A. Field's intentions are good, I am afraid his Assistants' Union will prove anything but a success, and his latest letter in reply to Mr. Davis's criticisms will not tend to increase its chance in that direction. Mr. Field says that "the unemployed benefit will be the least important branch of its work" —an unfortunate confession surely, as I certainly think that that branch would be likely to prove the most attractive to the majority of photographic assistants. The principles of trades unions cannot, in my opinion, be applied to photography. How few employers but what could successfully stand against the calling out of, let us say, the printers. Mr. Field only anticipates getting a membership of some 400, so we will suppose there are 100 printers amongst them. Is the withdrawal on strike of these hundred printers going to paralyse the photographic profession, when every photographic errand-boy of six months' experience thinks he can print? I trow not. How different a state of things when a thousand skilled artisans can leave one firm in a body!

My experience leads me to the opinion that photographic assistants, with, of course, exceptions, get what they are worth, and certainly no union of 400 of them, if there ever will be that number, will be likely to increase the rate of pay. Thinking thus, I personally can hardly see the wisdom of paying 8*d.* per week, with 7*s.* 6*d.* entrance fee, for the uncertain chance of receiving at the utmost 5*l.* 10*s.* during twelve months should I be unlucky enough to be out of employment a sufficiently long time, and I should only get that if the funds admitted of it. Oh! certainly I have the advantage of its legal assistance, but I should not care to depend on that if the legal adviser to the Union is the authority for the promise of legal assistance in the case of "illegal refusal to grant testimonials." I have always understood that there is no legal obligation to give testimonials.

Concerning another aim of the Union, I think it neither feasible nor wise to expect employers to pay extra salaries over such a limit as forty-eight hours per week. Should we like to be only paid for the hours we work during the winter? I for one should not; I should have precious little to draw some weeks. Well, I don't believe in it as a trade union, and Mr. Field says, "its programme is entirely foreign to the objects and plans of a mere benefit society." Of the two, let me advise my fellow-assistants to choose the benefit society. Any decent assistant ought to be able to contend against a few weeks' enforced leisure, but health is uncertain, and death is certainly certain. Let assistants do their work thoroughly and conscientiously and they won't want employment often or for long, nor will they require much legal assistance. I'm afraid it's mostly duffers who get done by the swindling employers—that sort of photographic assistant who advertises like this:—

"Disengaged, first-class operator and retoucher, can paint in oil and water-colours, also work up in black and white. First-class references. Salary 25*s.*"

No wonder such assistants as these find their specimens unreturned, or their agreements disregarded; no one but fools or rogues would reply to such an advertisement. These *specimens* of photographic assistants are surely *never kept* by good employers.—I am, yours, &c., A. J. E.

Manchester.

To the EDITOR.

SIR,—Mr. Arthur Field, in his letter in your issue of the 13th inst., noticing some calculations of mine in the previous number, apparently does not realise that my figures were made in the interests of the Photographic Artists' and Assistants' Union, being an endeavour to save the Society from starting on an extravagant basis, and giving an opportunity in good time of reconsidering the previous figures; but he prefers to make the position worse by frankly owning that only one halfpenny of the proposed average contribution of fivepence three-farthings per week is intended to be used for the direct benefit of the members.

I do not care about criticising the points under three headings at the commencement of Mr. Field's letter, as I do not wish to appear censorious

of any attempt to do good if possible to my fellow-men, whether photographers or otherwise; but, so far as I can understand the position, if Mr. Field really represents the ideas of his co-operators, the only apparent ultimate object of the Union is the habilitation of the *unappreciated* photographic *employé*. Such an attempt, with the plenitude of good workmen who need no credentials except their own productions, or the recommendation of previous employers, is certain of failure. The legal help offered by the Association is such as any *employé* can obtain for himself if he accumulates the average of fivepence three-farthings per week in his own pocket, for the small fees entailed in taking out a county court summons, and he who is so improvident as not to do so is very unlikely to keep up his weekly payments to a society on the off-chance of his requiring its assistance on any such occasion.

It is unnecessary to notice Mr. Field's allusion to the Engineers' and Printers' Unions, the conditions are so entirely different from those likely to surround the Photographers' Union. Mr. Field ignores that all the chief unions differentiate between large establishments and *shops;* most photographic businesses are of the latter class.

What does Mr. Field mean by "illegal refusal to grant testimonials?" What law compels any employer to give any to a discharged *employé?*

I am very anxious to give Mr. Field and his associates every credit for their desire to do good, and would willingly assist them if I could be of service in any way where I saw their desires could be established on a sound basis; but I am of opinion that they evidently require a more profound knowledge of Sociology and more aptitude for estimating the probable results of their present proposals.

Not being a professional photographer I am not personally interested in this matter, and I certainly think you can find more useful materials for your columns than any prolonged correspondence on this subject; this is therefore my last say thereon.—I am, yours, &c., HENRY E. DAVIS.

To the EDITOR.

SIR,—Allow me to inform your London readers that the first branch meeting will be held on Wednesday night (25th inst.) at eight p.m., at the "Red Bull Inn," Gray's Inn-road, W.C., near the Holborn Town Hall. All promissory members must attend and commence payments according to the scale already detailed. If these promissory members are not approved by the executive, their moneys will subsequently be returned in full. A copy of the rules will be in the hands of all branch secretaries, but will not yet be printed, in view of the necessary frequent modifications.

The first executive meeting has been held at 92, Aldersgate-street, but the meeting place (for the executive) will in future be at Imperial-buildings, Ludgate-circus, E.C. (New Bridge-street entrance). The following important modifications of the rules having taken place, I think it well to mention it to those who have read previous extracts:—

The minimum salary which all applicants shall have received before being admitted to this Society is fixed in each branch. Each branch also decides quarterly which are "first-class" and "second-class" houses within the sphere of its membership. The minimum salary fixed as necessary before being qualified for admission shall nowhere be less than the following scale:—

Operators, retouchers (or both), monochrome and other artists, in first-class houses, 40*s.*; in others, 35*s.* (If ladies, not less than 30*s.* and 25*s.* respectively.)

Printers, first houses, 27*s.* 6*d.*; others, 25*s.*

Reception-room ladies (engaged in photography), 25*s.* and 20*s.* respectively.

Photo-process workers (operators and photo-litho artists), 40*s.*; etching, retouching, redrawing, opening-up, &c., 30*s.*

Piece-workers shall have been in receipt of payments equal to the above minimum weekly rates for the stipulated period.

Each applicant shall send specimens of work, which must be of his or her own production:—

Operators.—Two busts, two three-quarter or full-lengths, two groups, and two of children.

Retouchers.—Three cabinet heads from unretouched negatives, and three prints from the same negatives in a retouched state. State the time spent on the work.

Printers.—At least six specimens, in as many different sizes as possible, vignetted.

Other workers shall send specimens of the work at which they are engaged.

It is not necessary for applicants to send their specimens by next Wednesday, the night on which we meet; but until they are sent in the executive cannot definitely accept applicants. As I have said before, all payments will be returned to members who are not accepted.

May I hope that those who are undecided will gather around us now that our Central London branch is established?—I am, yours, &c.,

ARTHUR FIELD, *General Hon. Secretary.*

SPOTS ON PRINTS.

To the EDITOR.

SIR,—I notice in last week's JOURNAL that one or two of your correspondents are troubled with the spot nuisance on their prints. Some few months ago I sought your counsel on this point myself, and you intimated your belief that they were caused by pernicious particles falling on the paper. Taking this to heart, I went to the expense of getting the printer's room papered all over, ceiling as well, but was much mortified in finding next day the usual crop of spots. I had now exhausted all devices, and had almost concluded to take spotty prints as a matter of course. Making an excursion to the printing room one evening, I found the man in possession engaged in fixing the prints, and, as printers seem to delight in, leisurely turning them over, It struck me that this was against my own procedure on such an occasion, and I requested him to fix the next day's prints face down, and *keep them that way.* From that time the spots have disappeared. Of course, all spots have not the same origin, but I should recommend "Spots" and "W. J. Allison" to adopt the plan suggested as a possible cure.—I am, yours, &c., J. BROWN.

Rhyl, February 13, 1891.

ROUGH PRINTING PAPER.

To the EDITOR.

SIR,—If Colonel Noverre will turn to the *Photographic News* for 1873, pp. 354–5, he will find full instructions given of M. de Constant's method of printing on plain paper, where he mentions, amongst other papers, "Whatman's rough drawing paper;" he also mentions a method of giving a coarse grain to smooth paper. I have never seen any of M. de Constant's productions, but I cannot doubt but that he used the roughest paper obtainable, as the word rough is especially mentioned, and not "*not pressed*," the medium quality of Whatman's paper.

Again, in a leading article in the same journal for the year 1875, pp. 390–1, on *Drawing Paper for Photographic Portraiture*, the phrase "rough drawing paper" is again used, and working directions for preparing the same are given.

You will doubtless have received many other communications referring to the early use of rough-surfaced papers in photography, but I pick these two out of my commonplace book as being particularly applicable to the present question.

I do not think that there can be a moment's doubt but that rough drawing paper was used long before the 1887 Pall Mall Exhibition, but at the same time we must freely give Colonel Noverre all credit for the revival of this most artistic method of reproducing our æsthetic impressions in monotint.—I am, yours, &c. LYONEL CLARK.

FLEXIBLE FILMS.

To the EDITOR.

SIR,—During last year I read in the technical journals an account of a patent taken out for the production of a film of cellulose by means of the cupro-ammonium process for the reception of silver prints, the object of the inventor being apparently to do away with the use of ordinary albumenised paper. I have been patiently waiting to see what would become of this patent, as I should have liked to try the paper if it had been placed on sale at a moderate rate; but so far one hears nothing about it, and I presume that the whole scheme has proved a failure. This is not surprising to a practical man, as in the first place it is difficult to conceive that a perfectly level film which would be free from cracks could be produced; and, in the second place, as the nitrate of silver enters into chemical combination with the albumen, what would happen if this latter is no longer present? Again, the invention as described seemed to aim at the production of permanent prints, I suppose because the sulphur contained in albumen would no longer be present; but what would this signify when hyposulphite is used in the process of printing?

If this patent is being worked, and any of your readers have tried it, I should be glad to hear, through the medium of your JOURNAL, what the result has been.—I am, yours, &c., COUNTRYMAN.

February 12, 1891.

THERMOMETER ERRORS.

To the EDITOR.

SIR,—The bubble in bulb of spirit minimum thermometers is a frequent occurrence, and arises from the instrument being shaken the wrong way, and is corrected by shaking or swinging the thermometer with the bulb downwards. The breakage of the hook at end of tube would make no difference to the spirit unless the bore of tube was exposed, in which case instead of a bubble of air getting into the bulb, the spirit in the tube would evaporate, and the tube and bulb in course of time become empty.—I am, yours, &c.,

WM. DUNSCOMBE.

Exchange Column.

Ether saturator in exchange for Beard's regulator.—Address, G. BARKER, Know road, Mirfield, Yorkshire.

Will exchange good violin bow, case, Instructor, and book of songs, &c., for half-plate camera.—Address, H. J. S., St. Mary's Hall Lodge, Cheltenham.

Exchange large rolling press, size 28×19½, extra new plate, good condition, for good hand camera or background and accessories.—Address, ADAM GOSNEY, Sherborne.

I will exchange a nine-inch double-geared rolling press, cost 8*l.*, for a cabinet burnisher (Entrekin's preferred), or offers.—Address, T. HAYWARD, Photographer, Devizes.

Wanted, 7×5 (or half-plate) rapid rectilinear by Ross in exchange for 7×5 Euryscope (working *f*-6) by Perken, Son, & Rayment.—Address, F. S. BENNETT, 43, Avenell-road, Highbury, N.

I will exchange No. 1 Diamond hand camera (as new) in case, holds charge of twelve plates $2\frac{3}{8}\times3\frac{1}{4}$, for a Burr's half-plate portrait lens. Difference of value arranged. —Address, W. C. BROMLEY, Stanley House, Farnborough, Hants.

Several almanacs and year-books, a seven-inch Berlin porcelain basin, scales and weights, and three volumes *Photographer's World;* will exchange for good brand of albumenised paper, a little over a quire, or chemicals.—Address, E. BUCKLEY, North Studio, Oldham.

Answers to Correspondents.

W. B.—Repeat queries; letter was not retained.

COMUS.—Remove the front and use the back lens of the rapid rectilinear. Working with equal apertures, the single lens will be four times slower than when in combination.

A. S.—When a Daguerreotype is dirty it can be cleaned by the method we have so often described; but when the image is faded, by rubbing or otherwise, there is no hope of its restoration.

J. H. E.—The spots are due to imperfect washing after fixing. Hence contact with the silver paper has produced the specks. Unless the washing is perfect, varnish is but a poor protection.

F. L. G.—1. Dissolve the dried pellicle in tepid water to the consistence of cream. Pour on levelled glass, and dry. Of course this must all be done in the dark room.—2. See answer to R. Morton Day.

A. M. N.—There is no one work in which the whole of the curriculum is contained. We can, however, recommend the manuals by Abney, Hardwich, Meldola, and Chapman Joncs, in connexion with the scientific aspect of your requirement.

F. PELLATT.—The duration in the different etching baths is simply a matter of judgment, only to be acquired by experience. Upon the skill displayed in this depends the excellence of the work. The process itself, as far as it concerns the mere manipulations, is simple enough.

W. ROSSEN.—A four and a half inch condenser is of no use for enlarging from a quarter-plate negative, whatever the seller of the apparatus may say to the contrary. Anything less than five and a half inches in diameter would be useless for even illumination. Six inches would be far more preferable.

S. GARDNER.—If you have made the photograph legally copyright you can certainly recover damages from the religious publication for the piracy. The clergyman has no voice in the matter if the copyright is yours. All, of course, depends upon whether the sitter paid for the portrait being taken or not.

A. CATHCART.—If the films with which you have been attempting to make Woodbury reliefs took nearly a week to dry, there need be little wonder that the hot water would not dissolve away the unaltered gelatine. The film had become insoluble through the slow drying. During the cold and damp weather drying by the aid of chloride of calcium is imperative. This system you will have to adopt.

S. A. W.—You will not obtain permission to photograph in the Crystal Palace or grounds, even during the photographic exhibition. Messrs. Negretti & Zambra pay a large sum annually for the sole right. It is not to be expected that they will allow any one to do gratuitously that for which they have to pay heavily. We believe the firm will take any photographs that may be required by any one for a very moderate sum.

ST. NEOTS asks if anything can be done with a studio camera stand he has. He says the wood parts swell in damp weather, and then the stand can scarcely be raised or lowered, notwithstanding that the wood is almost saturated with greasc and oil.—The grease and oil only makes the matter worse. We would advise that it should all be cleaned off with benzoline, and when dry lubricated with blacklead. Grease should never be used as a lubricant for woodwork.

R. MORTON DAY, JAMES STUART, H. W. TYLER, A. W. DAVIS, COLOURED INK, AND SEVERAL OTHERS.—The auto-copyist apparatus used by Mr. Warnerke in his demonstration, and upon which Mr. Clarke's article was based, is one of the numerous forms of copying apparatus now in the market. Any stationer and account-book maker will supply it to order. The press used for taking the impressions was the ordinary office screw letter-copying press. These presses, also, will be supplied by any stationer. They may be met with second-hand at any of the dealers in office fittings, but they only cost about thirty or forty shillings new of the ordinary folio size.

MATER S.—1 and 2. No permission is required to photograph the Albert Memorial, the Houses of Parliament, or other public buildings, from the highway.—3. We know of no one who gives instruction in painting lantern slides. An advertisement in the advertising columns will, no doubt, elicit the information.—4. Blistering rarely occurs on bromide paper, unless the solutions or the water is of too high a temperature.—5. Primuline may be obtained of Messrs. Brooke, Simpson, & Spiller, Hackney Wick. The other articles for the primuline process from any operative chemist. Hopkins & Williams supply them all, and probably primuline also.

G. KERSHAW says: "I propose erecting a wood studio about eighteen feet by nine feet. Could you give me some particulars as to the best style. Should I have glass on both sides or not? Should the sitter face the north, or in what direction? What colour of blinds should I have? How much glass should I have? Any particulars you can give me will be gladly welcomed. I have plenty of room and good light."—In the first place, eighteen feet is very short, as in that length it would be only possible to obtain full-length portraits with very short-focus lenses. If there is plenty of space, twenty-four or twenty-five feet would be better, with the width increased to eleven feet or a little more. The design shown in sketch will do very well if the proportion of glass be increased with the length. As shown it is too little. If the studio be erected so that the sitter face the north, dark blue blinds on the east and west side will be best.

G. C. PILE.—No article on the subject appears on the page of the JOURNAL for last year, as quoted by you. There is one, however, in the ALMANAC for the current year which contains all the information given by the author, and all that is necessary for experimental purposes. As you have tried all the plates in the market, and most of the formulæ for developers, you are perfectly qualified to judge which answers best in your hands. You might, however, give the developer mentioned a trial.

RESIDUES asks: "Will you kindly give me a little information regarding the following queries?—1. Should the tank containing silver print washings be exposed to daylight?—2. Should the siphoned liquid from the hypo residues be clear? I send you a small solution from my tank; it is so muddy that I doubt whether the silver has been properly precipitated.—3. Is a solution of sulphuric acid and alum in any way unsuitable as a clearing bath for negatives? I find no ill effect from it at present.—4. Is there any license required to produce photographic prints in the manner described in last week's JOURNAL by Mr. Archer Clarke in *Photography in Coloured Inks.*"—1. Exposure to light favours the deposition of the chloride.—2. If the liquor be quite clear (even if a little discoloured) it may be assumed that all the silver has been precipitated. The addition of a little more sulphide of potassium will always prove the fact.—3. No. In preference to sulphuric we frequently use either hydrochloric or citric acids.—4. No licence is required. See answer to "R. Morton Day."

TONING (Luton) writes: "1. We have an eighty-ounce bath, composed of sixteen drachms of gold chloride and a quarter of an ounce of acetate, which after a few times using turns quite a grass green, and produces bad tones. A drachm of gold was added for every sheet of paper toned, and a little acetate and carbonate of soda thrown in occasionally. A second bath recently prepared seems to be going the same way. 2. What is the best way of overcoming reflected light from side of camera? We use an inside flap shutter, so that a cardboard disc would not answer exactly, or would be in the way."—1. Sixteen *drachms* of chloride of gold to a quarter of an ounce of "acetate"—which we presume means acetate of soda—seems a very large proportion; but as "a drachm of gold" is said to be added for each sheet of paper toned, we presume it is grains instead of drachms that is meant. Even for this quantity of gold the proportion of acetate of soda is smaller than usual. Twenty to thirty grains to each grain of the chloride is the usual proportion. The discolouration is due to the gold being reduced by contamination with foreign matter, but what that is it is impossible for us to indicate. 2. Coat the inside of the camera with lamp-black mixed with negative varnish in such proportion that it dries dead; or line the camera with black cotton velvet.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.—February 23, lantern evening, *A Day at the Zoo,* by Lewis Medland.

PHOTOGRAPHIC CLUB.—Wednesday, February 25, monthly lantern meeting. March 4, *Printing on Rough-surfaced Papers.*

RECEIVED.—*Geschichte der Photochemie und Photographie,* von Dr. Josef Maria Eder; *Geschichte der Photographie,* von C. Schiendl; *Development,* by Lyonel Clark. These will be noticed on an early occasion.

MESSRS. CROMBIE & FLETCHER, Edinburgh, have sent us samples of their combined masks and binders for lantern slides. The mask has one side gummed, with flaps sufficiently wide to fold over the picture and cover. It is appled externally.

GLASGOW PHOTOGRAPHIC ASSOCIATION.—Mr. W. Lang, jun., writes:—"I would feel obliged by your correcting an error which has crept into your report of my paper read before the Glasgow Photographic Association. The name of the French traveller whose writings are referred to should read 'De Moncomps,' and not 'De Moncorrys.'"

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—February 26, technical meeting. March 3, lantern and musical entertainment, with brief interlude, consisting of a demonstration of *The Polarisation of Light.* The entertainment will be held in St. George's Hall, Champion Hotel. Admission by ticket only, obtainable from the Hon. Secretary. March 5, *Pictorial Compositions.* Address by P. H. Newman, illustrated by the lantern. March 12, lantern night.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next technical meeting will be held on Tuesday, 24th inst., at eight p.m., at 50, Great Russell-street, Bloomsbury, W.C. The subject for discussion will be *The Dark Room and its Fittings.* A special lecture will be given by Mr. Leon Warnerke, on March 4, at eight p.m., on the *Simplified Photo-Collographic Process.* It is hoped that a collection of English and foreign collotypes will be on exhibition. Any one interested in the process will be admitted on presentation of their visiting card.

FLASH-LIGHT PHOTOGRAPHS.—Messrs. Turnbull & Sons, of Glasgow and London, have been remarkably successful in flash-light photography applied in a novel direction. We have before us instantaneous photographs taken during the championship wrestling contest in Glasgow between "Tom Cannon" and the "Terrible Greek," and we have rarely seen any flash-light photographs so perfect. We have also received interior views of Mr. Turnbull's dining-room, every figure therein being admirably rendered. We observe that one of the Glasgow evening papers has reproduced in outline three views of the wrestlers.

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THE BRITISH
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MR. WARNERKE'S COLLOGRAPHIC PROCESS.

MONG those who have conferred great benefits upon photo-raphy by the free publication of their experiments and im-rovements in directions tending to simplify the modes of orking in vogue, Mr. Leon Warnerke has acquired a well-eserved prominence, and he has recently made an addition to ie debt of gratitude that is owing to him. A few weeks since e gave a demonstration of a process of obtaining prints by ioto-mechanical means before the members of the London id Provincial Photographic Association, which, as we have ready announced, is to be repeated at a meeting of the Parent ciety on March 4. We gather from the numerous letters ich have reached us that the new process has aroused con-lerable interest among our readers and photographers nerally, and we therefore deem this a convenient oppor-nity for making a few observations in reference to some ints suggested by the published details of the new process.

Those details are lacking neither in fullness nor in clearness, r. Warnerke's admirable explanation thereof having been erwards supplemented by a descriptive article contributed our pages by Mr. Archer Clarke, so that those—and there e many—who have not much knowledge of the principles of oto-mechanical printing, or who have hitherto "skipped" its erature on account of the "advanced" style in which it is ually treated by its professors, can easily grasp the essential tures of this process. Hence we will assume the absence of y necessity for repeating the *rationale* of the method in these umns.

Mr. Warnerke complains that photo-mechanical printing is sufficiently carried out by photographers themselves—he rs to professionals, of course. This suggests the reply that oto-mechanical printing is far too troublesome and scarcely fitable enough for them to undertake unless it has to be rked on a large scale. The "general impression that all h processes require special appliances not easily installed" ot altogether wide of the mark; and we may add, on our n account, that they also require some special knowledge and our, and the cultivation of such specialities in the way of trait work and so forth as will render the departure remu-ative. Mr. Warnerke's knowledge of the deeply rooted servatism of the average professional photographer, and of many obstacles and prejudices which, for example, the inotype and the gelatino-bromide processes had to demolish ore they secured any measure of popular adoption, should him a good idea of the likelihood of photo-mechanical nting in its present development ever being worked by many ond those whose sole business it is—at any rate, for some e to come.

Whether the publication of Mr. Warnerke's photo-collographic process, of which we have received very good accounts, will persuade professional photographers to consider, at least, the feasibility of adding some form of mechanical printing to their stock processes for use when occasion necessitates, remains to be discovered; we, on our part, do not hesitate to express the opinion that it will not. We go further and say that professional photographers rarely experience the need of any such process, for the good and sufficient reason that the orders placed in their hands do not often call for the production of a large number of proofs from any one negative. But, granting the contrary, let us subject Mr. Warnerke's process to brief examination and see in what respects it looks likely to bear out the sanguine opinions of its patron.

Given possession of a suitable office copying press—the largest kind, by the way, will only admit of comparatively small work being done—we suppose that anybody of ordinary skill could devise the stretcher required for holding the parchment support, or failing that, could easily find somebody to make one for him at a reasonable cost. Thus the extra appliances for the process have the advantage of being few, simple, and inexpensive. As regards parchment as a support for the bichromated film, and viewing the difficulty, or rather the danger, of employing glass with this form of press, we imagine that other substances could be used which would obviate the necessity of using a stretcher. Has Mr. Warnerke experimented with gelatine "skins" such as were employed in the old heliotype process, to which, we remark, photo-collography bears a striking likeness? We have seen some samples of celluloid of about the thickness of an eight-sheet mounting card which might also answer for the purpose; being so stout they were remarkably flat and rigid.

It would be incumbent upon the operator—at all events, until the gelatinised support became an article of commerce—to prepare and sensitise his own films. Now, as Mr. Warnerke estimates from six to ten hours as a good average time for the drying of the bichromated surface, at least one working day will so far be taken up. Then the *best* results are got after the sensitised film has been kept two or three days—or even a week, says Mr. Warnerke, blandly! In these times of rapid printing by development, a photographer could turn out as large a number of bromide prints as he is ever likely to have ordered in the ordinary way and have them washed if not mounted before he had got Mr. Warnerke's collographic film in the printing frame. Had photo-collography been introduced between the years 1875 and 1880, when carbon printing for small work was in disfavour, and printing by development had yet to come, it would in all probability have been cordially welcomed.

Most, if not all, of our readers are acquainted with the practical details of the exposure, &c., of the bichromate processes, so that we can pass to the removal of the bichromate by the immersion of the film in cold water for not less than two hours. In this part of gelatine printing we have always considered that there was considerable room for improvement, and we underline this lengthy period of fixation for the behoof of those in search of scope for experiment. While on the subject of the time taken up by the various operations, we conjecture that after removal from the water, the washing and drying of the surface, to say nothing of the application of the ammonia-glycerine solution for hardening purposes, would also absorb several hours. Thus far, photo-collography can hardly be called a rapid process, and except were a very large number of prints was wanted, and placing the artistic attributes of the process altogether on one side for the moment, we entirely fail to see where the benefit to the ordinary photographer by its adoption is to come in. We hasten to say that this opinion in no way prejudices the possible utility of the method in the hands of trade printers, process workers, or anybody with opportunities for working it on a commercial scale; but such as these, we surmise, are amply catered for by order and more finished modes of working.

The limited space at our command obliges us to defer any further remarks on the process until a future time.

FICTITIOUS SPECIMENS.

A FORTNIGHT back, when commenting on the new Copyright Act, we directed special attention to that particular clause which would preclude photographers from exhibiting portraits of sitters that have been taken in the ordinary course of business, unless with their written consent. The wording of the Bill is, "exhibiting in any shop window or otherwise." The "otherwise," according to the strict reading of the Bill, might well be construed in a Court of Law to include a photographer's showroom or elsewhere. However, this is not a point we are now dealing with. It is the question of specimens displayed in showcases and shop windows that are not the work of the exhibitors.

It is by no means an uncommon thing amongst a certain class of photographers to obtain pictures, sometimes surreptitiously, taken by first-class men, and exhibit them as their own work. This is nothing less than a fraud upon the public. People become customers on the strength of these examples, expecting to receive pictures equal to those shown. It is no very unusual thing to see in our own and other advertisement columns something like the following:—"Wanted, two or three dozen first-class cabinet or other size portraits for specimens." At one time some houses used to supply enlargements from a series of stock negatives to photographers to show as specimens from which to obtain orders. Then it was no uncommon thing to see the same portrait at different establishments throughout the country. Of course, it was assumed by the general public that the enlargements, or, at least, the negatives from which they were made, were the production of the exhibitors. Even now it is by no means uncommon in some country places to find published portraits of celebrities, by first-class artists, shown by local photographers as their own work. This system of deluding the public is, however, not actually illegal, but as to its morality there is no question.

Some showcases are stocked with specimens obtained surreptitiously from operators, retouchers, and others seeking employment. If this proceeding does not bring the delinquent within the pale of criminal law, it is sailing very close thereto. It is a cruel fraud upon *employés* in more ways than one. No only are their pictures filched, but in some cases the knowledg of the existence of such frauds prevents the assistant fro obtaining specimens at all. Some employers, we know, have strong objection to any portraits of their sitters leaving thei establishments; not because they doubt the integrity of th *employé* who is relinquishing the appointment, but the know ledge that he has no control of the pictures when once they ar out of his hands. They are fully aware that they are ofte sent to unscrupulous persons, who use them as specimens t the great annoyance of both the artist and the sitters. How ever, we are pleased to say that our efforts to repress this di reputable system are proving successful.

Negatives are often sold, and according to the present la so far as we are aware, there is nothing to prevent the pu chaser from making what use he chooses of them. He ma make prints from them and show them as being of his ow production, or he may sell them to others to exhibit as the work, and the unfortunate sitter has no remedy. Here is a example which came under our notice. Some few years bac the effects of a photographer who had been unsuccessful business were dispersed by auction. Amongst the negativ were some very fine ones, of large size, of private individua Prints of the most attractive subjects soon found their wa into the showcases of many third and fourth-rate phot graphers in different parts of the metropolis and the provinc to the great annoyance of the originals, the majority of whc were ladies. In some instances the pictures were purchased a fancy price in order to avoid their further exhibition. sitters at present run a risk of similar annoyance to that ju referred to when they have their portraits taken.

In the projected Act on copyright, if it passes, Clause will give the sitter protection so far as portraits taken after t Bill becomes law are concerned. The promoters of the I will, however, do well to consider whether this clause shou not be made retrospective, so as to give protection to th whose negatives are already in existence.

BLACKING WOOD AND BRASS WORK.

ONE of the ever-recurrent questions the editor of a photograp periodical is called upon to answer is with regard to the b means of applying a dead black coating to surfaces of wood metal in those portions of the apparatus which necessitate entire absence of any power of reflecting light; and though query has been so frequently replied to, there appears to ex in many quarters a difficulty in successfully following the structions given. Under the circumstances, therefore, it n be well to say a few words in detail on the subject.

It will be understood that what we have at present to d with is the blacking of the interior and non-sliding portion the camera and lens, for which purpose the varnish requires be of such a character as to dry with a matt surface, and possess just sufficient "body" to hold the colouring mat without allowing it to come away in the form of dust on one hand, and to avoid any sign of glaze on the other. U the due adjustment of the proportions of the constituents—a gum and the colour—chiefly depends the successful attainm of the desired end, though, as will be seen, a good deal is t

the proper selection of the materials, as well as the method their mixture.

Briefly, the instructions as usually given consist in incorpo-ing with any suitable clear and quick-drying varnish a fficient quantity of finely powdered lampblack to produce the ired deadness in conjunction with the necessary depth of t—a combination of conditions not always readily obtained, tly owing to unsuitability of the menstruum, and as fre-ently to the injudicious selection of colour, but more often to proper mixing.

First, with regard to the menstruum or varnish. It is often e practice to use ordinary negative varnish, and if this be of e right kind it will answer fairly well, though it is always eferable to select a varnish containing shellac only. The ason for this is that the latter gum-resin gives a hard, tough n, and dries without "tackiness," whereas most negative rnishes contain other matters added to confer special qualities sirable enough for negative purposes, but injurious for the e in question. Hence we strongly advise that plain shellac rnish be selected as the basis to work upon.

The ordinary shellac varnish of commerce answers every rpose; it is very dark in colour, which for this purpose is objection, but perfectly clear and transparent when in a fficiently thin layer. If it be not clear it must be allowed to nd undisturbed until the insoluble matter in suspension has bsided; and as, in the condition in which it is purchased, it oo thick for use, it will be as well before allowing it to clear dilute it with half its volume of methylated spirit, which l materially hasten the clarification. If the commercial icle is not obtainable the varnish may be made by dissolving rop" lac in good methylated spirit as strong as possible, ng from thirty to forty grains of lac to each ounce of spirit. The lac is first crushed into small fragments and added to spirit, which may be previously warmed, and the bottle, itly corked, be left to stand in a vessel of hot water and ken at frequent intervals until solution takes place. At s stage the solution will be opaque and muddy and light in our, like French polish; it must, therefore, be left for some s until the insoluble matter subsides, leaving the super-ant varnish dark and clear. If required for immediate use clarification may be expedited in the following manner:—ke a quantity of *perfectly dry* and finely powdered chalk—cipitated chalk obtainable at any chemists is the best if roughly dried—equal in weight to the shellac employed, shake up well with the varnish, which may then be filtered ough ordinary bibulous paper. If it be attempted to filter ore treatment with the chalk, the insoluble matter passes ough intact. Avoid the use of "whiting" as supplied for sehold purposes, as this often consists of powdered gypsum, ained by grinding up the old plaster moulds used in the teries.

Next we come to the colouring matter, for which lamp-ck is usually recommended. This is a very wide term, and ers almost everything that is black in colour—at least, in commercial sense. We have known ordinary soot, for ance, put up in packets and sold as "best lampblack." h samples are not only extremely coarse, but are so con-inated with foreign matter, that however deep the colour be while *wet*, upon drying the surface presents only a y grey tint. Though lampblack, if really such, answers ectly well, it is better not to trust to the commercial ply, but to use in preference "drop black," which is pre-ed with greater care for the use of painters. This is obtained in lumps of considerable size, but is very friable and easily reduced to fine powder.

But perhaps one of the best blacks for the purpose is obtained by collecting the smoke from a common benzoline sponge lamp. A considerable quantity of this finely divided carbon can be prepared in a very short time by setting a lamp to burn beneath a cold iron plate, or a clean tin kettle or saucepan filled with water, turning up the wick sufficiently high to cause it to smoke considerably. Paraffin oil answers in a similar manner, but the crop of carbon is not so plentiful nor the colour so good. As the carbon accumulates it may be scraped off the plate in a thick layer on to a sheet of paper and preserved until required.

As regards the method of mixing, it is a mistake to add, as many do, the dry colour direct to the varnish. Under such circumstances, however fine the state of division may be, the minute particles clot together in the varnish, and no amount of subsequent grinding or "mulling" will produce the highest degree of smoothness. But if the black be introduced into a small glass mortar with a little methylated spirit, or spread on a sheet of ground glass and freely moistened with the same, and then carefully rubbed down into a perfectly smooth paste of the consistence of cream, the varnish may be gradually added with the result that a beautifully intimate mixture is obtained, which may be subsequently either thickened or diluted by the addition of varnish or spirit as the case may require. It is a good plan to prepare a thin paste in this way containing a minimum of varnish and a large proportion of colour, and to dilute this with plain varnish to produce the right result as required.

A still better result is obtained for very fine work by making the paste as described with alcohol, and then shaking it up with sufficient methylated ether to make it perfectly liquid, and to allow it to subside, pouring off the clear liquid as closely as possible, and repeating the operation with a fresh supply. On pouring this off, sufficient alcohol is added to bring it to the creamy state, when it is ready for addition to the varnish.

Varnish prepared in this manner may be used on the bellows of a camera when it has lost its colour or faded; but a more flexible preparation is obtained by substituting for the spirit menstruum a thin solution of indiarubber in highly rectified benzole, a very little gum dammar being also added to give more body. In this case the colouring matter is first rubbed down with plain benzole.

A glossy varnish for outside work or "ebonising" can be prepared in precisely the same way, only using a much larger proportion of shellac to give the gloss, but still, not sufficient to cause the varnish when laid on with a brush to present an uneven appearance. If properly mixed, a beautifully deep and glossy surface drying quickly can be produced in one operation, or a second coating after the first is thoroughly dry will give greater depth. If it is desired to polish the work after ebonising, it will be, however, preferable to employ a copal varnish; but in that case a considerable time will be required for it to thoroughly dry.

PREPARING FOR THE COMING SEASON—DARK-ROOM ARRANGEMENTS.

We now come to the actual construction of the walls of the dark room. In the case of a permanent erection, and where expense is not an object, wood throughout will undoubtedly be preferable to any other material as being more substantial.

But in the case of a tenant on short lease, as such erections are scarcely ever worth much, except when first put up, it is cheaper, and on the whole better, to run up a lighter affair of cheaper material. This can be done with canvas, covered with stout paper stretched upon a framework or skeleton of wood, and if properly put together will prove as durable, with ordinary care, as wood at a very much less cost, and is, moreover, less troublesome to the unprofessional builder. The following is the course of procedure :—

Having made a plan or rough drawing to scale of the proposed erection, procure the necessary quantity of wood known as "quartering" or "scantling," measuring in section $2\frac{1}{2} \times 2$ inches or $2\frac{1}{2} \times 1\frac{1}{2}$ inches. In ordering the wood care should be taken to get it in such lengths as will cut up to advantage or without waste; at most timber yards the quartering is kept in various lengths, though it can be had cut to exact lengths at a slightly higher cost. In putting the framework together, to make the best job of it the joints should be made by mortise and tenon, but if to execute this class of work well be beyond the amateur's capability, he will be wise not to attempt it, as a bad joint of that kind is worse than none at all. Under such circumstances it will be better to have the uprights of quartering joined with cross pieces of "batten" about 3×1 inches, securely nailed with three or four nails at each point. If at all shaky when erected, diagonal strengthening struts of batten must be added as required. The purpose of this article is not, however, to give a lesson in carpentry, so we must perforce leave much of the details of construction to individual readers.

The canvas used may be the kind known as "paper-hangers' canvas," used for straining over uneven walls that have to be papered; but a stronger article used for packing purposes answers better and costs little if any more. It is obtainable about forty inches wide at threepence or fourpence the yard at most drapers or haberdashers. It is well to bear this width in mind in planning the framework.

The woodwork having been completed and placed in position, the canvas is strained tightly on to it and tacked at intervals of about three inches; it should be stretched tightly and evenly without puckers, otherwise a good basis for the later work will not be obtained. In performing this part of the operation it will be found advantageous to attach the whole of the canvas covering first of all with the tacks at, say, a foot apart, and then to tighten up gradually in all directions; here a common three-pronged kitchen fork will prove useful as a "stretcher," passing it through the material and applying leverage against the woodwork, driving home the tack while the canvas is strained. It is necessary to place the tacks closely because the canvas—unlike paper—contracts on being damped, and would be liable to drag off the wood if not well secured.

The next operation consists in thoroughly wetting the whole surface, which is most conveniently done with a large carriage sponge or a broad whitewash brush, which will be afterwards required for the paste. The canvas does not take readily to the water, which has to be almost rubbed in before it is absorbed, and it is therefore desirable to apply it at both sides, until by the alteration of colour the whole surface shows itself to be equally impregnated, when it will be found to be literally as "tight as a drum." When thoroughly wetted it may be left for an hour or two; meanwhile, be getting ready a plentiful supply of paste, neither too thick nor too thin, but about the consistency of paper-hangers'. Upon the thorough damping of the canvas basis of the paper subsequently applied and the use of plenty of paste depends to a great extent the quality of the work when finished.

Next procure a quantity of old newspapers, and if a good sized table be not available, clear a sufficient space on the floor on which to manipulate the sheets. Unfold each separately and thoroughly impregnate it with paste, allowing the latter to soak well in so that the paper expands to its utmost. Time will be saved by always having one sheet soaking while another is being manipulated. Before applying the paper to the canvas structure the latter must also be well pasted or the paper is liable not to adhere or to loosen in places on drying. This being done, pick up the sheet of paper carefully and attach it by its upper edge to the canvas, smoothing it carefully into contact with the brush well supplied with paste, and proceed until the whole surface is covered both sides. Some little trouble is involved in covering the side on which the woodwork is bare, but it is compensated for in the quality of the final result.

Two or even three layers of newspapers may be applied, on the outer side at least, with advantage, and will form a strong and cheap basis on which to place some still more durable and more sightly covering. But at this stage it will be well to allow the whole to dry thoroughly, which, owing to the number of dampings and pastings, will take probably a couple of days even when assisted by a fire in the room. The drying serves to consolidate the covering, and forms a more even surface on which to apply the remaining or ornamental coat.

This may consist of a couple of layers of stout brown paper applied in the same manner, thoroughly softened and expanded and the surface of the wall previously pasted; and, finally, the whole may be covered with wall paper to match the rest of the apartment. Or, the last layer of brown paper may be allowed to dry completely, which it will do more rapidly than the previous drying, and it may then receive a coat of some dark coloured paint as a finish.

When the affair is complete the walls will be as hard as wood being, in fact, practically stout millboard, and as such, not only durable, but perfectly opaque and light-tight. It only remains now to fill in the window if space has been left for such, or, if not, to cut an aperture in the canvas paper work and cover it with non-actinic medium. But it is preferable to provide, in constructing the framework, for the insertion of a wooden frame covered with the medium or glazed with coloured glass, as this may be hinged and thus prove useful for ventilating and other purposes.

No mention has been made of a door, though necessarily there must be a doorway. In a light construction such as that described, a swinging door, even though of the same composition, would be a weak point, so that it is better to apply a curtain running with rings on a rod. This will equally as effectually keep out the light, and at the same time submit the structure to no strain, as would be the case with a door.

We are aware of several of these "composite" dark rooms at work at the present time, and one which we saw a short time back, running the length of a room twelve feet long, cost to build (exclusive of curtain), we were informed by its owner, some thing less than ten shillings.

Apropos of the subject of the bursting of pressure gauges, Messrs. Newton & Co. write to *Nature* a description of certain desirable precautions to be taken. At the outset they seem to assume that pressure gauges must occasionally burst as they get worn out. To minimise

the danger from such an accident, they say: "There should be no cast iron in the gauge; the tube and works should be mounted on a brass or gunmetal frame. The glass covering the dial should be mounted in a ring, fitting on the body of a gauge like a cap; when the gauge is in use this cap should be removed, thus avoiding all danger from the broken pieces of glass. The gauge should then be enclosed in a brass wire cage, so that, should the tube burst, any portions of metal would be caught by the wire network, and if not stopped altogether, would at any rate be rendered harmless."

Recently we gave a description of a ready means of detecting the presence of wood fibre in paper, which is a decidedly deleterious ingredient in any paper required for photographic purposes. We have now to refer to another important point in connexion with the same important substance, the size used in giving the paper its stability. Our readers will, perhaps, scarcely need reminding that paper, as first produced, is nothing more than an analogue of "blotting-paper;" it is soft, rotten, and woolly in appearance and touch. To get rid of these defects the blotting-paper is dipped into a solution containing some substance of a glue-like nature and then hung up to dry. All the rottenness is gone, and according to the quality of the fibre there is produced paper of various quality, which only needs passing through a press to render it fit for use. The chief characteristics of paper as appealing to photographers are governed by the composition of this glue-like substance, this "size;" and so conservative are paper-makers that it is difficult to persuade them to vary their process in the slightest degree. If a particular paper suits, well and good; if it do not, the inquirer must go elsewhere. It is generally understood that the sizing of the well-known Rives paper has a foundation of resin, while Saxe paper is quite differently treated. M. W. Herzberg, in the *Moniteur Scientifique*, gives a ready means of distinguishing whether paper is prepared with a resin or animal size. The former, he states, is evenly distributed in the entire mass of a sheet of paper, while animal size forms two layers entirely separated from each other by the body of the paper. Hence, if the paper is well rubbed and bruised, any characters traced upon it (presumably in ink) penetrate through if an animal size has been used, while a resin size is indicated by the writing remaining confined to the particular side it was first put on.

An important part of paper making is so preparing the pulp as to have it perfectly white, usually this is done by bleaching with chlorine, and then getting rid of the chlorine by means of hyposulphite of soda, and the danger of the presence of any trace of this substance is too well known to need dwelling upon. The best paper is made without any chemical bleaching at all; and we may note that a very picturesquely situated paper mill where no chemicals are used is to be found at a spot in Wales not very far from where the Photographic Convention rambled to on one of the excursions last year. According to the *Moniteur*, as above, two English manufacturers are using electricity in the bleaching of the pulp, rendering it perfectly white without injury to its strength. The process depends on the use of a solution of magnesium chloride which is decomposed by the action of a powerful current into chlorine and oxygen on the one hand, and into magnesium and hydrogen on the other.

The subject of the solubility of glass in water is always interesting to photographers, though perhaps less so than when the state of the surface of the plate played such an important part in photographic operations as it did in wet plate work. Possibly even at the present time it may be a more important factor than is generally recognised. A writer to the *Chemical News* again points out this solubility of glass as being a possibility that may perhaps be lost sight of in determining the result of analyses. Thus he describes the result of certain investigations in his own laboratory:—He obtained a percentage in the material he was examining of 10·29 per cent. of potash. A duplicate in another flask gave him 9·18 only. Being puzzled, he consulted with a friend, who suggested that alkali might have been introduced through the use of new flasks. He therefore repeated his determination, and used No. 1 flask, and thus obtained 6·9 per cent., which was verified by a fourth experiment, with a result of 6·88. Now it is quite evident that if such important variations as here mentioned are analytically obtainable there must be great probability of photographic operations being at times influenced by the state of the surface of the glass plate itself upon which the film is placed.

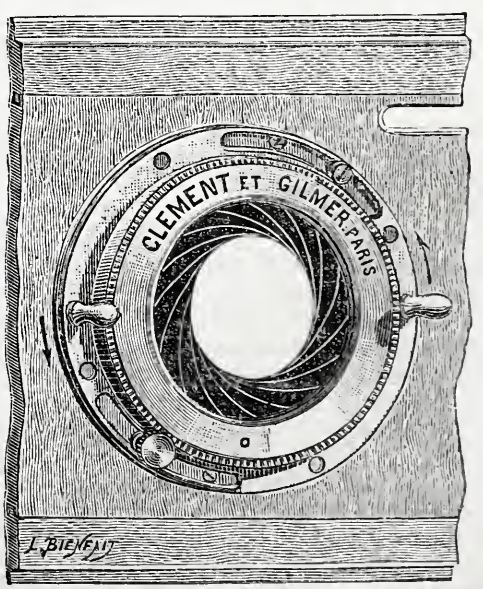
UNIVERSAL LENS ADAPTER.

No one who has often occasion to make use of several lenses to one camera, especially if these be so nearly of a size as to preclude the possibility of having adapters for each of them to fit the flange, but must devoutly wish that the time might speedily come when the great diversity in diameter and pitch of flange threads and apertures will cease to exist.

Expedients for attaching lenses to cameras, without entailing the necessity for having a separate front for each, have been suggested; and one of these, which originated in France, and a description of which is to be found at page 610 of our Almanac for 1890, answers well. But it necessitates carrying two rather large discs of ebonite and also a flange for each lens that is to be employed.

We have lately had attached to one of our cameras an adapting flange which will hold, with a grip sufficiently firm for every practical purpose, any lens from the smallest in general use up to the largest ever likely to be used with that particular camera. Like many other ingenious contrivances, it is of French origin, and is constructed by the optical firm of Clement & Gilmer, of Paris, successors to Laverne. It is formed on the principle of the iris diaphragm, the blades being considerably stronger than is necessary when adapting such a diaphragm to a lens, for in this case it has frequently a rather heavily mounted lens to support. Indeed, strength is a leading feature in its formation.

To insert a lens, it is only requisite that by means of two projecting finger-and-thumb pillar-pieces the aperture be opened to admit the lens easily, the flat face or shoulder of the lens screw pressed against the face of the adapter, and the collar rotated so as to close the blades tightly to ensure its being held so firmly as to resist any attempt to withdraw it by pulling it out. When fixed, a pinching screw, working in a slot as shown in the drawing, even prevents any one from expanding the iris in order to remove the lens. But when



this screw is eased by a slight turn with finger and thumb then may the iris be expanded with ease, the lens removed, and another inserted in its place.

During the brief period that we have had this expanding adapter in use we have derived much satisfaction from its employment.

It saves one from the necessity of having a separate camera front for each different lens that he may desire to take out with him when on a tour; and to those who, for experimental purposes, have occasion to be employing or trying different lenses on a camera it is invaluable.

ON THINGS IN GENERAL.

I LITTLE anticipated when, a few months ago, the periodical photography-in-colours mania was running its course that we should so soon have another virulent epidemic of the same disease, one, too, that is the cause of so much discomfort that I present Messrs. Pasteur and Koch with the idea that they investigate the symptoms so as to find an innoculatory substance to prevent its access. Possibly a course of elementary physics would have some effect in preventing the spread of the infection. Personally, I may say the subject is the means of producing great discomfort. I am well-known among my acquaintances to be interested in matters photographic, and after the publication of the Lippmann announcement the number of queries and congratulations combined that, in connexion with the great discovery of photography in colours, perfectly overwhelmed me is absolutely distressing to contemplate. What does it all amount to? Absolutely nothing. M. Lippmann has shown a plate to the members of the Paris Academy of Science which is represented to be a photograph of the spectrum, and to show the whole range of colours by reflected light. The *Daily News* gave the first blare of trumpets. Listen what its correspondent says, speaking of one of these photographs-in-colours shown to him by the discoverer in his own laboratory:—"In the light it (the paper lamp shade) threw back on them, the colours took such a brightness as to be only comparable to the prismatic hues of a well-cut Golconda diamond." (Would not a Cape diamond have answered?) "When he held the plate between my eye and the light, *I did not see a trace of colour on it!*" The discoverer, however, states, "Seen by transparency the *cliché* is negative—that is, each colour is replaced by its complementary; green by red, red by green," &c. A statement exactly contrary to that of the correspondent. So far as to the actual results obtained, the theory explaining them (so far as at present advanced) is a tissue of absurdity. The light is reflected from a mirror back again through the film, and so gives rise to the phenomena of interference fringes, which cause the production of a multitude of superposed layers in the film. M. Lippmann does not explain how the layers come to be superposed instead of, as might be expected if his theory had a grain of solid foundation, placed at right angles to the surface of the plate. He does not explain how one layer merges into the neighbouring layer, nor how he gets his "half-length undulations" so learnedly described. He does not explain how, as the neighbouring waves are of continually increasing or decreasing sizes, according to whether they are calculated from the red or the end, they do not, in reflecting, disturb one another. He does not, and cannot, explain how superposed layers such as he describes can give a coloured effect at all. Finally, neither he nor any one else has for one moment attempted to give a mathematical demonstration by rule and compass of any possible result of his "interferences" in the direction he specifies. I do not know what M. Lippmann's reputation may be, but it appears as though he had heard of interference phenomena produced by the aid of mirrors, and jumped at the conclusion that it was something after the style of the reflection he was experimenting with, the latter in that case really being a burlesque of a well-known optical experiment.

Triumphal pæans have so accompanied this annonncement that such a valuable demonstration as that given by Mr. Warnerke before the London and Provincial Photographic Association on a simplified system of collography is likely to get lost sight of. Yet the simplicity and apparent ease of his method of working, the readiness with which the particular material required can be purchased, and the absence of all special apparatus, commend it to all who take an interest in collotypic processes.

The discussion on pressure gauge explosions and the gauging the contents of a cylinder by a method I have long recommended, viz., weighing it, all will tend to facilitate the use of the optical lantern. By the way, what does Mr. Baker really mean when he writes of coal-gas having a "specific gravity of 216·77 grains per cubic foot?" It may be useful to those desiring to adopt the method of weighing to state that it is correct within five per cent. to put down a hundred feet of hydrogen, oxygen, and an average sample of coal-gas as half a pound, three and a half pounds, and eight and a half pounds weight, respectively.

The Parent Society is to be congratulated upon having entered into its new abode, and I heartily wish it every success. Possibly, now it has a definite and easily accessible abiding place of its own, it may attract new blood. It would be a pity for anything but success to follow in its footsteps, for the long and honoured list of names on its rolls, and the papers of great value that have first been read under its auspices, prove fully, if need were, its *raison d'être*. The objectors to the cost of the journal may be right, but more likely they are wrong. It needs one accustomed to the ins and outs of serial literature to have anything like a true conception of the expense attendant upon such enterprises. Lately the briefs of current, scientific publications in connexion with photography have given so greatly additional a value to the journal, that I should be sorry to see the last number of the *Photographic Journal*, and I trust I never shall.

FREE LANCE.

NATURAL AND ARTIFICIAL CLOUDS.

FROM very remote times clouds have been regarded as an indispensable part of landscape pictures; not only this, but have frequently formed the chief point of interest in them. We have ample evidence of the necessity felt for such additions in early specimens of both paintings and woodcuts. In many instances the attempt seems rather to be the indication of a want than a want fulfilled. A few lines, curved or horizontal, or a smear of several colours, did duty for cloud effects; but even in this rudimentary work contrast of form was not overlooked, the lines of the clouds afforded the required balances to lines in the landscape, helping to harmonise the parts and tie them together in the best available manner, filling up what would otherwise be a blank, unmeaning gap.

We shall not, in this short article, discuss the advantages of a good cloudscape in painting, but confine our attention to its effect, or even necessity, in a skilfully made photographic landscape, and the filling in of that otherwise waste space called sky. In the earlier days of the art, when the calotype process was the only known reduplicating method, the exposures required were so protracted that it was beyond our power to photograph with definition and distinctness anything in motion. It was not until Scott-Archer introduced the collodion process and more rapid exposures that there was a possibility of securing at one and the same operation clouds with the rest of the picture. With this process at the command of the photographer it was only occasionally that clouds were secured well defined and suited to the subject. Even now it is not so thoroughly appreciated as it should be. That, however charming clouds may be to the eye, they are often of little or no value to the photographer from a pictorial point of view, and the idea that because there are clouds they must of necessity be suitable is one that the sooner it is exploded the better. All clouds are to the eye more or less beautiful, provided they only partially cover the heavens and are varied in form. Their beauty chiefly depends on an infinite delicacy of shading and colour that photography only inadequately renders, limiting us to certain classes and forms that specially lend themselves to our particular art as most effective and suitable. It must be borne in mind that the form of the cloud is quite as important, or should be, in the composition of a picture as that of the landscape if they are rendered in any way to command attention. *En passant*, a suitable cloud is never out of place in any landscape, although a view may be excellent without if there is only a little sky-space in the picture; but, given the space, it will always be better for judicious clouding. In nature a few little wisps of cirrus will break the uniformity of an otherwise clear blue sky by contrast of colour, but would be of little or no use to the photographer, the blue and white having very much the same actinic value at the end of an exposure rightly calculated for the landscape. Colour makes up in nature for many shortcomings in form, but in photography form is all in all up to the present time, and we must, so to say, decolourise our imagination in the composition of a picture to be made by the chemical agency of light on a sensitive plate.

To have clouds properly represented in our photographs has always been a development anxiously desired. The most successful method has hitherto been to take separate negatives of clouds and landscapes and print them together, and will, I think, continue to be the favourite plan. The opportunity for taking views when cloud effects are specially suitable is rare, and pictures taken under such conditions form but a very small proportion of those photographed. If by a fortuitous concurrence of circumstances clouds and landscape can be taken by one and the same exposure, by all means seize the opportunity, for no other plan can surpass the beauty of such a combination successfully rendered. I believe the earliest attempt at manufacturing clouds was by smearing some opaque pigment on the back of the negatives; then some brilliant genius tried gumming small

tufts of cotton wool on the back; again, smoking the back and rubbing off the soot in places; also by laying opaque objects on the front of the printing frame during the time the print was being made, thus shading off the light in irregular patches any way, destroying uniformity and calling it clouding. An advance in the manufacture was made when clouds were painted on the back of the negative in somewhat conventional forms, but with some regard to suitability. The result was, however, conspicuously different to the real photograph. Lithographed clouds have also had their trial; their monotony and want of adaptability was a serious objection.

The repetition of the same cloud-forms time after time in different landscapes is a great drawback to any kind of picture: the fact of nature supplying the original does not exempt them from this charge, and the great objection to stock cloud negatives of any kind is the injudicious use of them at times, and often has the photographer provoked an avalanche of censure by exhibiting a number of different views with the same clouds, and worse still, by the landscape and clouds being lighted from different directions. The most common, I was about to say continual, departure from accuracy is this improper lighting, of which we see numerous examples. Few exhibitions are free from them. Unfortunately, to many photographers a cloud is a cloud and nothing more; its lighting, its shape, its position, are looked upon as merely matters of unimportant detail. A cloud, however intrinsically good, is made to do duty in the most absurd fashion and get into disrepute.

Given a good cloud negative, there is a right and wrong way of using it. The wrong ways are pretty freely exemplified in most collections of photographs, the most conspicuous of which are, printing them in too dark and strongly, and improperly vignetting them off into the landscape; the result is, the clouds are brought down to the foreground, where they partly cover with cimmerian darkness some light object, entirely spoiling the print; or they stop short of the foreground and obliterate the distance, or show a decided line where the clouds and land meet. The less conspicuous faults are where clouds copied from the zenith are made to appear over the horizon, and *vice versâ*. Perspective in clouds is less considered than it should be, and in this particular, clouds and landscape taken at one exposure never err, and this alone is one very good reason why such photographs are to be preferred. There is no *necessity* for added clouds to be so wrong in perspective as they frequently are. Providing a really good cloud is judiciously added to a landscape, the sharpest criticism will fail to detect it. It will offend against no art canon, or offer any point for adverse criticism.

With regard to the kind of clouds that are most generally useful, we cannot do better than study the paintings of the best artists to see how they are adapted to the landscape, how they pull the whole, as it were, together and emphasise the landscape by strong contrasts of form and texture. Perhaps Constable selects the style of cloud that better than most others suits the photographic landscape. Turner, who produced wonderful natural effects in his best works, depended a good deal on his skies; but in his, colour was a more important factor than form, and divested of this would fail to give photographic satisfaction; but in all good paintings the light, shade, and form of the clouds are chosen with respect to the light, shade, and form in the landscape over which they float, and no sky would suit equally well a dissimilar landscape. This rule applies to photographs quite as much as to paintings. It therefore behoves us to be particularly careful in selecting clouds of a character that will harmonise with our pictures, and is a strong protest against their indiscriminate and injudicious use. The idea once realised that the perspective and form of the clouds is as important as the rest of the picture will help the photographer to help himself and avoid the various pitfalls that the indiscriminate use of a limited number of cloud negatives is likely to place in his path.

EDWARD DUNMORE.

PHOTOGRAPHING IN COLOURS.

THE invention which has recently been announced from Paris of a method of communicating colour to a sensitive photographic film by the action of a ray of coloured light will, if confirmed, awaken very widespread interest, for it is impossible to foresee all the applications to which such a discovery might be expected eventually to lend itself. The idea is credited to M. Lippmann, a professor of the Sorbonne, and a physicist whose name is already widely and favourably known in connexion with some highly ingenious instruments of physical research. The theory which he is said to have successfully embodied in experiment is that the interference of two rays of light of the same wave length may be caused to produce a characteristic effect upon a sensitive film, such as amounts to dyeing the film of the particular hue in question. So far as has at present been explained, the process appears to depend upon the doctrine that the chemical action, like the chromatic properties, of a ray of light is capable of being affected by the conditions which give rise to the phenomena of interference. In itself this seems likely enough. It is well known that if two rays of light having the same wave length travel along the same path simultaneously they interfere with one another. It may and does happen that at certain points along the path, depending for their position on the wave length, the two impulses tend to counteract and at other points to reinforce one another. A luminiferous particle—whatever that may be—which is acted upon by two opposing forces will remain at rest if the forces are equal as well as opposite; while if the forces be not equal or not directly opposed, there will be some resulting disturbance, but still a disturbance different from that which would have been produced by either of the coincident forces acting alone. From this cause arise all those beautiful optical effects of interference which so strikingly illustrate the undulatory theory of light. Now, if it be a fact that the chemical activity of a ray of light is subject to the same law, and can be either exalted or depressed by causing a second ray of the same wave length to act upon the sensitive reagent, it is quite conceivable that a pair of rays of light might be so directed through a photographic film as to cause, not a uniform, but a sporadic deposit of the precipitated element. These minute deposits would in that case be distributed at definite distances apart along the line of the common path of the active rays, because they would mark the points of co-operating, and therefore exalted activity. Similarly, their intervals would occupy the spaces in which the antagonism of the two rays had reduced or even destroyed the actinic effect. Now, such a film would apparently be opaque to any light not having this particular wave length, because at some point it would necessarily be absorbed by the opaque deposit. But if a ray of the same wave length impinged, it might be able to pick its way successfully between the deposits. Professor Lippmann is said to have produced such a film by the expedient of placing a mirror at the back of his sensitive plate and causing the focussed ray to return along its own path. The mirror is produced by making the plate one side of a mercury trough, which when filled constitutes a mirror in exactly the desired position. The expedient, if successful, is certainly charmingly simple, and, seeing that the healing art would undoubtedly benefit in as high a degree as any by a practicable system of chromatic photography, we look with lively interest for some further information upon the theory and practice so ingeniously originated.

—*The Lancet.*

COPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY MEANS OF ARTIFICIAL LIGHT.

IV.

IN my previous article I referred to the importance of modelling or working up the subject to be copied (when such was of a nature as to permit of same being done), and perhaps next in importance to this working up of the picture itself comes the modelling of the negative, and here there is a wide field open for an enthusiastic worker to act upon. Undoubtedly very much may be done in the way of obtaining contrast or vigour by having recourse to a reliable method of intensification. In my practice on such subjects as are merely black and white I invariably intensify; but in numerous cases of copying ordinary photographs I seldom have recourse to such, for when a good negative of such a subject, say, as a portrait has been obtained, and the same is sufficiently plucky and full of middle tints, intensification would do more harm than good. But there are very many subjects where intensification stands pre-eminently out, and when used with proper judgment it places a great power in the hands of an operator for obtaining superior results. It must not, however, be supposed that every subject is best treated with intensification.

Having, therefore, after due deliberation, made up one's mind to resort to intensification, the operation must on no account be hurried. First of all the negative must receive a most thorough washing, when the ordinary bichloride of mercury solution may be applied with good effect, and when the film has assumed a cream-like colour, the negative must again be subjected to a thorough washing, and provided the operator has at hand a good, broad, camel-hair brush, the same may with good effect be brushed firmly over the face of the film. I quite believe it is at this juncture that beginners make so many failures in intensification; they do not wash thoroughly before and after the application of the mercuric chloride solution, but become over-eager to get the job finished. Provided such a formula as I have referred to in my previous articles has been used for development of the plate, when the film that has now become bleached with mercury and washed receives a bath of weak ammonia and water the negative will assume a beautiful black colour, and in cases where the subject copied has

been a black and white one, the transparent parts will be but little clouded or removed from clear glass.

I will now relate a method which, in my hands, has proved most serviceable in cases where it is desired to obtain good white margins without blocking up the details of the subjects. The method I am about to relate I am not aware has ever before been made public by any writer. I can certify to its great advantages when working on some class of subjects; and as I write, I just remember a particular case which was so treated with excellent results. The case in question was when a number of lithographic prints of locomotives were sent to me to copy and make lantern slides from, but little time was permitted for the work, so I could not use collodion, and had to have recourse to gelatine and artificial light for the making of the negatives. Mawson & Swan's photo-mechanical plates were used, and all the operations of exposing, &c., were carried out much after the lines laid down by me in these articles, but when I came to the intensification stage I saw at once that were I able after the plates were intensified to remove from such portions of the negative the atoms of mercury that had been added to the metallic silver deposited by development in such places as would have been better left unintensified and leave those parts only, such as the whites, in the picture intensified, I would improve matters to a very appreciable extent, and this is how I went about it. After a good washing, and before the negative was allowed to dry, but after the superabundant water had been drained from the surface of the film, I placed the negative in an old printing frame, one large enough to allow of its being held up at the four corners by books of similar thickness; the printing frame being a large one, and containing a sheet of glass, allowed the negative to lie flat, under which a sheet of white paper was placed to act as a reflector, the light coming in at the four sides between the books; in other words, I extemporised a flat retouching desk. I then made a clean, fresh, saturated solution of hypo, and taking a new clean camel-hair brush of small size, I first of all went carefully round the edges of those parts of the negatives that it was desired to remove the mercury from; in doing this the brush should not be overcharged, but just nice and damp; it soon made its presence felt, and the atoms of mercury disappeared as if by magic. The entire surface of the picture which was wanted to be so treated was then brushed over in a similar way, and a most distinct advantage gained by leaving those parts only intensified that were benefited by such. The one thing to avoid in this treatment is the running of the hypo solution beyond the parts it is desired to treat; if the negative is placed flat and the brush not overcharged with hypo, there will be found but little trouble, and even should there be a slight overflowing in a few places, this is easily put right afterwards by a slight application of Chinese white when the negative is dry. An ordinary retouching desk is not nearly so useful for this dodging, for with its aid any superabundant flow of hypo solution is very apt to flow down the face of the negative and cause trouble and loss of temper; there are many other ways in which this dodge is most useful in improving negatives that are to be improved by merely intensifying some parts only, such as thin skies. Another class of subjects which are also conveniently treated in this way is the copying of coins or medals, or many of the numerous articles met with in commerce, and which it is frequently desired to photograph.

T. N. Armstrong.

IMPRESSIONISM IN PHOTOGRAPHY.

[A Lecture delivered before the Pacific Coast Amateur Photographic Association.]

Impressionism in art has been described as "The record of a visual sensation in all its freshness, without the complication of its simple purity, by the addition of hypothetical lines or masses which the eye has not directly observed."

Before the term impressionism can be applied to the productions of the camera, we must first thoroughly understand what it means when applied to the work of the painter.

If you look at a landscape where the elements which go to make it a harmonious whole are simply arranged, your eye will be at once attracted to the main object of interest. That object is the backbone of the picture, without which there would not be sufficient interest to make the view pleasing. It may be that one or more of the subordinate elements of this view in some way interfere with the main object, either in size, colour, or form. It is the object of the artist who tries to paint this landscape to make his interpretation of the scene as attractive, as ideal as possible; so he changes these conflicting elements until they are in accord with the principal object of interest. If he ignores most of the detail and seeks to give only an impression of form and colour, letting the imagination fill in most of the detail, he is called an "impressionist." Of course, there are impressionists who represent the extreme, and impressionists who represent the happy mean of the middle line. It is from the work of the latter that we will draw comparisons.

True impressionism is founded upon the fact that the intelligent mind objects to having everything shown—that it is best pleased when left to do a little thinking for itself. In reading a book we do not care to have things too minutely described. First, because we would grow weary of the detail; and next, because we want to do a little imagining for ourselves. And so with pictures. Too much detail is tiresome to the eye—does not allow our imagination any scope at all; and, what is of great moment, frequently attracts our attention away from the most important object in the production.

Imagine a view with a group of trees in the middle ground, and cattle feeding beneath them. Let an artist of the Düsseldorf school paint that scene, his foreground will be a marvel of detail. The branches of the trees will show, and every leaf will be strongly indicated; you can almost see the hair upon the cattle. Perhaps you will marvel at the apparent fidelity of the detail; everything seems to be so correctly drawn. But is this impression correct? Is the effect true to nature? Do the trees seem to sway with the wind? Do the cattle seem to be moving as they feed? Is your eye directly and unerringly attracted to the theme of the painting? Does the picture please and impress you?

Now let this same view be pictured by an artist painting in the broad style. Near to the foreground is but a smudge; the cattle are mere dots of pigment—probably without feet; the trees are unmeaning patches of colour. But take the proper focus and the effect is changed. The foreground is inconspicuous, and while only indefinitely suggestive, leads you by subtle gradations to the middle ground, where the cattle seem to be moving about as they feed in the rich grass. The trees seem to sway with the summer breeze, and through all there is the suggestion of atmosphere; that is art—not the mere copying of the details of nature, but rather suggestive of her poetry. The details of nature cannot be copied, for they are too infinite; they can only be suggested.

Some writers assert, and Robinson, the English photographer, is one of them, that when one looks at a landscape the eye sees detail everywhere. Very true, but it does not, and cannot, see detail everywhere all at once. One cannot look at two things at the same time and do each one justice. And if there is in a picturesque view, as there should be, a principal object of interest, all outside detail is lost sight of when contemplating that object. Then why should we represent in a photographic reproduction the detail we take no notice of when looking at the thing itself? And why should we demand from the limited possibilities of a photograph more than we exact from illimitable nature?

The subordination of detail to effect is a natural law. The history of a people is best remembered by the principal events of their era, and if, in a description of those events, detail concerning minor events be given, their importance becomes lessened and a distinct impression has not been made upon the mind. Some writers have a happy faculty of presenting in a few words descriptions so vivid that the reader sees with the author's eyes. If in these graphic descriptions the author descended into petty detail he could not make so strong an impression. It is but natural that when one is called upon to give attention to two or more things of equal importance at the same time the result is a clash. There is a confused impression consequently, but little can be remembered.

In giving an example of broadness in art, I do not know of a better illustration than the effect of a clever water-colour. Upon close study there is nothing to suggest the realistic impression produced when the proper focus is maintained. A photograph is far removed from a water-colour, it is true: but they are alike in this—both are reproductions from nature upon the flat plane of a piece of paper. And if a water-colour painted broadly gives such an agreeable effect, why should it be necessary for a photograph to show minute detail? Why not take a lesson from the many years' experience of painters, and do as they have not only found it best to do, but necessary to do, in order to secure the most truthful effect.

There is an old saying in studios, applied to those who almost touch their faces to a picture when criticising it, "Kick him on the nose." One is tempted to carry the advice into execution when some would-be critic says of a really good production of the camera: "What's the matter with it? It isn't sharp." An artist can only paint or reproduce so much as he feels. His object is to make upon the minds of others the impression nature made upon his. But he cannot make that impression if those who see his pictures have not sufficient appreciation, if they have not studied nature enough to enable them to declare whether or not the effects shown are truthful. Any one can, to a certain extent, criticise the drawing in a figure, because we see figures all our lives, and, in a measure, study them. But very few study nature. How many can tell whether the clouds in a painting are lighted correctly? And yet who has not looked at and admired a clouded sky? The mission of every reproduction of nature is to suggest her beauty, her power, and her grandeur. After these attributes are suggested, appreciation can come only from those who know from their own observations how truthfully they have been suggested. So, when a person looks at one of your photographs and dogmatically tells you it isn't sharp, you can labour with him, and tell why you are glad it is not. But if you have produced a poetical composition and your critic cannot see the beauties in it, envelop yourself in a mantle of silence, for your auditor is not in the same plane of intellectual appreciation with yourself, and no amount of argument on your part can change him.

Some of these critics are queer creatures. Show them a photograph in which some of the elements are out of focus, and properly so, and they

will immediately draw your attention to the fact. Tell them a mild fib—that the photograph is a copy of a painting by your friend Brush, the noted artist—and they immediately see beauties that were previously concealed from them.

Before an artist can paint broadly he must serve an apprenticeship in painting minutely—in drawing detail accurately. It takes him a long time to find out what to leave out. And so with the photographer; before he can produce broad effects with his camera he must be thoroughly accomplished in the arrangement of the image upon the ground glass. He, too, must find out what to leave out, in order that details may be made subordinate to the main theme of his composition. Unfortunately, the means for accomplishing this result are few. Lack of definition in minor objects of interest, coupled with a suitable lens for such work, are his only possible assistants. It is strangly so, but the best lens for such a purpose is a cheap one of the second grade. It is difficult to make a fine lens cut poorly, while an indifferent lens does so as a matter of course. The lens must, however, be able to completely cover the plate at all times.

In producing a landscape to meet the ideas of those who admire what we must call, for lack of a better term, "impressionistic photography," select a point of interest in a composition—some important object—the whole or part of which adjust to moderate sharpness. Then see if the importance of that object is lessened by what should be subordinate. If it is, the reliance must rest upon the swingback and the judicious use of large diaphragms. One should not be governed by the idea that it is necessary to make a copy—an exact likeness of the scene. Suppose that for the sake of the picturesque you do distort a little; what matter, so long as the effect, in the main, is truthful to nature as a whole, rather than to that locality in particular.

I once made a successful picture, which I have called *Spring Rains* out of a landscape that was not specially interesting. A piece of overflowed land, a line of trees in the distance, and some clouds in the sky were the simple elements out of which I was to try and make a picture. By using a nearly open lens some unsightly telegraph poles were thrown out of focus—or, more properly speaking, were not allowed to come into focus. By using the swingback I secured good definition in the middle ground upon the bunches of grass sticking up through the surface of the water, thus making that part all-important and drawing attention to my motive—the overflowed land, and the consequent suggestion of *Spring Rains*. To properly focus the different objects in the competition took me all of fifteen minutes.

What I have said concerning lack of detail applies principally to landscapes, and I have spoken particularly of landscapes because it is easier to illustrate my ideas from them. The principles set forth apply equally to figur eand genre studies, for in all productions intended to please the artistic sense, detail must give way to motive. The motive of a picture is paramount to every other consideration. If there are figures in a landscape they should have the attention their importance in the composition deserves, and no more. If the detail in them is too well defined when they are only intended as accessories, their presence will hurt the effect of the picture, by attracting attention away from that object upon which it is intended the eye should rest. On the other hand, if figures are not sufficiently defined, it will be difficult to recognise their purpose. The same rule of subserviency applies when the figure or figures are all-important and the landscape accessory. By subtle gradations of detail and tones the attention should be unerringly directed to the motive of a composition.

In studies of architecture, where the object of interest extends nearly to the edge of the plate, all parts of the image should be reasonably sharp. The architect has, presumably, so massed his material that your attention is directed to the proper place in his design. In portraiture, the best galleries are now using lenses made specially to secure moderate sharpness in one point at a time only; and as gallery photographers are now studying more closely what is good in art, and applying to their work its principles, their productions are gradually becoming more worthy a place in the domain of art. Some of the noted photographers of the country will probably severely criticise my use of the term "gradually," or at least consider me patronising. But I have taken as representative of their progress the successfully competitive pictures of their annual conventions. From a strictly critical standpoint, their is much to be desired in even their prize pictures.

The substance of these remarks is the result of reflection after hearing a friend, who is a very skilful photographer, say, and in good faith, too, that a photograph should be considered and criticised from a standpoint of its own. I do not believe this; for the same rules governing composition, perspective, and the proper balance of light and shade must be the same in photography as in painting, for both are transcriptions from nature. The laws governing the criticism of art productions are founded upon truth. They are the result of the observations of men who have given a lifetime to the study of nature and of art.

The landscape painter seeks to give upon his canvas the effect that nature makes upon his mind; while the average photographer is content to give the effect of nature as reproduced through an unsympathetic lens. Some may think that the lens, being mechanical, cannot be wrong in its productions—that the effect it produces must necessarily be correct. Now the lens, when stopped down is, to a considerable extent, a small telescope. While it does not bring the distance nearer than it ordinarily appears, it does make detail in the distance appear sharper than it seems to the eye. This statement may not seem true until some experiments are made to demonstrate it. After making a photograph of a landscape in which there is distance, using a small stop in the lens, compare the photograph so made with the view itself, and you will observe that the detail of the distance is sharper in the print than it seems to the naked eye. A photograph is in black and white, with intermediate tones which represent the many colours of nature. Now imagine a landscape in which the colour of one object makes soft contrast with another. Detail is subdued and the result is a soft, pleasing mass. Any reproduction of that view, whatever the process, should preserve that effect of softness, even if it cannot reproduce the colour.

The eye is often deceived by the brain. For instance, in the distance the eye observes a tree. The leaves cannot be seen, yet the mind, knowing that the green mass is composed of innumerable leaves, fancies it can see them. If you will look about you when out in the country, you will be astonished, perhaps, at the little detail you can actually see unless you look for it. That cow over there, a hundred yards away, you thought was a piece of red rock until you saw it move; and that grey rock on the hill yonder you believed to be a bunch of bushes until you approached it. But in neither, the cow nor the rock, even at the short distance of a hundred yards, can you see detail.

The study of paintings, and the study of etchings particularly, is the best possible training for that æsthetic sense, that appreciation of harmony, which is so necessary to the photographer. He can only select what is pleasing, and though he may feel that certain things are inharmonious, he cannot change them. To be able to intelligently criticise a work of art, to be able to call attention to the merits and point out the faults, in any production of the needle of the etcher, or the brush of the painter, requires considerable schooling. One must study not one painting, or one etching, but hundreds of them; not the work of one artist, but of many. The ability to intelligently criticise is no royal gift. One may have innate taste, a sense of form, and a correct eye, but these faculties are not all sufficient. One must have certain knowledge in order to combine these faculties, and knowledge can only come from close application.

There are certain laws which explain why the art productions of man are beautiful. And the same laws apply to nature, for certain parts of nature are only beautiful when the elements which go to make them are in harmony with one another. The laws of harmony are absolute, and they apply to everything in form or colour which attracts our admiration.

I have tried to prove that the painter shows no more detail than it is natural for the eye to take in; that sometimes, to call attention to a particular or important feature, he exaggerates one thing and subdues another that the desired effect, and a harmonious effect, may be produced—as Emerson says, in his essay on art, "omits the prose and details of nature, giving only the spirit and splendour." And I have tried to make it plain that photographers must follow in the wake of the masters of the brush, who have already studied out the laws governing the beautiful, if they wish their work to find a resting-place within the domain of the fine arts. There are now, and always will be, two kinds of photographers: those who make copies of nature, and those who make pictures from nature. The productions of one give an excellent idea of the characteristics of a locality, and are pictorially descriptive thereof. The pictures of the other suggest the feeling, the poetry, and the subtle beauties of creation. You look at the views of the first and are soon satisfied, but the pictures of the second afford you continued interest, and awaken in you emotions of keenest pleasure.

A. J. Treat.

PHOTOGRAPHY IN THE COLOURS OF NATURE.*

We have here a true solution of the problem of reproducing the colours of nature in a screen picture, dating from November, 1888. Previous to the publication of my new principle, it was assumed by Cros, Poirée and others, that if the projection method were employed, each picture should be projected by the same kind of rays as those which acted to produce it. In my method, as I have already stated, a picture made by the joint action of red, orange, yellow, and yellow-green rays, but chiefly by orange, instead of being projected by a similar mixture of spectrum rays, is projected by red rays only. Similarly, the picture made by orange, yellow, green, and green-blue rays is projected by green rays only. and that made by blue-green, blue, and violet rays, by blue-violet rays only. That is the true principle, yet nothing of the kind had ever been suggested. The process is capable of giving results which are above criticism, except of that hair-splitting kind which applies also to the ordinary photographic process as a means of reproducing objects which have no colour. The most serious objection to this method of solving the problem is that its only commercial value would lie in its application to the illustration of popular lectures.

Dr. Stolze, who was one of the first to recognise the genuineness of this solution of the problem, doubted if, even in theory, colour prints

* Concluded from page 120.

from the same kind of negatives could be made to furnish such a perfect solution. A year ago I also believed that there were theoretical difficulties in the way of realising a perfect process with colour prints. Only recently have I succeeded in showing what relation the colours of the prints must bear to the colours of light used in projection, in order to perform exactly the same function and, under like conditions of illumination, secure equally perfect fulfilment of theoretical requirements.

In the projecting method, we build up the luminous image by adding light to light. White light is produced by the mixture of the three coloured lights used for projection, and black by their suppression. But when we carry out the process to produce permanent pictures, the paper which may form the basis of the picture is itself white, and it is the shadows that are built up by the superposition of colour prints.

Nevertheless, the colour print has exactly the same function to perform as the lantern positive, *i.e.*, to absorb and suppress, by its shading, light affecting one primary colour sensation. It we remove our three positives from the lantern, the screen is evenly illuminated with white light. If we then replace the one representing the green sensation, its shadows will absorb the green light, with the result that the screen bears a picture in the complementary colour, pink, on a white ground. In the colour-print method, we commence with a white surface, which corresponds to the fully illuminated screen; and the shadows of the colour print representing the green sensation, when laid upon this surface, absorb the same kind of rays as the shadows of the positive in the lantern, and with the same result, a pink monochrome picture on a white ground. Superposing the other two colour prints upon the first one on paper is like inserting the other two positives in the lantern. This explains why the primary sensations are represented by prints having shades of the complementary (absorbing) colour. It is the lights and not the shades of the colour prints that represent the effect upon the respective primary colour sensation. It is only necessary to use dyes that completely absorb red light, but neither green nor blue-violet for the print representing the red sensation, green, but neither red nor blue-violet for the green sensation, blue-violet, but neither red nor green for the blue sensation, in order to obtain from my negatives a colour print heliochrome that exactly fulfils all theoretical requirements, provided that it be examined in the same kind of white light that we obtain in the screen projections, by mixing red, green, and blue-violet rays. The dyes mentioned by me in my paper of November 21, 1888 (Prussian blue, aniline-magenta, and aniline-yellow), fulfil this requirement, and colour-print heliochromes made therewith according to my instructions must, therefore, reproduce all the colours of nature under the conditions of illumination just stated.

We have, then, a theoretically perfect and, at the same time, practicable process of reproducing all the colours of nature in permanent prints from three negatives.

In order to obtain colours that would appear of exactly the right kind and shade in ordinary white light, it would be necessary to use dyes each of which completely absorbed all light affecting the colour sensation which it represented, but no other. The colours would then be correct in ordinary white light, but would appear too dark, relatively to the white ground. In order to obtain colours that would appear brighter in ordinary white light, dyes may be used which completely absorb only rays that excite chiefly single primary sensations and other rays in due proportion. The dyes proposed by me also fulfil this requirement, so that even in ordinary white light the degradation of a colour is insignificant except in the greens, where it is noticeable.

I have seen some of the results produced by the older processes of composite heliochromy, and others who have also seen them will, I am sure, bear me out when I say that the colours have invariably been not only untrue, but either very dull or else flat and patchy and wanting in the delicate details and gradations of light and shade which characterise good monochrome photographs. All that showed bright colours resembled nothing so much as cheap chromos. In the composite heliochromes by my process, which I show to-night, the colours are, as you can see, as perfect in detail and gradation as the monochrome shades of an ordinary photograph.

According to Captain Abney, the pictures produced by the silver subchloride process are "photographs in natural colours." Those which I now show are not so in the same sense, but they are something more and better than that—they are photographs in the colours of nature.

I have already spoken of a class of writers who still believe in the ultimate success of the silver chloride process, or something like it. It is not very surprising that men imbued with such a belief should be displeased with the idea of composite heliochromy, which is something short of a miracle; but the worst of it is, that they will not even take the trouble to make themselves familiar with the subject, and almost every utterance they make in reference to it is calculated to mislead the public and discredit true progress. I do not know how many times such writers have assured the public that composite heliochromy was based upon the same principle as chromo-lithography, and was merely the production of coloured pictures by the aid of photography. Even Dr. Eder, a most able photographic chemist, is reported to have assured the representative of a London newspaper that my process was "chromo-lithography, in which photography is only an accessory!" Now there really is such a thing as photochromy, which is carried out on the same plan as chromo-lithography, but it is no more like composite heliochromy than the Morse system of telegraphy is like telephony. In photochromy it is only necessary for the photographer to make one negative of the object to be reproduced, and this negative contains a register of form and light and shade only. Composite heliochromy cannot be carried out with less than three negatives, which must contain a register not only of form and light and shade, but of colour also. In photochromy an artist is employed to regulate the distribution of colours, according to his taste or judgment; in composite heliochromy it is the light itself which regulates their distribution and combination, automatically, according to fixed and true scientific principles. Photochromy is an art; composite heliochromy a science.

There are others who do make a distinction between photochromy and composite heliochromy, but whose statements are nevertheless too misleading to have any value. Only a few months ago there appeared in one of the oldest and most pretentious of the photographic journals an editorial article upon this subject, in which reference was made to "the three primary colours—red, yellow, and blue," and all advance made upon the basis of true theory was discredited. Another, writing for an important periodical, said, "the red, yellow, and blue" theory worked well enough in practice, and classed as an "advanced worker" one who had never got beyond that idea in composite heliochromy, or even contributed anything to its development. Dr. H. W. Vogel, taking advantage of the prevailing ignorance, even tried to make the readers of *Anthony's Bulletin* believe that I had claimed as my own something which belonged to him.*

The frequency of such misrepresentation by writers, from whom the public has a right to expect something very different, is my justification for assuming the office of teacher and historian long enough to state the facts, which many people have wished to know, but could not discover by reference to current photographic literature.

In conclusion, for the benefit of those who would like to know why this process is not now in commercial operation, having been perfected in theory three years ago, I will say that, for various reasons, it is not practically available to one whose time is nearly all taken up with a business of a different character, and I do not expect to do much with it until I shall have completed preparations which will justify me in making it my chief occupation. In order to carry out the process in strict accordance with the theoretical requirements, means must be employed not only to secure three negatives and three prints, each of which is correct by itself, but each must bear also a certain definite relation to the others. A very little over or under-exposure of any one colour print, or a very little too much or too little of the colour stuff in the film, will change the shade of delicate colours. Fortunately, there is a simple optical test by which such a defect can be detected without reference to, or knowledge of, the colours of the object photographed; but at present it is difficult to secure such harmony of parts when but little time can be spared to devote to the operation of the process.

Composite heliochromy must always remain a comparatively costly process when carried out in a manner calculated to yield the finest results, and can most profitably be brought before the public in the form of optical lantern lecture illustrations, not with the triple lantern, but with transparent colour-print heliochromes mounted as lantern slides. If the colour prints are made by the Woodburytype process, such heliochromic lantern slides, infinitely superior to hand-painted ones, can be made in quantity at a cost not exceeding one dollar each.

F. E. Ives.

PROFESSOR MELDOLA'S FORTHCOMING LECTURES ON PHOTOGRAPHIC CHEMISTRY AT THE SOCIETY OF ARTS.

The following is the syllabus of Professor Meldola's lectures:—

Lecture I.—March 9.—Photography as a branch of technology—Methods of giving instruction in the subject—The preliminary training essential—Photographic materials—Silver and its compounds—Reduction and oxidation occur simultaneously—The forms of reduced silver; grey and black deposits—Supposed allotropic modifications of reduced silver—The haloid salts of silver; their behaviour towards reagents; influence of solvents; formation of double salts—The state of molecular aggregation—Order of reducibility.

* *Anthony's Bulletin*, 1889, p. 101.

Lecture II.—March 16.—The existence of subsalts of silver—Coloured forms of the haloids—Photo-salts—Colloidal organic compounds of silver—Silver albuminate and "gelatino-nitrate"—The principle of emulsification—Other photographic materials—Photo-physical and photo-chemical change—Modification of crystalline form under the influence of light—The action of light on asphalt—Photo-chemical study of iron compounds—Photo-chemical study of mercury and copper salts.

Lecture III.—March 23.—The action of light on the silver haloids—Accelerators and retarders of photo-chemical decomposition—The invisible products of the action of light on the haloids—Sensitive films—The function of the vehicle in modern emulsions—The invisible effect of light on the haloids—The photographic image—Development and subsequent processes.

Foreign Notes and News.

The *Photographische Mittheilungen* has this week some remarks to make relative to the all-absorbing colour-photography of M. Lippmann. It points out, as we have already done, that the hitherto published account, particularly the allusions to interference, are anything but clear. In spite of this admission, however, it claims that the principle on which Lippmann worked was discovered twenty-five years ago by Dr. Zenker, and published by him in his *Photochromie*. We confess to a feeling of perplexity with regard to the matter. If the method as described is so wanting in lucidity that the *Photographische Mittheilungen* cannot make out its nature with certainty, how can it be sure that it has been anticipated by Dr. Zenker?

Professor Rietschel has communicated to the *German Friends of Photography* a very simple method of preparing a focussing screen. He simply coats a plate with a "*milk emulsion*"—*i.e.*, a solution of milk and gelatine. This easy proceeding ought to be of advantage to amateurs when on excursions if they should happen to break their screen, as milk and gelatine are obtainable pretty nearly everywhere.

Dr. Jeserich, who appears to have an extended experience of judicial photography, has recently communicated to the same Society some interesting examples of the results he obtains. In one case he detected a fraud effected by altering amounts in a will by which Rm. 5000 had been converted into Rm. 75,000 by altering the bottom stroke of the m into a 7, and completing it in front by the tail stroke of the R. The photographic enlargement clearly brought out the difference in the inks. Another case of forgery by the same individual of the signature of a lady eighty years old was also detected. The forger had first traced an imitation of the signature in pencil—*à la* Piggott—and then inked it over. On enlarging, the pencil marks were rendered visible alongside the ink.

The *Cercle des Effigistes*, of Geneva, has for some time past been stirring up the authorities, and at length has succeeded in inducing them to establish a course of instruction in photography. The course is at present divided into two portions, consisting of (1) a series of lectures in optics, and (2) a series in photographic chemistry. Both courses are to be delivered by Professor L. Duparc on Mondays and Fridays in the rooms of the University, and are open to all photographers and photographers' assistants on the payment of one franc registration fee. Further courses will be added after October 1. We heartily congratulate the *Cercle des Effigistes* on the result of their endeavours, and particularly in the establishment of the optical course, for there is, perhaps, no branch of the sciences connected with photography in regard to which so much want of knowledge prevails, both among professionals and amateurs, as in regard to optics.

We learn that Herr Bregazzi, member of the *Deutscher Photographen Verein*, has been awarded by King Christian IX., of Denmark, the Royal gold medal for proficiency in Arts and Sciences, and further that he has been accorded express permission to appear in public with the article in question suspended at the end of a ribbon!

The first photographic year-book—the *Fotografisk Tidskrifts Arsbok*—which has appeared in Sweden has just been issued from the press of Messrs. Albin Roosval, in Stockholm. The publication in question affords a very good index to the degree of photographic activity prevailing in Scandinavia. The original articles, of which the year-book contains an ample supply, are mostly of high value and evidently the work of proficients in photography. Such, for example, is a valuable article by Professor Duner on the photography of invisible stars, based on the work of Professor H. C. Vogel; also an article by L. Oestlin. The work contains a number of useful receipts, and is elegantly illustrated in collotype throughout.

The Berlin *Photographische Verein* has made a good move in the interests of photographic employers and *employés*. It has arranged that advertisements, both of employers seeking assistants and assistants seeking employment, shall be inserted gratuitously in their organ, the *Photographische Nachrichten*.

Our Editorial Table.

Development.

By Lyonel Clark. London: Hazel, Watson, & Viney, Limited.

In this manual Mr. Clark enters into both the philosophy and practice of development. In the first part of the essay, which is mainly a reproduction of articles contributed to a contemporary, he gives preference to pyrogallol as the developing agent; but he subsequently devotes a special chapter to eikonogen as a developer for instantaneous work. He concludes a booklet of interesting reading by a reproduction of his paper, *A Comparison of Developers*, read by him at the Camera Club Conference, 1889, and published in our columns at the period.

Annual Report of the Photographic Club.

This annual report is really a copious and well-written digest of the proceedings of each meeting. As there are many of our best practical photographers who are members, this record of the proceedings is most instructive and valuable. The Club meets every Wednesday evening in Anderton's Hotel, Fleet-street, and is usually very numerously attended. Accompanying the report is a pamphlet giving an account of the origin of the Club, with an epitome of the proceedings of the meetings which led to its formation, edited and compiled by Mr. Alex. Mackie. It numbers 130 members. Mr. F. A. Bridge is the Honorary Secretary.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2880.—"Improved Means and Devices for Obtaining Optical Projections of Photographs in Natural Colours." T. R. Dallmeyer.—*Dated February* 17, 1891.

No. 2934.—"Improvements in the Construction of Printing Frames used by Photographers, called 'The Non-shifting Photographic Printing Frame.'" C. Cloakly.—*Dated February* 18, 1891.

No. 2935.—"Improvements in Photographic Plate Carriers and Cameras." W. J. Lancaster.—*Dated February* 18, 1891.

No. 2956.—"Improvements in the Method of and Apparatus for Focussing in Photography." W. G. Thomson and W. Ward.—*Dated February* 18, 1891.

No. 3042.—"Improved Means or Apparatus for Producing Artificial Light for Photographic and other Purposes." Communicated by P. Nadar. J. Y. Johnson.—*Dated February* 19, 1891.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 3	North London	Wellington Hall, Islington, N.
,, 3	Holmfirth	
,, 3	Sutton	Sutton Scientific Society's Rooms.
,, 3	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 4	Coventry and Midland	The Dispensary, Coventry.
,, 4	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 4	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 5	Bolton Photographic Society	The Baths, Bridgman-street.
,, 5	Leeds	Leeds Mechanics' Institute.
,, 5	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 5	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 5	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 6	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 6	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

February 24.—Mr. Leon Warnerke in the chair.

Mr. C. F. Hayward showed some early Daguerreotypes, dating from 1842 and 1843. One of these was a very good example, and might have been referred to a later period. The great difficulty at that time was stated to be that of obtaining sufficient polish on the silver plate, a great number having to be rejected on account of spots, &c.

The Chairman requested Mr. W. E. Debenham to open the discussion on the subject of the evening, *The Dark Room and its Fittings*.

Mr. Debenham said he would begin by describing the window of the Society's dark room, as he was responsible for its arrangement. Outside was a sheet of deep yellow pot metal, as that might be assumed to be admissible in conjunction with any other medium. In front of this were four frames, any or all of which might be used or slid on one side as required. One frame was fitted with cherry fabric, one with two thicknesses of golden fabric, one

with stained red glass, and one with a rather pale yellowish green glass. One dark-room accessory which they had not at present, but which he hoped to see supplied before long, would be a drying cupboard. It was very desirable to have such accommodation, particularly for the purpose of drying backed plates and of orthochromatised plates. He would also like the cupboard to have a sheet of perforated metal, with points brought up to one level, for drying collotype plates upon. This, though desirable, would not probably be so much required as the employment of the cupboard for drying backed plates. He thought backing deserved to be much more general than it was, and that many were prevented from adopting it from the want of convenient drying arrangements. A simple plan that he had known to succeed very well for small numbers of plates was to thoroughly dry a cardboard grooved box in an oven, and then to put in a couple of backed plates with the moist surface outwards.

The CHAIRMAN said, with regard to backing, that he had had considerable success with using a hygroscopic gelatine film in optical contact with the glass as a backing, stained with a non-actinic colour.

Mr. DEBENHAM said that he had found, when endeavouring to get optical contact with such a film, even with plain glass and in a good light, there were many air spaces which made the backing bad. It did not seem likely, therefore, that with plates covered with emulsion and backed in the obscurity of the dark room the assumed optical contact could be depended upon.

Mr. E. CLIFTON had had some experience in endeavouring to use hygroscopic gelatine films, the colour and convenience of which would have made them very suitable for plate backing, but even with the help of squeegee, and on plain glass, through which the operation could be watched, he had failed to secure optical contact.

Several patterns of dark-room lamps which had been sent for inspection were then discussed. The first was one presented by the Stereoscopic Company. It was made from a pattern furnished by Mr. A. Cowan, and consisted of a semi-cylinder of tin, japanned yellow inside, and presenting a surface of about a foot and a half. An Argand gas-burner in the centre was furnished with a movable screen, which, when down, allowed only the light reflected from the yellow surface to pass through the front. The screen could be raised or lowered from the outside. The front was filled with frames, the one for general use furnished with golden fabric, whilst a ruby glass could be exchanged for it if occasion required.

A folding lamp of millboard, for use with a night-light, was next discussed. It was remarked that, as one side was filled with cherry fabric and another with golden fabric, the latter should have been of two thicknesses, which would still have allowed plenty of light to pass.

A lamp for use with a special hard candle, furnished with a hood bearing interchangeable discs of glass of various colours, supplied by Messrs. Benham & Froud, was described by Mr. J. DESIRE ENGLAND. The method in which it was recommended to use it was to allow the light to fall on a sheet of white paper or card and use that reflector as the source of light.

Mr. DEBENHAM would recommend yellow paper in place of white.

Mr. CLIFTON said that a dark-room appliance which had not been mentioned that evening was a plate rocker. He had one of Hunter's rockers in constant use, and found it a great convenience.

The CHAIRMAN, referring to the dark-room lamps, thought ruby glass a mistake; he took it out and replaced it by canary medium. He did not use ruby glass on any occasion.

The CHAIRMAN then discussed the question of Professor Lippmann's discovery of photography in colours. He had begun to experiment with the process, and described by diagrams on the blackboard the principles involved.

Mr. W. ENGLAND offered to present to the Society a drying cupboard, an offer which was very thankfully accepted. Votes of thanks were also passed to Messrs. Vevers, Reynolds, Preston, Benham, Hayward, and the Stereoscopic Company for the various articles presented to, or brought before, the Society.

It was announced that on Wednesday, March 4, Mr. L. Warnerke would give a paper and demonstration of *A Simple Collotype Process*. On March 9 Sir David Salomons would read a paper on *The Registration of Slides in the Optical Lantern*, and show a new appliance for the purpose. On the 24th the discussion will be on *Hand Cameras*, and on April 28 on *Animal Photography*.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 19,—Mr. S. G. B. Wollaston in the chair.

Contributions for the Library were received from the proprietor of THE BRITISH JOURNAL OF PHOTOGRAPHY of several works, from Messrs. Iliffe, who had promised to complete the set of their published photographic works, and from members.

Samples of "Barnet" plates were received for distribution amongst the members.

Mr. J. J. Moran showed specimens of flash-light photography by Messrs. Turnbull, including some of athletes wrestling, and several views of private apartments with inmates "at home." Some of the pictures of wrestlers had been reproduced as engravings in one of the illustrated papers.

The CHAIRMAN, referring to the expedition with which photographs were now utilised for current literature, said that he had one afternoon last autumn started work at three o'clock, had taken pictures, made bromide prints from them, and sent them to the *Daily Graphic* office, in which paper engravings from the photographs appeared the next morning.

Mr. T. E. FRESHWATER related an instance in which the plates had been exposed a considerable distance from London in the afternoon and sent direct to the *Daily Graphic* office, where they were developed, and the engravings appeared next morning.

Mr. J. B. B. Wellington showed a lantern, the joint invention of Messrs. Pringle and Baird. The leading characteristic was the great compactness of the instrument when closed for travelling, and this compactness had been achieved without sacrifice of usefulness.

The CHAIRMAN remarked that he very much preferred the lantern top to be flat, as this was, for warming plates on. He also inquired the opinion of members as to the relative advantages of cylindrical and flat limes for use in the lantern.

Mr. FRESHWATER was aware that the Chairman advocated the use of flat limes, but personally he had not had sufficient experience with them to form a decided opinion.

The CHAIRMAN thought that he got a distinct advantage in light from the use of flat limes; another advantage was the simplicity of the adjusting gear. A flat lime, too, weighing only double a cylindrical lime, would last at least four times as long. There was no question in his mind that it was very much easier to centre with a flat than with a cylindrical lime. Referring to the recent hoar-frosts the Chairman said that he had tried some very careful experiments recently in photographing frost scenes both with ordinary and orthochromatic plates. When there was considerable fog forming the background he found ordinary plates gave the best result, but when the fog lifted and there was a background of blue sky, the orthochromatic plates had the best of it. Was that the result that might have been anticipated?

Mr. W. E. DEBENHAM thought that it was. The yellow background of fog should come out the darker with ordinary plates, and the blue sky with the orthochromatics, in either case allowing the frost to show better against it.

Mr. A. HADDON inquired whether any of the members had any eikonogen that had been kept for a length of time in corked bottles, and, if so, how had it kept.

Mr. F. W. Pask had some that had gone quite black.

Mr. C. H. Cooke had some of the solid which had remained unchanged.

Mr. P. Everitt had some solution that had remained exposed in a flask for two or three months with no particular change. It had been mixed with bisulphite of soda.

It was announced that on March 5 a paper would be read by Mr. P. Newman. On the 12th would be a lantern night, on the 19th a comparison of gelatine lantern slides, and on the 26th a paper on *High Speed Shutters* by Mr. G. Newman.

HOLBORN CAMERA CLUB.

FEBRUARY 20,—Mr. Lowe in the chair.

A demonstration on *Enlarging on Bromide Paper* by Messrs. Smith and Benest was given, Mr. Benest using Lancaster's enlarging apparatus and Ilford paper, and Mr. Smith the Club lantern, and an arrangement of his own for using his own lens, making trial exposures on slips of Ilford, Fry's, Mawson & Swan's, and Eastman papers, and afterwards exposing a sheet of each, giving the exposures found necessary, and both gentlemen getting good results, in each case using ferrous-oxalate developer.

The Club exhibition and Cinderella dance will be held at Anderton's Hotel, Fleet-street, on Saturday, March 7. Single tickets, 2*s.* 6*d.*; double, 4*s.*

NORTH LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 17,—Mr. A. Mackie in the chair.

This being the evening on which the lantern-slide competition was to take place, two lanterns had been arranged side by side, and two discs were thus thrown upon the screen side by side. Four quarter-plate negatives, each presenting some difficulty, &c., had been selected and lent by the Chairman some months beforehand, and these had been for one week in the possession of each member who wished to take part in the competition. Lantern slides were to be made from them on any plates and by any method or developer which the member might choose to adopt. Clouds were to be added or not at the will of the competitor. No prizes were offered, but the honour of securing a place in the competition seems to have been sufficient incentive, for no less than thirteen sets of slides were sent in. These had been sorted into four sets of thirteen of each subject, and each slide bore the number of its set and each competitor had chosen a motto, his real name being contained in a sealed envelope until the competition had been decided. The members came up in force, and the keenest interest was shown in judging the slides, the vote for superiority being taken by show of hands, and the slide adjudged second best being quickly removed from the screen, another taking its place, perhaps in its turn to pale before the next. Thus the slide left on the screen by this "selection of the fittest" was adjudged to take first place in that set. The remaining slides in this set were then gone over again for the second best, and thus first and second best slides were named in each set. The names of the winning competitors were then read out, and each one told the plate used, the method, and the developer by which the slide was made.

The following were the successful members and the particulars they gave as to their slides:—

Mr. E. W. Parfitt, with Mawson's plates, by contact, developed with pyro, ammonia, and carbonate of ammonia, took first place by standing two in Sets Nos. 1 and 3, and first in Set No. 4. These slides were of a lovely warm brown tone. Mr. Smith, with a wet collodion plate, in camera by daylight, and afterwards toned, took first place in No. 2 Set. Mr. B. J. Grover, with a Cowan's chloride plate, developed with hydroquinone and afterwards toned with gold, took first place in No. 1 Set. Mr. W. P. Dando, with a collodio-bromide plate, took second place in No. 4 Set. Mr. Tanner, with a lovely slide on Thomas's plate, by contact, developed with pyro and ammonia, took first place in Set No. 3. And Mr. Few, with one of the new Ilford plates for black tones, by contact, developed with hydroquinone, took second place in Set No. 2.

In several of the sets there was little to choose between Nos. 1 and 2 slides, and in these cases great care was taken in judging, the slides being shifted from lantern to lantern, and sometimes shown alone, and then again thrown by the side of its competitor.

All agreed that the first lantern-slide competition of the Society had been a great success, and it was determined to begin preparing for another competition early in the next session.

The SECRETARY announced that it had been found necessary to postpone

the annual exhibition to March 17, and therefore the meeting on March 3 will be a technical evening, and Mr. Newman will give his paper on *High-Speed Shutters* later on.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

FEBRUARY 23,—Mr. J. Saville in the chair.

Mr. LEWIS MEDLAND exhibited his beautiful and interesting collection of slides, entitled *A Day at the Zoo*. These were about 250 in number, and, to the wonder of the non-photographic visitors, were introduced by a picture of the lecturer taking a snap shot in Epping Forest at a gigantic lion, quite fifty feet in length from his snout to the tip of his tail. Mr. Medland led his audience through the Gardens, visiting first the cages of the larger carnivora, showing several fine slides of the lions, lionesses, and cubs. Many of these were taken from inside the cages, thus avoiding the bars. A species of danger attended some of these shots. One lion had nearly secured the lens from the camera as a memento of Mr. Medland's visit. Tigers, leopards, jaguars, wolves, and other "wild beasts of prey" were exhibited in great profusion, and an "amusin' little cuss" of a hyena attracted much attention, but the "snaix" were conspicuous by their absence. We were then conducted through the houses of the hippopotamus and the rhinoceros. The latter gentleman having kindly opened his mouth, his portrait might be described as belonging to the class of interior architecture. If not of pleasing features, he had at least a good open countenance. The deer, zebras, bison, oxen, llamas, giraffes, and monkeys had all been shot at, and large or small afforded excellent food for the camera. The brown bear, balancing himself on his uneasy eminence, and his white-coated relative were next interviewed. The seals flopped aeross the screen, and to the intense and audibly expressed delight of some of the younger visitors a splendid slide of the kangaroo, with her young peeping from her pouch, was then displayed. The elephants, camels, dogs—native and foreign, and even the harmless, necessary, domestic cat of common or garden extraction were done justice to. We were conducted through the aviary. The eagles, vultures, &c., winged their way across the fields of light, not so rapidly, however, but that absurdly caricatured resemblances to the human face might be traced, noted examples of which were duly called attention to by the lecturer. Having trotted out the existing Zoo-ology, the audience were carried back to prehistoric times, and were shown the antediluvian monsters in their habit as they lived. As to how he obtained negatives of them, Mr. Medland remarked that the least said would be soonest mended. The slides shown, most of which had been taken under great difficulties, and in some cases even with danger, were remarkably fine, wonderful definition and detail having been secured. The lecturer afforded much sound information as to the structure and habits of the animals, and the lecture was enlivened with stories of Mr. Medland's adventures in South Africa and the plains and rocky defiles of Western America.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

FEBRUARY 20.—Lantern evening.—The President in the chair.

Mr. W. Low-Sarjeant exhibited a series of slides by the lantern, entitled *Round about Exmoor*. The whole of the pictures, which were from film negatives, were of the highest order.

Mr. SHELDON, who accompanied him on his tour, gave a brief description of each slide, coupled with numerous amusing incidents that occurred on the way.

The next ordinary meeting will be on March 6, and lantern night March 20.

EALING PHOTOGRAPHIC SOCIETY.

FEBRUARY 19,—The President, Mr. H. W. Peal, in the chair.

The Society resolved to support the petition to the railway companies now being prepared, praying for cheap fares for photographers.

Several slides were passed through the optical lantern.

The next meeting will be on March 5, when Mr. R. Whiting will read a paper on *Intensifying and Reducing*.

SYDENHAM AMATEUR CAMERA CLUB.

FEBRUARY 17,—Mr. T. C. Cole in the chair.

The memorial to London and suburban railway companies in favour of cheap fares for photographers was laid before the club, and it was decided that the Secretary should sign the same on behalf of the members.

Mr. ZIMMER then read a paper on *Platinum Printing*. During the course of the evening he developed a number of prints, including one on paper ten months old, with very good results.

Mr. PIGOTT remarked that warmer tones could be obtained by mixing a few drops of bichloride of mercury in the hot bath.

A general discussion by the members then followed.

Next meeting on Tuesday, March 3, lantern evening.

EPPING FOREST PHOTOGRAPHIC SOCIETY.

FEBRUARY 18,—There was an exhibition, which numbered some 300 pictures, many of them being the work of members.

The *Boy's Own Paper* competition prints were lent by the editor, and the Stereoscopic Company showed several photographs and a fine stereoscope.

A lecture was then given by the Rev. J. Bradford, descriptive of how to take a photograph.

The proceedings terminated by a lantern display.

The Secretary, Mr. J. W. Spurgeon, of Drayton-villas, Leytonstone, will be glad to hear from intending members before the spring and summer programme is arranged.

At the next meeting, on March 16, Mr. Bennett will read a paper on *Negative Making*.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

FEBRUARY 20,—Mr. Ardaseer in the chair.

The award of Mr. J. B. B. Wellington on the recent competition in landscape photography was made known, and the batch of prints handed to the successful competitor, Mr. Ardaseer.

Mr. C. Hussey not being sufficiently recovered to give his promised demonstration of the collodio-bromide process, Mr. Cembrano, at very short notice, filled the vacancy, and gave a practical illustration of the difference in tone which can be produced in gelatine lantern plates simply by varying the exposure. Using the same negative and same developer, he exposed and developed three plates, giving to the second four times, and to the third sixteen times, the exposure of the first. An excellent slide resulted in each case, but the tone varied from a brown-black in the shortest exposed to a warm purple in the longest.

An ingenious registering printing frame for lantern slides, designed by Mr. A. Cowan, of Marion & Co., was shown by Mr. Cembrano.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

A MEETING of the section of this Society which has undertaken to survey photographically a part of the county of Warwick was held at the Colonnade Hotel, New-street, on Thursday evening, February 19, Jethro A. Cossins, the well-known architect and archæologist, being in the chair, and a large number of photographers were present.

The officers of the section for the coming year were elected as follows:—*President:* Mr. J. B. Stone, J.P., F.L.S., &c.—*Vice-President:* Mr. J. A. Cossins.—*Treasurer:* Mr. S. G. Mason.—*Secretaries:* Messrs. J. H. Pickard and W. Jerome Harrison: with a committee of eight members.

It was resolved that the work of the coming season should be confined to the Hundred of Hemlingford, which forms the northern part of Warwickshire, including Birmingham, Tamworth, Nuneaton, Solihull, &c. The six-inch Ordnance map is to be the basis of the survey, and each member was requested to undertake one of the sheets of this map, with a view to securing a photograph of every prominent, remarkable, or historic object contained in that sheet. It was further resolved that each worker should "report progress" by the end of June.

Mr. Cossins promised to give the members of the section an address on the archæology of the Hemlingford Hundred at an early date.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 16,—Mr. S. Wells (President) in the chair.

Mr. Councillor Abraham Pyatt and Mr. Thomas Warwick were elected members.

Mr. Howson, of the Britannia Works Company, gave a practical demonstration on *Alpha Paper*, printing, exposing, and developing several prints and obtaining excellent results. Mr. Howson also exposed and developed several of the Alpha lantern slides, and demonstrated the range of tone obtainable by prolonging exposing and developing.

Sample plates of the Paget Prize Plate Company were distributed among the members.

The Society has had a most successful week in lantern slide making, the results forming a nucleus for a loan collection for exchange with other societies.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

FEBRUARY 18,—The President (Mr. Andrew Pringle) in the chair.

Mr. WILLIS, of the Platinotype Company, read a paper on *Platinum Printing*.

The next meeting will be held on Monday, March 2, at the "Station Hotel," Sidcup.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

JANUARY 16.—Annual meeting.—The officers and council of the previous year were re-elected.

FEBRUARY 6.—Mr. JOHN LEWIS, Birmingham, demonstrated the new *Kallitype Printing Process*. He said: The process of kallitype printing is so simple and easy that I shall not have to detain you long either with the demonstration or in what I have to say. The process is the invention of Dr. Nicol, of Birmingham; and Messrs. Lewis & Co., of Birmingham, are the manufacturers of the paper. The name kallitype is from a Greek word, meaning beautiful; and I hope the prints I exhibit may be thought deserving of the name. Kallitype paper is made sensitive by coating with normal ferric oxalate, $Fe_2 (C_2 O_4)_3$, and is much more sensitive than ordinary silver paper, and must therefore be more carefully kept from the light. It is also desirable to keep it quite dry; the image does not show so distinctly in printing if damp, and does not develop so brilliantly. Still, the precautions necessary in this respect are not by any means strict, and in any but damp weather may be disregarded. The print I now pass round will show the depth to which printing should be carried—the detail of the clearest parts of the negative should be first indicated. The action of the light converts the ferric oxalate into ferrous oxalate.

Ferric oxalate ..... $Fe_2 (C_2 O_4)_3$.
Ferrous ,, ... $Fe_2 (C_2 O_4)_2$.

By referring to the instruction forms handed round you will see that the developer contains silver nitrate and sodium citrate. When the print is floated upon the developer, the ferrous oxalate on the paper dissolves in the sodium citrate in the developer, and at the same instant precipitates metallic silver as a black powder forming the image. The developer contains sodium citrate to dissolve the ferrous oxalate and to enable it to reduce the silver nitrate; but the citrate also plays another important parts—it prevents the precipitation of the iron by the ammonia present. The ammonia is added to

dissolve the silver citrate, which is formed when silver nitrate is added to sodium citrate. I will now develop a few prints by floating upon the developer made according to the formula given in the instructions. In our own practice we use forceps for lifting the prints from the developer and for passing through the No. 1 washer; by this means an objection sometimes urged against Kallitype is avoided, and all staining of the fingers also. If the print has been properly exposed the development is completed after a few seconds' floating, and may be at once transferred to washer No. 1 (for formula see instructions). If under-exposed, it may be to some extent compensated for by a prolonged floating, or by leaving, face upwards, for several minutes on a sheet of clean glass, where it will gain brilliancy and detail. Over-exposure is not so easily compensated for, but it is best overcome by floating upon a developer containing a very little more bichromate of potash. An over-exposed print flashes up quickly, and while the detail is buried and the shadows are too heavy, the colour is not so good, and the print will look mealy when dry. It is desirable to shake the developing dish frequently, particularly when developing prints with plain flat backgrounds, to avoid stains from a slight scum that sometimes floats upon the surface. Prints may be kept several days after exposure if kept dry. Remember not to put the prints into water from the developer, but pass directly into No. 1 washer, where they must remain for twenty minutes. Probably five minutes would be sufficient, but to be well on the safe side we recommend twenty minutes. They are next passed successively through two baths, chiefly of ammonia (see instruction forms), to dissolve the unreduced silver, and so fix them. If exposed to the light before being thoroughly fixed in the ammonia baths they would speedily discolour. After about ten minutes in two ammonia baths the prints should be washed in several changes of water, and after draining may be dried between clean blotting paper that has not been used for any other purpose. The use of bichromate of potash in the developer is to secure contrast. It is a very powerful oxidiser, and must be used very sparingly. If too much is used all the half tone will be dissolved from the print. For negatives with little contrast the judicious use of bichromate of potash will enable the printer to produce prints satisfactorily brilliant, which would otherwise be very poor and flat. The developer is very economical, and with careful usage may be made to develop a great number of prints. After a time it requires restoring, as follows:—When a considerable number of prints have been developed the developer begins to get milky and the prints begin to deteriorate. By adding, after filtering, one drop of strong ammonia to each ounce of developer, and then gradually adding a few drops of a strong solution of silver nitrate, shaking frequently, till a permanent precipitate is produced, the developer will be found to be equal to that newly mixed. Filter before using, and each time the developer is used return it to the bottle through the filter. The No. 1 washer may be used over and over again indefinitely, but the ammonia washers must be fresh and smell distinctly of ammonia. The developer should not smell of ammonia. If it does, leave it exposed in the dish till the ammonia has evaporated.

Failures.—These are due chiefly to want of cleanliness in handling the prints, &c., and to the use of an unsuitable sample of sodium citrate, which is not always easily obtainable of the right kind. Most persons, with a little practice to get the right exposure, and care as regards cleanliness, will find kallitype printing one of the easiest of processes. Its special advantages, independently of the results, are quickness, simplicity, and economy. No process seems simple to the beginner, all the solutions and the working being unfamiliar. Kallitype prints must in no case be put into plain water till after they have been through all the washers, or the iron will be precipitated in the paper, and no after treatment will remove it. Our plan for increasing contrast in prints is to add about one drop of a three per cent. solution of bichromate of potash to each ten ounces of developer.

LEEDS PHOTOGRAPHIC SOCIETY.

February 16.—The second of the series of elementary lectures was given by the Hon. Secretary (Mr. S. A. Warburton), his subject being *Development*. Previous to entering upon the subject of actual development, Mr. Warburton stated that it would be well to trace the sensitive plate from its package to the developing dish. In the first place he advised the "backing" of all plates with burnt sienna backing in order to prevent halation; and with respect to exposure a little experience gained by exposing a couple of dozen plates upon, say, half a dozen different subjects, making three or four exposures of varying lengths of time upon each subject, carefully noting the conditions as to plate, subject, stop, light, &c., and after development making a note of the result, was worth all the exposure tables yet invented. An exposure book of this kind formed a record of actual experience which would with constant additions, in time become invaluable. Mr. Warburton then proceeded to develop a number of previously exposed plates by means of the ferrous-oxalate, hydroquinone, and pyrogallic acid developers, stating that for his own use he greatly preferred the latter used with ammonia, and urged those present to make themselves thoroughly acquainted with this developer, as possessing great power and being the most under control. The operations of intensification and reduction were afterwards dealt with. For intensification Mr. Warburton said that he had found nothing better than mercury bichloride followed by dilute ammonia, and for reduction a weak solution of ferrocyanide of potassium, to which a few drops of hyposulphite of soda solution were added, was the best chemical reducer; local reduction could be effected mechanically by rubbing the film with a rag dipped in methylated alcohol.

The President (Mr. Godfrey Bingley) occupied the chair, and at the conclusion of the lecture a discussion followed.

MANCHESTER PHOTOGRAPHIC SOCIETY.

February 12,—The President, Mr. Alan Garnett, in the chair.

Mr. Harrison Garside and Mr. Joseph Gibbons Sankey, B.A., were elected as members.

Mr. Samuel Okell, F.R.A.S., read a paper on *Astronomical Photography*. Mr. Okell traced the development of photographic aid in the study of celestial objects from the earliest days of the process when Arago spoke of Daguerre's discovery as a new servant to astronomers down to the present time, when the results given by the great Lick telescope afford an opportunity of studying and examining the features of the heavenly bodies in a form not before attainable, the direct images obtained of the sun and moon being six inches diameter. Amongst the interesting details of the work of the early astronomical photographers given was that the method employed by Mr. A. Brothers, of Manchester, in photographing the eclipse of the sun in 1872 at Syracuse, was the one now universally employed.

The lecture was illustrated by numerous photographic prints, and supplemented by an exhibition of excellent lantern pictures of great historical and scientific interest.

An amusing conversation with respect to the alleged discovery of photography in colours recently given in the newspapers took place amongst many of the members, Mr. Brothers having carried out the details of the process as described in the papers with a result that showed the unreliability of such reports as regards technical process, the only colour obtained being *fog*.

The subject of *Photography and Colour* (not photographing in colour) will be fully treated in a paper by Mr. Brothers at the next meeting, on March 12.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

February 16,—Mr. John Morison, jun. (President), in the chair.

Six new members were elected.

Professor Barr, of the University, showed and explained an apparatus of his own invention for photographing book illustrations and diagrams, so that they may be projected on the screen by means of the optical lantern; thus saving the expense and labour of drawing elaborate cartoons for lecturing purposes.

The President made two enlargements from hand-camera negatives by means of the limelight lantern, and Mr. V. L. Alexander showed about thirty slides by the lantern, illustrating a tour to Stornoway.

GLENALMOND PHOTOGRAPHIC CLUB.

February 21,—Mr. E. H. Cunningham Craig delivered a lecture on *Lantern Slide Making and Painting*.

Messrs. C. C. Robertson (Glasgow), A. M. Dykes, F. Moore, and F. H. O. Harrison were enrolled as members.

BERLIN PHOTOGRAPHIC SOCIETY.

February 6,—Dr. Stolze in the chair.

The proceedings were commenced by Dr. Bruno Meyer, who said: I have just been reading an article in the *Journal des Débats* which seems to me of such importance that I propose to lay its contents before you. On Monday, February 2, M. Lippmann made a communication to the Academie des Sciences, and at the same time exhibited his photographs of the spectrum in natural colours which were thoroughly fixed and unaffected by light. The accounts hitherto given cannot be regarded as sufficient. We are told that the process is in the main a physical one. The chemical elements involved are those in ordinary use, with the only difference that a grainless emulsion is employed, and the action of the light is assisted by a mercury mirror. The fixing is performed with ordinary fixing soda. The colours are those of thin plates, &c. Professor Meyer finished his remarks by stating that he regarded this communication in the *Journal des Débats* as being of more importance than any of the discoveries of the last fifty years, and to be of an epoch-marking character with which only that of Daguerre can be compared. The communication was received by those present with much "emotion."

Dr. Meydenbauer then gave a disquisition, illustrated by examples, entitled, *Old and New Methods of Development*, after which the Eastman Company's detective camera Kodak for rollable films become the subject of somewhat lengthy description and discussion.

Herr Kühn then proceeded to expatiate at length on the whole subject of bromide paper. He stated that when he visited the London Exhibition three years ago he was astonished to find in this respect how much behindhand English photography was, and that even now much better effects were obtained on the Continent. He pointed out that he had in the previous year exhibited a number of prints on Stolze bromide paper, which for their delicacy and richness of detail had been preferred by persons qualified to judge to platinum prints. In regard to enlargements on paper, Herr Kühn observed that there was a limit, as the protecting layer of glass has to be very carefully freed from dust and dirt. This objection does not, of course, apply to linen. After hearing the exhaustive and masterly paper on the subject by Dr. Meydenbauer, Herr Kühn had come to the determination only to exhibit reproductions on linen, which he had executed on Winter's principles. Amongst the various objects exhibited by Herr Kühn was a reproduction made by himself from a charcoal drawing, and retouched in oils, which was said to be of quite unusual artistic value. Finally he exhibited a process which he stated was altogether unknown in England, by means of which oil paintings are produced by photographic assistance on transparent linen for lamp-shades, windows,* &c. Herr Kühn concluded his address by combating the "prejudice" that better photographic wares were procurable from England than Germany, instancing in proof of his statement the British colonies, which import such large quantities of German dry plates and paper.

Herr Peter Geh, the representative of Herr Nehlmeyer, placed an extensive collection of photographs of buildings, interiors, ornaments, flowers, animals, and foliage before the meeting, and invited co-operation for the purpose of eventually publishing a more extensive collection, after which the proceedings terminated.

The Liverpool International Exhibition.—This exhibition will be formally inaugurated at eight p.m. on Friday, March 6. The entire suite of rooms at the Walker Art Gallery (including the permanent collection of pictures) will be open on that occasion.

* Herr Kühn is mistaken. This was known and even patented in England twelve years ago.—Ed.

Correspondence.

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

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—Were it not that I hate to be misrepresented I should have kept silence this week. As it is, having a large amount of work on hand, I content with saying that we do not intend to try to "paralyse the photographic profession," as "A. J. E." says. We simply reserve the right of working where good terms are forthcoming.

"H. E. D." tells us that a union of photographers is different from a union of printers or engineers. What a "profound knowledge of sociology" is evidenced here! I am glad "H. E. D." assures us he is a friend—one would hardly learn it from external evidence. "A. J. E." advises the photographer to choose a benefit society sooner than a trade society. If he desires money benefits by all means *let him* choose a benefit society.—I am, yours, &c.,

ARTHUR FIELD.

FLEXIBLE FILMS.

To the EDITOR.

SIR,—The letter in your last signed "Countryman" refers, I take it, to the cellulose film paper described in your JOURNAL of July 25 last year. The *raison d'être* of the process seems to be that the product possesses "a surface closely resembling the albumenised paper used in photography." The advantages accruing from the employment of such paper are not mentioned, but presumably it possesses merits beyond that of the glaze referred to; the mere possession of such a surface would not, one would think, entitle it to serious comparison with albumen or gelatine-coated papers. The reticence of the specification on this point provokes one to speculate on the possible qualities of the alleged improved paper from the chemico-photographic properties of the materials of which it is composed.

According to the specification, the paper is acted upon by a solution of cuprammonium to more or less dissolve the surface; the dissolved portion is then re-deposited on the paper by evaporation, and the copper extracted from the paper by acids and washing. The result of the treatment is a glaze on the paper. Now, as the paper itself has furnished the material for the film or glaze, and the other ingredients (ammonia, copper, &c.) are said to be removed in the subsequent acid treatment and washing, the net result of the operation is a sheet of paper covered with a more or less glossy film of *paper*, which, however, in the specification is called a "structureless film of cellulose." Now, all this practically resolves itself into the polishing or glazing of the surface of a sheet of paper, a result obtainable in a very high degree by the simple operation of calendering; and viewed from this standpoint the improvement would appear to be a more complicated method of producing a by no means novel result.

Regarding, then, the glaze as a polished surface of paper on a support of paper, it would seem that this process instead of being an advance is in reality a retrogression. We are carried back to the days of plain salted paper at once. One of the advantages of albumen is that the picture being held in the albumen film is prevented from sinking into the paper. Does the glazed surface have the same effect? Again, the albumen surface has always been regarded as playing an important *rôle* in the formation of the picture, the so-called albuminate of silver being sensitive to light. In the cellulose paper there appears to be no provision whatever for the organifier, which, if formed at all, can only consist of a compound of silver and cellulose; but I find no mention of such a compound in the chemical text-books.

Finally, how does the inventor prevent the slow decomposition and blackening due to the contact of free nitrate of silver necessary to form the picture with the paper, and which is obviated by the use of an albumen surface? It is almost certain that it is solely in respect of the glaze that this paper bears any resemblance to the albumen surface; in all other respects their properties are diametrically opposite. This is not to be wondered at when it is considered that cellulose is derived from the vegetable and albumen from the animal kingdom, and bear a similar relation to each other as silk and cotton. It is difficult to conceive that such a surface would give pictures having the well-known characteristics of albumen. In short, with the exception of the absence of sulphur in the film mentioned by "Countryman," and the "surface closely resembling albumenised," &c., I see nothing in this paper to entitle it to serious consideration as a photographic support; in fact, chemically considered, it is the plain paper of thirty years ago, with the doubtful advantage of a glazed surface, or, rather, "structureless film of cellulose."

I have not succeeded in purchasing any of this paper through the ordinary photographic channels, and presume that it has not yet become an article of commerce.—I am, yours, &c.,

LUX.

DETAINING SPECIMENS.

To the EDITOR.

SIR,—May I beg a small space in your JOURNAL for a few words on what I consider a great grievance to photographic assistants, that is, in having to send specimens when applying for situations? Why do not photographers rely more on testimonials? I do not think it fair to employers or assistants either; it stands to reason that assistants always show their best productions, and not their general work, and I could quote many an instance of operators taking specimens about and showing them as their own work, and they had never seen the studio in which they were taken in. It is all very well for photographers to remark that they soon find them out, but these unscrupulous duffers do a lot of harm to honest assistants; and I think photographers will agree with me (thanks to dry plates) that there are an awful lot of inexperienced men going about posing as artists.

Before concluding, I must say that there is another strong objection to specimens, and that is, dishonest photographers detaining them, which I think is a great imposition. I speak from experience, as several cases have lately come under my notice, and one of these gentlemen has kept my specimens a fortnight; I have applied for them three times, but no notice is taken of my application.—I am, yours, &c.,

AN ASSISTANT.

[We strongly advise all operators who submit specimens of their work to advertising employers to adopt the simple precaution of writing in aniline ink such words as "Specimen, by So-and-So," across the neck or shoulders of the portraits thus submitted. The dishonest advertiser will thus be checkmated.—ED.]

NATIONAL PHOTOGRAPHIC EXHIBITION, APRIL, 1891.

To the EDITOR.

SIR,—Some slight misconception having arisen as to the construction of Rule 10, Clause "E," affecting the Challenge Cup Competition, as evinced by the letters received from various Societies, I should esteem it as a favour if you will kindly explain, by the publication of this letter, that it means "the professional work *shall not exceed* one-fourth the number of whole exhibit."—I am, yours, &c.,

S. G. BUCHANAN WOLLASTON.

Crystal Palace Company, Crystal Palace, S.E., February 20, 1891.

THE LIVERPOOL EXHIBITION.

To the EDITOR.

SIR,—The following was addressed to the railway companies running out of Liverpool.

I would be glad if local photographic societies would aid our efforts to obtain greater railway facilities than we at present receive.—I am, yours, &c.,

THOS. S. MAYNE.

Liverpool, February 24, 1891.

"INTERNATIONAL PHOTOGRAPH EXHIBITION, 1891.

"DEAR SIR,—This important function (triennial) takes place this year, March 6 till April 4. It will, without doubt, be on the largest scale of any similar exhibition ever held in the kingdom. The Liverpool Corporation have granted the use of the greater portion of the Walker Art Gallery. We anticipate visitors to the extent of at least 50,000.

"Probably the interest in the Liverpool Exhibition is everywhere the feature of importance in photographic circles over the country.

"We now only want the help of the railway companies to double our number of visitors. The growing popularity of photography with the rising generation amongst all classes of our community, from the highest personages to the middle class and enlightened artisans, is not recognised to the extent it deserves by railway companies. Like cycling, it is only in its infancy; photography and cycling are the landmarks of the nineteenth century as elevating pastimes.

"What I now beg you to grant is return tickets at single fare (day tickets) during the currency of the exhibition from all stations within thirty miles of Liverpool to holders of our season tickets, or purchasers of single admissions, which tickets I will provide you with (the shilling admission tickets). On hearing from you I will circularise all the local and county photographic Associations within this radius.

"I have written this letter to your brother railway superintendents of the three chief railways terminating in Liverpool.

"The favour of an early answer is requested.

"THOS. S. MAYNE, *Hon. Secretary.*"

THE LAST OF "NATURALISM."

To the EDITOR.

SIR,—I do not think any detailed reply is needed to Dr. Emerson's personal attack upon me published in your last issue. I hear but one opinion on all sides. The letter carries its own confutation on the face of it, and I decline to follow in the line of violent and unscrupulous personalities which it seems natural to Dr. Emerson to adopt. If he have any serious inquiries to put, any arguments to maintain, or, indeed, any "expostulations" to make, and can do so in a fairly dignified manner, I shall be prepared to answer, confute, and explain. It will certainly not be necessary for me to descend to intemperate and untruthful language, nor to grub amongst his private letters to exhibit publicly what a delightfully pleasant gentleman Dr. Emerson is! Your readers have the picture direct from himself.—I am, yours, &c.,

GEORGE DAVISON.

February 21, 1891.

[This correspondence here terminates.]

WE are sorry to learn of the death of Mr. A. Whitham, photographer, Rochdale, which took place suddenly from heart disease on the 18th inst.

Exchange Column.

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

Will exchange one of Marion's half-plate landscape cameras, double dark slide, with quarter-plate Vogel combination portrait lens and oak tripod stand, for tricycle or safety.—Address, WILLING, 233, Uxbridge-road, W.

Will exchange Vols. XI. and XII. of *Amateur Photographer*, Ashman's *Silver Printing*, and THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS for 1890 and 1891, for good quarter-plate leather camera case.—Address, P. IVE, Northbrook-street, Newbury.

Wanted to exchange, Muffle gas furnace, also Shew's Eclipse hand camera, with leather box, finders, and four double slides; wanted, enlarging apparatus and large-size camera and stand.—Address, OCTAVIUS, 5, Queen's-terrace, Surbiton-road, Kingston, Surrey.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

H. HAYMAN.—The extinguisher has now been applied.

E. H.—The address is Silverhouse, Champion-hill, S.E.

X. X.—It is simply a question of duration of immersion and strength of the bichloride of mercury solution.

W. J. M.—Communicate with the National Association of Professional Photographers, of which Mr. Richards, of Barrow-in-Furness, is Hon. Secretary.

RESIDUES.—Precipitate with sulphide of potassium. The same flux serves for gold as for silver, with an addition of a little nitrate of potash.

F. G. S.—The light from that lamp, while pure and white, lacks penetrating power. We very much prefer albo-carbon with two burners, one in front of the other.

DEFINITION.—1. There will not be distortion in either case. Both pictures will be alike except in dimension. 2. Without expressing any preference we use D. ourselves.

G. BLAKE.—Celluloid dishes are very good for photographic purposes generally. They are light, and not easily breakable. But they must not be used for alcohol or acetic acid, or such substances in which the celluloid is soluble.

B. POWELL.—Aurine was at one time recommended for coating dark-room windows. Although it answered well for wet collodion, it was soon found that it quickly faded, hence it went out of use. You will see by this that it is unsuitable for the purpose suggested.

S. T. asks: Can we recommend anything to clean films off old dry plates, varnished and unvarnished?—Soak the plates for a day or two in cold water, and then immerse them in hot. If the varnished ones do not yield readily to this treatment, soak them in a strong solution of American potash instead of the cold water.

W. J. S. and CHROMO.—1. See answer to "R. Morton Day" and others, last week.—2. All dealers in printers' materials, such as Hughes & Kimber, Fetter-lane, or Winstone & Son, Shoe-lane, E.C., supply every requirement in lithography. The Americo-European Trading Company, 72, London Wall, E.C., are sole licensees for the autocopyist patents in this country.

NORTHUMBRIAN wishes to know what is carbon tissue, and how it is made.—Carbon tissue is simply paper coated with gelatine charged with pigment of the colour desired in the finished picture. A small proportion of sugar is usually added to the gelatine. We cannot here afford space to go into the details of the manufacture of the tissue; they are, however, simple enough.

G. J. ELPHICK asks: "Would you have the kindness to answer the following query in your next issue?—Recipes for emulsion for making my own dry plates, and the exact quantities of the different articles contained therein."—Formulæ for emulsion will be found in all the ALMANACS for several years past. Two will be found on pp. 744 and 745 of the one for the current year.

DRY PLATE.—The most protective coating for negatives that are subjected to continual printing is first to coat them with tolerably thick plain collodion and then to varnish them with a hard spirit varnish having lac as a basis. It must be borne in mind that unless the whole of the "hypo" is thoroughly eliminated from the film, no protective coating will avoid staining if damp silver paper be used.

S. WALSH.—Pyroxyline can be obtained, suitable for photographic purposes, from most dealers in photographic requisites, such as Messrs. Mawson & Swan, Rouch, Thomas, Hopkin & Williams, &c. Guncotton for explosive purposes, such as you say you can obtain for the asking, is not at all suitable. It is quite possible that those who make the latter variety would make you some of the soluble kind.

C. M. HUTTON.—You are under an entire misconception as to an English patent only enduring for four years. Its duration is fourteen years if the fees be paid for that period. The fees for a patent for four years are only 4*l.*, and if 150*l.* then be paid it is prolonged for the full term; or the fees may be paid by yearly instalments, then the patent may be dropped at any time if not found remunerative.

OPERATOR says: "I recently sent some specimens to a photographer in the Midlands, according to request in an answer to my advertisement. After a week had elapsed without a reply or return of pictures, I wrote requesting their return. No notice. In a week wrote again. No reply. I then sent a letter saying that unless I had them back by return of post I would 'black list' him in your register. The pictures came without apology, but with a note saying I was 'rather in a hurry wasn't I?'"

S. W. R.—Inks prepared and sold for lithography will do quite well for collo type printing. The various tints are obtained by mixing different coloured inks together. Any printing-ink maker will make an ink to any colour required if a pattern be supplied. Of course a good quantity must be ordered at a time; therefore it will be better for you to purchase the inks and blend them yourself, unless you are likely to be a large consumer.

LUX writes: "1. Can you tell me how the glass transparencies are made by Wilson, of Aberdeen? They are all about the same tone, and by reflected light have a peacock-blue colour all through. They are, of course, wet collodion, and intensified with, I suppose, mercuric bichloride and something. 2. Is it a safe thing to use house gas from a burner and oxygen from a cylinder with Beard's regulator in a jet for mixed gases?"—1. The slides are made by the wet collodion process, but Messrs. Wilson & Co. do not publish the process they employ for toning.—2. Yes, if ordinary care be used.

COMPLIMENTARY writes as follows: "Kindly let me know, through 'Answers to Correspondents,' whether I am justified in exhibiting and selling photographs of a party who is now dead. The party of whom I speak was taken by me without payment, as a complimentary sitting, on the understanding that they were to be sold. Since his death I have been threatened by his brother with legal proceedings if I do not abstain from selling and exhibiting said photographs. I may also add that I made the deceased gentleman a present of proofs off four different negatives taken at that time. Kindly give me your opinion on the matter as to whether I can continue sale and exhibition."—If the facts be as stated by our correspondent, he is perfectly justified in selling copies and exhibiting the pictures. It may, however, be a question of policy whether it is desirable to continue to do so against the wishes of the family. That is simply a matter of business.

BRADFORD says: "In attempting to intensify an old negative from which a few prints (silver) had been taken I did as follows: first, washed the negative five minutes; second, soaked in alum five minutes; third, washed again five minutes. Then, after putting it in bichloride of mercury, gave negative a thorough washing, and put it into weak ammonia solution until it became quite black all over. However, after again rinsing the negative, I found, on examining it by looking through it in a good light, that some parts had a very strong orange tint, while other parts had the same appearance as if mercury had not been cleared by action of the ammonia. The negative is quite dense enough, but of course does not print 'evenly.' Could you please suggest some means of rectifying the same?"—Imperfect washing is the cause of the staining. We fear there is no remedy now except masking or shading it in the printing. A great deal may be accomplished in "dodging" in printing.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, March 4, *Printing on Rough-surfaced Paper.*

MR. OTTO SCHÖLZIG writes that, in consequence of the continued fall in price of silver, he has reduced the price of his sensitised papers to the same level as they were before the rise in the silver market took place.

GLOUCESTERSHIRE EXHIBITION.—The entries for this Exhibition close on March 13. The Committee anticipate as great a success as they had in 1888. Messrs. H. P. Robinson, V. Blanchard, and E. Brightman are to act as judges.

MESSRS. LANCASTER & Co., Birmingham, have issued a circular letter in the form of an agreement with photographic dealers by which the latter, for the consideration of receiving certain terms, shall not sell their goods below the catalogue prices except in special cases at a trifling cash discount.

HACKNEY PHOTOGRAPHIC SOCIETY'S FIXTURES FOR MARCH AND APRIL.—March 12, *Bromide Enlarging*, Mr. A. R. Dresser; March 26, *Lantern Slide Making*, Mr. J. A. Sinclair; April 9, *Hand Cameras*, Mr. W. D. Wellford; April 23, Members' lantern night. All members are requested to bring some slides.

MR. A. R. DRESSER gave his promised lecture and demonstration on Friday evening last at the rooms of the Fry Manufacturing Company. The attendance was large, upwards of ninety listening to his remarks, which were characterised by his usual vigour and point. Mr. Fry stated his intention of announcing a series of Friday evenings for the next winter session.

LONDON AND PROVINCIAL PHOTOGRAPHIC SOCIETY.—March 3, lantern and musical entertainment, with brief interlude consisting of a demonstration of *The Polarisation of Light* (tickets obtainable from Hon. Secretary), to be held in the St. George's Hall, "Champion Hotel." March 5, *Pictorial Composition*, Mr. P. H. Newman. March 12, lantern night. March 19, demonstration on *Gelatino-chloride Paper*, Mr. J. Howson. March 26, *High-speed Shutters*, Mr. A. S. Newman.

ON Monday last Mr. James Perriman was sentenced to six months' imprisonment for receiving some photographs which had been stolen from Mr. Hayman Gelig Mendelssohn. It appears that, from a mistake in apprehending the meaning of the judge who tried the case, the sum of 100*l.* had been paid to the prosecutor in the way of compensation in restitution of the wrong done (the photographs—sixty-eight in number—had been valued at 25*l.*), and Perriman declared that they were *given* to him; but the judge before whom the case was last brought said he would never sanction the payment of a sum of money between conviction and sentence.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1609. Vol. XXXVIII.—MARCH 6, 1891.

SINGLE LANDSCAPE LENSES FOR ARCHITECTURE.

A FRIEND the other day brought us for inspection a landscape lens which, he said, possessed the property of taking architectural subjects without noticeable distortion. We found it to be a single achromatic cemented lens of small diameter. With a focus of ten or eleven inches, its diameter was only half an inch, or about equal to that of a threepenny piece, its form was meniscus, and the stop was within half an inch of the front surface. It had been hitherto mainly used for interiors.

It is easy to perceive how such a lens gives a minimum of distortion, and by this term we here mean a curvature of what should be straight lines at a distance from the centre of the picture. As we have frequently said, the condition of rectilinearity is that every ray entering a lens must emerge from it in direction parallel to that at which it enters. A pinhole in place of a lens fulfils this condition, because none of the rays transmitted through it undergo any refraction at all; the same result is produced by the centre of the lens, the immergent and emergent rays passing through it without undergoing refraction. But no sooner is any other portion of the lens brought to play than we get refraction in an increasing degree in proportion as we recede from the centre.

Let us take the case of a lens of any given focus and of large diameter, and having its stop so adjusted (as it ought to be for producing the best effect) as to cause the margin of the picture to be produced by the margin of the lens. Under these conditions the marginal lines of an architectural subject will not be straight, but slightly curved, such curvature being most prominent when the included angle of view is great. Now, if the stop is brought closer to the lens, this curvature of the lines is diminished, and goes on so in an increasing degree until—if such a thing were possible—it reached the optical centre of the lens, when all distortion would cease.

From this we learn that the smaller the working diameter of the lens, the less will be the distortion. Not that it will ever be wholly eliminated, but it may be so minimised as to be inappreciable. But when, in order to secure this advantage, the stop is pushed up closer to the lens, then does the definition rapidly fall off towards the margin of the plate, and the only way to obviate this is to employ a stop having a very small aperture, for in proportion as the effective diameter of the lens is reduced, so must the stop be diminished.

If it be asked, "Why not place the stop at the optical centre of the lens, and thus cure the distortion entirely?" we reply that while it is undoubtedly the case that it would do so, seeing that all the rays which pass through this point emerge parallel to the direction in which they enter the lens, and thus fulfil the condition already mentioned, yet is this an exceedingly bad place for it, on account of the imperfection of the image that results. Take the case of a lens of meniscus form: the optical centre is situated outside of the surface of convex curvature, and with such an objective the diaphragm would have to be bodily transferred from before to behind the lens, while so long as it is next to the concave surface the rays will be transmitted with some chance of forming a fairly good image, subject, as we have said, to the stop being small, and with the concomitant of distortion reduced, but not wholly eradicated.

It is scarcely necessary, we add, that to the photographer who goes in for general outdoor work, in which architecture is to form a fair proportion, it is infinitely to be preferred that he employs non-distorting combinations, now so easily attainable, for this special class of subject. Landscape lenses, now employed by so many for purely landscape subjects, and for which they are so admirably suited, are apt to break down when used injudiciously on subjects of an architectural nature, hence to such the hints here given may be useful.

MR. WARNERKE'S COLLOGRAPHIC PROCESS.

II.

Since it is probable that there are many of our readers who intend to make a trial of the above process, we will now endeavour, in returning to the subject, to frame our remarks so as to assist them in a few of the difficulties that generally crop up in all forms of photo-mechanical printing when worked for the first time, while we may be able to indicate some possible improvements in details.

We surmise that most of those who essay collographic printing will do so by the aid of improvised appliances. In that case they will at the outset perceive the necessity of gelatinising the parchment support for themselves, or of preparing gelatine "skins" which need no support, and only require to be made adhere to the bed of the press. Vegetable parchment is a common article of commerce, and is to be had, we believe, of druggists' sundrymen at a few shillings the quire. For coating the support, perhaps the following directions will answer as a basis of working:—Let two ounces of collotype gelatine, of which there are several varieties extant, be soaked for about an hour in, say, a pint of water, dissolved by heat, filtered, and poured into a clean, flat, porcelain dish, which is warmed by being supported over a vessel of water maintained at a temperature of about 120°. The sheet of parchment cut to the required size is folded back for half an inch or so at one end, and then coiled up in a roll at the other extremity. The folded end is next lowered on to the gelatine, and the roll

allowed to uncurl itself so that the whole of the parchment finally rests upon the solution. After a few minutes the folded end is taken with both hands, and the uncoated side of the parchment is drawn on to a clean glass plate previously placed at the side of the dish and allowed to remain thereupon until the gelatine sets, when it may be hung up in a suitable cupboard or room to dry spontaneously. The flotation may have to be repeated in order to get a film sufficiently thick.

The sensitising solution in the proportions advised by Mr. Warnerke can, of course, be added to the dissolved gelatine, as in other processes; but it is, for many reasons, better to prepare it separately, and float the gelatine films upon it as required. We throw out the suggestion that the addition of a small quantity of methylated alcohol to the sensitising solution might materially hasten the drying by slightly diminishing the absorptive properties of the gelatine. A still further advantage might also result from standing the films, after being attached to the glasses coated with talc, in a dark box a few feet from a fire. As we inferred in our former article, we regard the length of time occupied in drying, as mentioned by Mr. Warnerke, in the light of a serious drawback, and we therefore make the above suggestions with the view of assisting to obviate it.

Passing next to the removal of the excess of chromium salt from the film after exposure under a reversed negative in the printing frame, we note that, following the necessary soaking for that purpose, Mr. Warnerke directs the surface to be drained, blotted, and dried. But is drying at this stage really necessary, seeing that immediately afterwards comes the application of the glycerine-ammonia solution? We imagine not, so long as the last trace of bichromate has been dissolved out of the film—this being ascertained by an examination of the wash water, which should be quite colourless. Hence we offer the further suggestion not to dry the film at this stage, since a considerable saving of time may thus be effected. Experiment may, perhaps, not sustain the practicability of these suggestions, although, to the best of our belief, they have been successfully adopted before now.

Little can be added to what Mr. Wernerke says as to the inking of the gelatine picture, inasmuch as the instructions he gives for treating the shadows and half tones, so as to show them to the greatest advantage in the prints, are those which many years' working with collotypic surfaces have confirmed as most valuable; but as this department of process work is necessarily that with which photographers are least at home, we advise them to pay close attention to the lucid manner in which Mr. Warnerke describes the operation of "rolling up," together with the hints he gives as to the properties of the inks and rollers required. It needs little reflection to inform a photographer that in the inking of the picture he can exercise considerable control over the character of his results.

The likely sources of failure in collographic printing are so numerous that their mere enumeration would take up a formidable part of our space. We can, therefore, only indicate the directions in which they may usually be looked for, allowing, as far as possible, the necessary remedies or precautions to suggest themselves. Every care should, of course, be taken to prevent the access of dust and foreign matter generally to the film in its various stages of preparation, and in its sensitive state it must be shielded from light quite as carefully as albumen-silver paper; indeed, more so. Very many troubles and failures spring from over-exposure, the first consequence of which is that no part of the gelatine surface absorbs water, the ultimate effect being a strong liability of the film to take the ink all over, which no intermediate treatment can ever quite cure. Very thin negatives produce the same kind of result. Again, the excited gelatine, if kept too long, is apt to become insoluble, in which case the failure will also resemble the foregoing. Insufficient washing, which likewise produces insolubility, is an inexcusable defect. The soaking should be done in several changes of water until no colouration is observed. Over-exposure is practically irremediable. It is about the same with under-exposure, which, unless to a very experienced eye, cannot manifest itself until the surface is inked, and an impression pulled, when it will be seen that the shadows alone yield anything like a vigorous impression. The remedies suggested for this defect are very forlorn hopes indeed. Some collotype printers endeavour to counteract it by the use of a different kind of ink, others entirely clean the plate with turpentine and allow the film to harden for a day or two. The proper exposure of a fresh surface is the best remedy that could be suggested.

We said last week that collography bears a striking likeness to heliotypy, an analogous process, but in truth the field of comparison was far too confined, for there are not merely two but many processes in which the salient properties of bichromated gelatine are employed for the production of prints in lithographic ink. The foregoing hints, which we trust will be of service to those of our readers who are making their first trials of photo-mechanical printing in the shape of Mr. Warnerke's simplified collotypic process, are not by any means exhaustive.

Some modern photographers have very confused ideas as to the old methods of toning which it will be well to dispel, otherwise they may become accepted as facts. It is no unusual circumstance to find writers alluding to the "*Sel d'or*" process of toning when as a matter of fact it should be the usual compound toning and fixing bath, the one in general use until the introduction of the present alkaline method. *Sel d'or* was, if we remember rightly, first introduced as a toning agent for paper by the late Mr. Thomas Sutton. It is a double salt—hyposulphite of gold and soda—and occurs in fine, needle-like crystals. At one time it was an article of commerce. That made by Fordos & Gellis, a French firm, used to be most in favour. The toning bath was made by dissolving the salt in the proportion of half a grain to each ounce of water, and then acidifying with hydrochloric acid. After the prints were toned they had to be fixed as in the present system of working. Toning and fixing were, as now, separate and distinct operations.

Sel d'or yielded very good tones on the old plain salted paper, and on the ammonio-nitrate paper, but it did not answer so well with albumenised. It had a tendency to cause a yellowness of the light even with the very slightly albumenised paper then in vogue. It was at one time thought that the *sel d'or* process gave more permanent results than when the toning and fixing were done in one operation but this idea was not confirmed by the test of time.

As the crystallised *sel d'or* is no longer an article of commerce, some may like to try it for toning rough paper or gelatine papers, here give the formula for an extemporary *sel d'or* toning bath. Chloride of gold, three grains; hyposulphite of soda, nine grains; water, twelve ounces. Dissolve the gold and hypo separately in two ounces of the water, and then pour the gold solution into that of the hyposulphite, stirring vigorously the while. Finally, add twelve minims of hydrochloric acid, and the bath is ready for use. After toning, the prints are fixed in the ordinary manner.

The price of silver is again very low. Bars are now being quoted at about tenpence an ounce less than they were a year ago. This great

eduction in price is said to be in part due to the American "silver ng" not being able to hold against the almost unlimited supplies of ne metal. It is different from the case of platinum. Hitherto there as been but one source of supply of that metal. However, it is the pinion of bullion dealers that silver has now reached about its inimum price, and that it may be expected to become dearer again efore long.

ERAMIC photography is likely to receive some little impetus if it be orrect, as stated in some of the newspapers, that the Princess of Vales is having a tea service made embellished with photographs. t is to consist of over sixty pieces, each being adorned with a different icture. Most of the pictures are views in the grounds of Balmoral nd Abergeldie, and are stated to be of her Royal Highness's own aking. This ought to stimulate the business of burnt-in photographs. here is no question that if they once become fashionable, and now here is a possibility that they may, there would be a good demand or this class of work, particularly amongst wealthy amateurs. Many vith whom price is of little importance would, no doubt, like to ossess dinner, tea, or dessert services embellished with photographs of heir own production.

UPPOSING there should be a demand for ceramic photographs, who vill execute the work? Will it fall into the hands of photographers r the potters? Hitherto photographers have not proved very suc- essful with this class of work, or, at least, commercially successful. ut this, in great measure, was owing to there being no demand for his kind of picture. The case may be different in the future. Many f the burnt-in photographs on porcelain supplied in this country are oduced in Germany, the negatives being sent there for the purpose.

HE Franco-German spy scare has evidently not abated, for the tter Government have decided to not only withhold for the present e proposed modifications of the passport system, but to make them ill more stringent. Therefore English tourists with a camera siting any of the frontier districts should provide themselves with ly attested English credentials. Even those thus provided must be reful not to plant their cameras anywhere in the neighbourhood of a rt, or they will assuredly get "run in." It is in this event that the nglish credentials will prove of value in lessening the inconvenience tailed. It is well that this fact should be borne in mind just now hen so many are making for the Continent in order to avoid the issitude of an English spring.

HENEVER discoveries of "a process for taking photographs in tural colours" are announced, as they have been pretty frequently late, photographers have been inundated with applications from ir sitters to be taken by the "new process." When told that the ng is a myth they will not believe it, and consider the artist is hind the times because he is not able to work by the alleged new thod. Of its authenticity they seemed to be convinced, as they ve "seen it announced several times in the newspapers." Since ne of the daily press have of late been so assiduously "booming" Lippmann, several artists we know have, as usual, been applied by customers wanting their portraits taken in natural colours, d who refuse to believe in its present impracticability.

HEN commenting a fortnight back on the charges for English and erican patents, we mentioned that the latter cost considerably der twenty pounds. This sum includes ordinary agents' charges en obtained from here. The Government fee is only seven pounds t to eight pounds, or equal to this in English money, for seventeen rs, as against one hundred and fifty-four pounds for fourteen rs in this country.

THE DIOPTRIC SYSTEM.

I often happens in experimental work that one has to calculate what c bination of lenses will produce a required focus; and the ordinary n thod of focussing each element by a distant light is difficult, if not a times impossible, on account of the smallness of the room or want o a distant light. With a small set of test lenses worked on the dioptric system the desired information can be obtained readily, and calculations made much more easily. I had occasion the other day to tabulate the details of various optical lantern condensers that I knew from experience gave satisfactory results with various forms of illuminants and objectives, and had some difficulty in getting the fractions of inches when focussing; so I had recourse to an oculist's set of trial lenses, such as now used by eye surgeons and most first-class opticians, and found the work was much simplified.

For your readers who are interested in photographic and lantern optics, and who have not studied this system, I will give particulars. A lens of one metre focus, as determined in the usual way, and called a dioptric, is the standard unit of measurement. If it should be desired to express it in inches, it is 39·37, or for all practical purposes in calculations, 40 inches. Now, as the power of a lens increases as the focus shortens, one of double the power will be half the focal length or two dioptres, or as expressed generally, + 2 D (about 20 inches focus); and, in like manner, a lens three times the power will be one-third the focus, expressed, + 3 D (or about thirteen inches focus). 4, 5, and 6 D will therefore be respectively about 10, 8, and 6·7 inches focus, while those of very powerful lenses, such as 14, 15, to 20 D can readily and quickly be found by dividing the several numbers into the metre.

Now for the practical application of this system. If we have a convex lens and wish to find out its focus, we try to *neutralise* its power, as it is called, by placing a concave lens centrally over it, moving the two slightly to and from the eye while looking at an object placed for preference 3 or 4 feet away, and notice if it magnifies or diminishes; if the former, we know there is not enough concavity in the test lens, and therefore try another with deeper curve, *or combine* it with another concave lens in the dioptric system; for instance, taking the two lenses separately of a 4-inch condenser that works well with the limelight, it was found that the meniscus was neutralised by a concave lens of 7 dioptres power, expressed, – 7 D, while the bi-convex was neutralised by one of – 7·5 D. If it had shown a *diminished* object when looking through the condenser and test lens it would be known there was too much concavity, and so a less concave lens, say half (0·5), one (1 D), or more, would have to be used. When the two lenses of the condenser were screwed together in their mounts the combined power represented about 15 D, or rather more than their separate foci added together. Now, supposing we wanted to get this same combined focus in a different way, say in a triple condenser, we have only to select the elements that will make a total of fifteen dioptres, and it is probable that by making the first (next the light) of 4 D, the second 6 D, and the third (or that next the picture) of 5 D, we shall get a satisfactory result, for the three combined will give 15 D, or slightly shorter focus. It was found that any combination much shorter than 16 D was too short for use with long-focus front lenses, while one of 14 D focus was too long to properly cover a square, matted, commercial slide, with a 6-inch combination front lens.

The condensers supplied with the ordinary three and multiplex paraffin oil lamps have a combined focus generally of about 20 D, and while useful for the combination objectives or front lenses of 5 or 6 inches or so focus, are not suitable for the medium long and very long focus lenses now used for large halls. Probably an optical testing case containing the following would give one all the lenses required, for singly or in combination nearly every focus could be obtained.

+ 0·25, 0·5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, D.
– 0·25, 0·5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, D.

the + being convex and the – concave as explained, and the whole in a case would cost somewhere about a guinea, the lenses being round, of about one and a half inches diameter, truly ground, and centered.

With this in one's possession there would be no doubt many occasions where it could be advantageously used for practical purposes, and most assuredly with interesting results at all times. It goes without saying that if a magnifying power of 14 D was required, the two lenses + 10 and + 4 would be used together, or + 9 and + 5, and so on with any combination, and if a diminishing glass, then any – D in combination to produce the total desired. Supposing one had a condenser of 20 D focus and it was desired to bring it to 17 D, it could be done by either adding a concave element of – 3 D, or removing one lens, which we will suppose to be + 10 D, and substituting for it one of + 7 D.

Useful as these test lenses are for arriving at the focus of convex lenses, they are far more so for concave, in fact almost indispensable, as without standard convex lenses it is a difficult matter to arrive at an exact focus for a concave lens; while in the dioptric system with lenses from a quarter dioptric up to 10 dioptres it is readily and intelligibly done.

For those who desire to work very closely, this system permits of great exactness, for the calculations can all be made in decimals of a metre (or dioptric). G. R. Baker.

PHOTOGRAPHIC SHUTTERS.

[A Communication to the Birmingham Photographic Society.]

On the table I have placed a large number of shutters which have been very kindly lent by different firms. These shutters are intended to suit all classes of work, for in the present day who ever thinks of using a cap for outdoor work—or indoor work either for the matter of that — for whether in the studio, cathedral, or drawing-room, whether in landscape, seascape, or animal studies, a shutter has become a *sine quâ non*. We have here all kinds and conditions of shutters. There is the light shutter and the heavy shutter; the fast shutter and the slow shutter; the revolving shutter and the blind shutter: in fact, such an array that it is a difficult matter which to select for choice.

The object of my paper to-night is to bring before you some of the different shutters at present in the market, with a little explanation of their mode of working, and in some of the fastest giving you the speed, as tested by myself and Mr. Jerome Harrison at the kind invitation of our member Mr. E. Underwood, who has lately perfected a shutter-speed-testing chronograph apparatus. It consists of a circular ebonite disc or cell, in which is placed a piece of film, and over this a cover. Round the latter a circular line is drawn containing 100 perforations. There is an arrangement which allows light to fall on only one hole at a time, and that during exactly one-hundredth part of a revolution of the cell or disc. It is so constructed that six separate exposures can be made without changing the film. This is all enclosed in a dark box and connected with an "Otto" gas engine, which causes the disc to revolve exactly 180 times per minute. This allows three revolutions per second, giving each hole one-three-hundredth of a second exposure, so that a shutter working so as to show six holes on the film would have a speed of one-fiftieth of a second. The shutter to be tested is fastened in front of the circular disc, and is discharged while a piece of magnesium wire is burning in front of it. The film is then removed and developed in the usual way, when the images of the holes appear as black dots, which can be counted with the greatest ease. It is then only necessary to divide the number of dots to get the speed of the shutter.

The simplest form of shutter is perhaps the "Grasshopper," "Up-and-down," or "Rebounding," in which a single plate covering the lens is raised and lowered. This is actuated by elastic bands or by springs, and is released by means of a trigger, or—as is more generally the case now—by a pneumatic ball with tubing connected with a piston rod, which, when the ball is pressed, fires the shutter. This class gives about double the exposure to the immediate foreground than to the sky, which is at times very desirable; but the great objection in the simpler form is that the rebound is apt to vibrate the camera just at the particular moment when the apparatus is fully open. This is obviated in another class of shutter, which has two pieces of vulcanite or other material working in opposite directions simultaneously, so that when the one begins to rise the other begins to fall, and the aperture in each meeting exactly opposite the lens, exposes the plate. This prevents any jar whatever.

The "drop" shutter is about the oldest form, and is certainly still one of the most effective. In the drop shutter a plate with an aperture in it simply falls across the lens by the force of gravity. Many modifications of this shutter have been put upon the market, one being the roller-blind shutters of the Kershaw pattern, although the "Kershaw" is *not* a drop shutter. These admirably fulfil the purpose of the "drop," and have the advantage of being less cumbersome and lighter, and can be regulated for fast or "time" exposures.

The foregoing kinds of shutters are generally used in front of the lens, but there are others which can be used, if desired, behind the lens and in the camera, such as a "flap" shutter.

Another shutter which is worked in front of the lens is the "flap and drop" species, one of which consists of a flap which uncovers the lens, and immediately the full aperture is uncovered there is another plate which falls down and completes the exposure. This serves two purposes—1st, that of giving more exposure to the foreground than to the sky; and, 2nd, the flap acts as a sky shade.

There is an increasing demand for shutters which work in the diaphragm slot, the most important being those which open and close from the centre, generally by means of two pieces of metal or silk, which moving simultaneously allow the apertures in them to cross the centre of the lens at the same time, or by means of their pieces of metal opening and closing, after the form of the iris diaphragm. With these great speed can be obtained, as although strong spring may be used, there is little fear of vibration, there being but on movement. This opening and closing of the shutter in the centre act as a stop, which gives greater detail in the resulting picture.

Some shutters give both "instantaneous"—whatever that ma mean—and "time" exposures. These are very well for general worl but for taking subjects which are moving very quickly it is generall best to forego the "time" arrangement, so that there shall be le complication in the workmanship, and greater speed can therefore b gained.

In choosing a shutter, one must take into consideration whether is wanted for general or fast work, and whether for position in fro of, behind, or between the lens. There should be an entire absence vibration, ready adjustment for high and low rates of speed, smoot action, pneumatic release, compactness, lightness and strength, sma as possible in bulk, and price to suit one's pocket. I may here rema that by unscrewing the flange a much smaller shutter may be fitt to any lens, which, when speed is required, is a consideration, as it more difficult to obtain a rapid exposure with a large shutter tha with a small one. In fact, it is impracticable for very high speeds t use lenses of large diameter.

Many shutters in the market are fitted with strong springs wit "time" arrangements, so that when an exposure other than a fracti of a second is required, the pneumatic ball is pressed, and the shutt immediately flies open, and remains so as long as desired; and the when the ball is pressed a second time, it *closes instantly*. This an important point, as other shutters in opening and closing do so slowly that the plate is very unevenly lighted. For instance, if architectural subject is being taken, and the speed of the shutter placed at two seconds, the lower half of the plate will receive, perha the two seconds' exposure, but the top part will, perhaps, only rece a fraction of a second. What is wanted in this case is equal illum nation all over the plate. This is obtained by a shutter Mr. Unde wood is just making (a sample of which he has sent me). It consis of a blind shutter fitted, as it were, to this dark slide, and which u rolls very rapidly, the aperture in the material travelling the whe length of, *and next to*, the plate itself.

And now for a few remarks on the shutters we have before With regard to the "Up-and-down" species I have given you n opinion of the "Grasshopper," although if a *firm* stand be used the is not so much fear of vibration. Then, with the two plates on t one string the danger of "shake" is quite absent. I have work "Place's" shutter for several years for many classes of work, a found it very useful indeed. Tylar's window shutter is a variati of this principle. With Newman's "Grimstone," &c., the same opaq plate uncovers and covers the lens without any jar whatever.

The *Roller Blind Shutter*.—The Kershaw is one of the oldest a best shutters, and the latest pattern is certainly one of the fastest the market. "Underwood's Instantolux" is a shutter very much af this make, and is of a high speed, as the tests show. The Thornt Pickard Company have made considerable alterations and additions the original, and their shutter is well made and fast. One of t latest devices is the "fan break," which is fitted to their stereosco shutter, and which I think rather unnecessary. If desired, the sp can be reduced by the "time" arrangement without having to res to this.

The *Flap* shutters are not used for very fast work, but may be u for general work instead of a lens cap, such as the "Norden," a "Guerry's Double-flap."

Repeating shutters are useful and handy, as they require no setti As you have simply to press the pneumatic ball, it makes th very suitable for detective work. (Shew's "Eclipse self-setting" "l'Automatique" shown). Of the shutters which work in the d phragm slot, one of, if not, *the* best for speed is Messrs. Marion Company's "Crown" (Bain's patent) shutter. Made of metal, i compact and light, and is very fast in action. The fastest sp registered twice in succession being one hundred and fiftieth o second. It can be used at different speeds, and also as a "tim shutter, the catch which converts it into the latter being quite separ from the working parts. I have also a "Caldwell" shutter whic very highly finished, with lens attached, and is fairly fast, register one-hundredth of a second.

The "*Voigtlander* Sector shutter' also possesses considerable att tions. The way in which the plates forming the shutter open close gives about the greatest possible amount of light to the plat a given time.

Wollaston's patent diaphragmatic shutter has the advantage rotating diaphragms, but in my opinion the size and weight of shutter are not compensated for by the speed obtained.

Messrs. Sands & Hunter's is a light shutter, and when "time"

osures are made with the cap, the shutter itself being adjustable acts s the diaphragm.

The "*Eclipse*," with rotating shutter and stops registered one-sixtieth f a second, would be a capital shutter for hand-camera work. It s very light and simple in construction.

The following shutters were tested with "Underwood's Shutter Chronograph" after the men had finished work on February 12th and he 24th, so that uniformity of speed could be obtained with the ngine. The highest speed as tested was obtained with Marion's Bain's patent) "Crown" shutter, which registered:—

		Seconds.
he Caldwell (highest speed)	2 dots, or equal to	$\frac{1}{150}$
„ (lowest „)	3 „ „	$\frac{1}{100}$
Underwood's Plate Shutter	6 „ „	$\frac{1}{50}$
Kershaw's ($3\frac{1}{10}$ in. aperture)	3 „ „	$\frac{1}{100}$
Underwood's Instantolux (high speed)	4 „ „	$\frac{1}{75}$
„ „ (middle „)	$4\frac{1}{2}$ „ „	$\frac{1}{60}$
„ „ (slow „)	$5\frac{1}{2}$ „ „	$\frac{1}{50}$
hew's "Eclipse" (and Mattiloli)	6 „ „	$\frac{1}{50}$
Thornton-Pickard (Instan.), $1\frac{3}{4}$ in. aperture	5 „ „	$\frac{1}{60}$
Voigtlander's "Sector"	5 „ „	$\frac{1}{60}$
L'Automatique	$5\frac{1}{2}$ „ „	$\frac{1}{55}$
Thornton-Pickard (double blind $2\frac{5}{8}$ in. aperture)	6 „ „	$\frac{1}{50}$
„ "Time" (high speed $2\frac{5}{8}$ in. aperture)	7 „ „	$\frac{1}{48}$
„ „ (low speed)	7 „ „	$\frac{1}{40}$
Sands & Hunter	17 „ „	abt. $\frac{1}{18}$
Guerry's Double-flap	8 „ „	$\frac{1}{38}$
Thornton-Pickard (Stereoscopic)	8 „ „	$\frac{1}{38}$
Wollaston's Diaphragmatic	11 „ „	$\frac{1}{27}$
	13 „ „	$\frac{1}{25}$

ARTHUR J. LEESON.

COPYING AND ENLARGING.

RESUMING that an enlargement (negative) is required from a certain hotograph, the usual method adopted is, I believe, to make such egative from the original, if to be obtained; it is not always avail- ble, and often the negative has to be made by copying and enlarging p direct from the print itself, which may be and often is a very poor fair.

From an experience of some years, during which I have had to do umbers of enlargements, I have come to the conclusion that the nlargement from the *print* is invariably every bit as good as that btained by the roundabout method of making first a transparency d the enlarged negative from this.

Any one who has to handle negatives from various firms knows w very much they differ in quality and cleanness and colour. It is t every negative that will yield a good transperency suitable for producing other negatives, but it must be a very poor negative that ll not yield a passable silver print, and in a passable silver print we ve all that is requisite for the purpose.

If the negative be a portrait it will require retouching; this should done carefully and skilfully, and indeed every means adopted to ure a clean and perfect print, which will not require any or very tle spotting. The print may be collodionised or squeegeed upon n and clean glass with gelatine, but some of the best results are to obtained from prints in carbon, particularly those which have been veloped on and transferred from the grained zinc supports; or, ain, the silver print may be just mounted and rolled. Care must taken to have the copy in the best light for focussing, and the ter process must be judicious, as will be seen later on. In many es the enlarged negative, if from a portrait original previously ouched, will require very little work before sending to the printer focussed very sharply; there may be an excess of "hardness," ce in such cases, and where the degree of amplification is con- erable, excessive sharpness should be avoided—really, the *sine quâ n* of copying is *ample exposure*. I think we may safely say that nety per cent. of copies are under-exposed, and of course in the e of an enlarged negative this is fatal.

Given attention to focussing, lighting, and ample exposure, the ative, properly developed, should not show a great deal of granu- ty; this will have been softened down to a great extent by the gth of time given in the camera, and it will be admitted, I suppose, t a large head would not be retouched with the minuteness and cate work of a card head.

Architectural and such-like subjects lend themselves particularly to this copying system, and here where the *skies*, maybe, are rough coarse they may be easily blocked out. It may not always be essary, but it is a great advantage to have a series of large paper d negatives for work of this kind. Architectural "bits" often look very fine when enlarged to, say, 15×12 or 20×16, and are invariably easy subjects.

Landscapes come next in order, but it is not a difficult matter to block out the sky, even if that is found necessary. Shipping views will require the most care and trouble, and one is tempted often to discard the *print* in this case for the *negative;* but one thing is certain, the result will be very little in favour of the negative and transparency. If a really good print is taken, of good colour (and this is very important all through), sky printed in, &c., and mounted on glass face down with gelatine, a good negative will be got, which may require merely a moderate amount of work with brush, pencil, or stump, to make presentable.

An enlargement, even if the subject be architectural, is not always the better for being accurately and, as some would say, painfully *sharp;* hence, judicious focussing, with ample exposure, and enlightened and careful development, are absolute necessaries to success.

Formerly I used wet collodion for this class of work. It is a long time now since I gave it up in favour of gelatine; those hard, coarse-grained collodion negatives were an abomination.

Particular attention must be paid to the printing of these enlarged negatives, no matter what method they are made by; they only seldom give good silver prints, but, fortunately, in carbon, bromide, and platinotype we have all we require, and any coarseness in the negative will disappear in the bromide or platinum print. Finally, when an enlarged negative is wanted, don't bother with the small negative, if a good print is obtainable.

D. D.

HINTS TO BEGINNERS IN PHOTOGRAPHY.

IF in the few words of counsel I am about to offer to those who have a strong because a natural claim upon them it falls that I should encroach upon the ground so ably covered by those gentlemen who have favoured the world with numerous lucid photographic primers, I humbly ask that the intrusion may be set down to inadvertence, and nothing else; for in approaching my subject I have drawn a line beyond which it is my resolution and my wish not to penetrate. This line clearly and sharply separates the field of the preceptor from that of the instructor. Therefore, if the reader has emerged from his photographic long clothes, I beg him to pass to the next article. He has no need of hints—unless, perhaps, of a kind to help him produce better work. These he will find in abundance elsewhere.

I assume the beginner's attention to be divided between a dealer's catalogue and a book of instructions. He will, of course, have very soon found out that modern photography is intimately bound up with the influence of light upon certain salts of silver. In a like connexion I wish to remark that not unimportant functions are performed by very many other salts with which, however, we have no business yet awhile, save in one instance. The substance excepted is, it is true, not employed in photography—or, better, by photographers—so much as it deserves, nay, ought to be; still, when its valuable properties come to be thoroughly examined by trustworthy experimenters, I anticipate a great future for it. Photography will reap immense benefits from it. Let the beginner, therefore, procure a small supply of it for his own laboratory. He can perform one or two very instructive experiments on his own account. Moreover, if it is not inconvenient, he should always carry a few grains of it about with him for use at a moment's notice, because, when he has progressed a few stages, he will find it of assistance in emergencies that are sure to arise. The formula for this useful salt is NaCl. The common kind answers just as well as the chemically pure. It is sold by all respectable Italian warehousemen.

I can easily understand that at the present time a beginner's inclination takes a decided turn in the direction of a hand camera. By the way, I do not remember to have seen any reference to the fact that the popularity of this more or less ingenious little instrument has seriously interfered with the sale of shutters and ordinary landscape cameras, but such, I believe, is the case, as I have been assured so by those whose fingers are constantly on the pulse of commercial photography. Let us be grateful for small mercies; the choice of a shutter was rapidly becoming a fertile source of bad headaches. But worse remains behind, I fear. How many hand cameras are on the market at this moment? *Par parenthèsè*, is "cameras" the correct plural of "camera?" I fancy the word is Italian; if so, the plural would be "camere." We say or write *prima donna* and *prime donne* respectively. But to resume.

The hand camera should supplement rather than supplant the ordinary landscape instrument. If a choice has to be made, I would recommend that it be given in favour of the latter. I have heard persons of long experience and undoubted ability as photographers

say that you cannot make good pictures with a hand camera; but this is said at the expense of truth. It depends upon the skill of the picture maker. Some people take really capital landscape negatives in a cigar box punctured at one end; others never succeed in doing so by the aid of the greatest triumphs of photographic optics and cabinet making to be had for love or money. Exactly; it is a question of brain power. Not much of this kind of thing is wanted *à priori* in photography nowadays, although the demand for it *à posteriori* is as great as ever, as you will understand by-and-by.

The sphere of the hand camera is, I think, tolerably well defined. It enables us to secure rapid sketches of groups and animated scenes which it would be difficult, if not impossible, to obtain under similar circumstances when using an ordinary camera. If you have studied your instruction book carefully you will be able to realise that its sphere is, after all, a limited one. My opinion of the hand camera may be gathered from the next sentence. It should be to a conscientious and high-aiming amateur photographer what a sketch-book is, in many respects, to an artist—a guide, a reminder, a source of inspiration, as occasion demands. For landscape work pure and simple, for architectural subjects, for taking the picture of a friend, or of his dog, or of his man-servant, or of anything that is his, the hand camera, when used as such, is not the best instrument to select. It is possible in some cases, I believe, to adapt it to a stand and use it as an ordinary camera, and to focus with accuracy; but I do not remember to have come across any arrangement which would allow of all lengths of exposure being given. If there is a hand camera combining these three important features of the ordinary camera with those of its own class, then do I recommend the beginner to invest in such an one. If there is not, I offer the hint to any enterprising tradesman who may chance to stumble across these lines.

When you have become wiser in photographic lore you may be surprised, and possibly amused, at what I am going to say now; but it is my firm opinion, and I intend to adhere to it, paradoxical as it looks. I believe hand cameras will die of their own excellence. Just about ten years ago a violent epidemic of instantophobia broke out among photographers, and we had some truly remarkable pictures of swallows, gulls, express trains, waves, dropping athletes; but the fever died down and was practically conquered when the hand camera appeared among us to revive it in a new guise. This, I think, will be the fate of hand-camera work before very long, and we shall then fall back upon those old resources of pictorial excellence, namely, artistic selection, judicious exposure, careful development, which are the backbone of modern photography. Somehow—I do not know *how* it is, but there is the fact—I can generally pick out hand-camera negatives and prints from those made by other means. They lack detail in the shadows, that grand test of correct exposure; they exhibit, in fine—to me at least—most of the defects arising from under-exposure and consequent thinness of image. The other night I was present at a lantern entertainment given by a society in Oxford (where I reside), and a great number of pictures were projected on the screen. One series comprised views taken in the Scottish Highlands, and the author of them sat by my side. He was kind enough to inform me, in tones of pride, that they were all taken with a hand camera. This was one of Mr. Samuel Weller's self-evident facts: the dark, heavy foliage, the want of perfect detail in any part of the pictures, the absence of anything approaching balance or harmony in the lights and shades, told me all I wished to know. The shutter of the lens, I was informed, worked at a rapidity of one-hundredth part of a second. There were steamboats, cattle, and things of that kind in some of the pictures; but one-tenth of a second would have been quite fast enough for them, and the difference in the quality of the resulting pictures would have been very great. The negatives were developed with somebody's developer, sent out in pints or quarts. Have none of these things.

The greater part of hand-camera work is unquestionably inferior to that produced by other means, and the reasons for this are tolerably plain. Pictorial composition and all kindred considerations are, of course, cast aside in the rush to secure the moving object; the exposure can only be a very rude approximation, a point which very largely determines, if it does not absolutely govern, the development of the result. Hence, hand-camera "pictures" must, in the nature of things, be more or less of a rough and ready character, sketchy, if not thumbnailish, in design and execution. If the beginner is content with such, let him by all means have a hand camera. He can always sell it when he is tired of it—or try to.

From the foregoing it will be seen that hand-camera pictures are not the kind which usually pay for enlarging or for conversion into lantern transparencies, or for other forms of reproduction. Unfortunately, hand-camera workers very often think otherwise, and the results are such as to set the judicious a-grieving. There is a facility about the release of the catch or the pressure of the button which is fatal to the good effects of second thoughts, which have an opportunity of asserting themselves when one stands behind the focussing screen of an ordinary tourist camera and contemplates the inverted image upon it.

This is not a technical article. Most of the hand cameras about just now differ from each other chiefly in name. I advise the beginner, if his heart is set upon having one of these instruments, and if money is no great object, not to examine into the merits or peculiarities of any one camera, but to collect the advertisements, write out the names on slips of paper, shake them in a hat, draw one, and buy the particular camera thereupon mentioned. R. E. Chesterman, D.Sc.

ON THE PROPER CONSTRUCTION AND USE OF THE SWING-BACK, SWING-FRONT, RISING, AND SIDE-SHIFTING FRONT.

Swing-backs are most generally used as necessary aids in obtaining correct views of architectural subjects, though they are also used in the studio for portrait work; but for the purpose of this article their use will be best explained by assuming a practical application. Suppose it is desired to obtain a correct photograph of a house, camera occupying a position in front of house, but somewhat to one side of a point directly opposite middle of front. Suppose camera constructed with double swing-back only.

Operation will be as follows: Camera will first be set up level and firm; it will then be swung on tripod until image of house is centred on ground glass laterally; the horizontal swing will then be used, back of camera turning on a vertical axis until it is parallel to horizontal lines of house front. Now, while maintaining this adjustment, camera will be tilted upward until image of house occupies a central position on ground glass vertically; the vertical swing will then be used to bring ground glass parallel to vertical lines of house. The close focussing will then be done, and then the largest stop, which will give satisfactory definition over the whole plate, will be inserted. Now while this method, if correctly practised, will produce a correct view of house, and one that will be satisfactory to many, still the method is far from being correct and is of the nature of a makeshift. An examination of a camera in the position just described will reveal the fact that the four edges or margins of plate are each at a different distance from lens, and no two points of plate are at same distance from lens. As far as definition is concerned a lens used as above is used under the most unfavourable conditions, and this can only be compensated for by using a very small stop, which is very often not at all desirable.

The above will be quite evident from the following consideration—viz., if a camera and lens be set up in front of a vertical plane, such as house-side or front, in such manner that the optical axis of lens—*i.e.* the line through centre of lens tube—is horizontal, and also at right angles laterally to vertical plane, and if lens is then focussed on a point in vertical plane where axis of lens cuts said plane, and the ground glass of camera is also at right angles to axis of lens, then the definition on the ground glass will be as nearly uniform over its whole surface as possible with lens used and its largest stop. Lenses are designed and constructed to accomplish above result, and it is only under above conditions that a lens can be used to the best advantage. Now, referring again to the example of photographing a house, let all the conditions be as there assumed, except that the camera will now be assumed as having a rising front, side-shifting front, and double swing-front, in addition to double swing-back.

The procedure would then be as follows—viz., camera set level, ground glass vertical and parallel to front of house, without as yet using swing back; the lens would first be shifted to one side with parallel motion until house was centred laterally on ground glass, and would then be shifted vertically until house was centred vertically on ground glass. If after using to their full extent the side and vertical shifting devices, the image of house was still not centred on ground glass, then camera would be turned sidewise and tilted upward until image was satisfactorily rendered on ground glass, and then the ground glass would be brought to a vertical and parallel position by means of swing-backs, as in the first case; but after this was done the horizontal and vertical swinging devices of lens would be brought into use to bring optical axis of lens at right angles to plane of house-front and ground glass. Of course, under these conditions the lens would be used beyond its regular or rated covering capacity, but every part of ground glass would be in the legitimate plane of the focus of lens, and satisfactory definition would be obtained, using a much larger stop than could be used under the first conditions.

The preceding remarks may be summed up in brief by the following

eneral directions: The optical axis of a lens should be kept in a hori-ontal position under almost all conditions, and it should also, whenever racticable, be kept at right angles to the principal plane of the view or ubject, architectural or otherwise, and the plane of the ground-glass hould always be kept at right angles to axis of lens, horizontally and ertically. The camera which is so constructed as to permit the above onditions, to be perfectly and readily compassed under all circumstances, the only perfect instrument, and the only one which will continue to ve satisfaction as a knowledge of the requirements of a camera becomes ore general. C. W. GRANT.

—*American Annual of Photography.*

OPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY MEANS OF ARTIFICIAL LIGHT.

V.

N my previous articles I have referred more particularly to the opying of photographs, lithographs, engravings, or such pictures as re commonly to be met with in books or illustrated publications, so printed matter, such as hymns, maps, &c., and referred to the ecessity of following out such a line of treatment in development nd after intensification of the negatives as will yield bold contrast etween high lights and clear glass for the blacks on the pictures. o matter what dodging of the negative be resorted to, it is only y doing everything in one's power, and by using suitable plates to btain such contrasts, that really good results are to be obtained with elatino-bromide. With collodion, however, it is very different, and henever a worker is possessed of some experience in collodion work e will understand the enormous power which is placed in his hands r the production of absolutely clear glass and dense high lights. A ower which, certainly so far as our present experience goes, does not ist in the use of gelatine dry plates. It is but very seldom, how-er, nowadays, among amateurs at least, that we find any of such nversant with collodion work, and hence the first question of mportance for their consideration is, What is the most suitable class gelatine plate to use as a substitute for collodion? When writing ch articles as the one I am at present treating, it is at all times a ry difficult thing for a writer to refrain from so expressing his inion as to avoid referring to this or that particular maker's pro-uction, for trade interests are now so largely mixed up with what m time to time we see written about photography, that the oment any particular braud of plates, &c., is recommended, the natural ference is that So-and-so has some interest in recommending the rticular article in question. I make this remark lest any of my aders should think that I have any other interest whatever save erely letting it be known to those who are anxious to know what, my opinion, is the most suitable gelatine plate to employ when pying a black and white picture or printed matter. I have given good deal of attention to this subject, and after an experience of me years I have no hesitation in saying that when collodion nnot be used, the next best plate for an amateur to employ is one ated with Mawson & Swan's lantern emulsion; in using such, how-er, the worker must work only his exposure by experience, and make ch tally with the particular form of developer he is best acquainted th, and as a rule, when copying black and white, intensification ould invariably be employed, but only after a most complete and orough washing.

So much for copying black and white subjects, &c.

I now pass on to the consideration of photographing such articles as ina, cut glass, medals, coins, and very many other articles of *vertu*, even such commonplace articles as are to be met with in every-day mmerce, and which very frequently it is desired to copy, either with view of making lantern slides for projection on the screen, or even, may be, the mere pulling off of a silver print for the album or to nd a friend.

I once met with a very enthusiastic worker who was a good deal ven to bounce anent his knowledge of photography; in fact, he was hat one sometimes hears termed a "new shutter man," and knew ore about instantaneous photography in a drawing-room than he ew on a pier-head or a busy thoroughfare, and I well remember en meeting him in this fashionable drawing-room, and he was own a very valuable and chastely cut decanter, which was highly zed by the lady of the house, and on his being asked if he could ke a photograph of it, so as to show up the exquisite pattern, he mediately replied, "Only too delighted!" Now, I guess, so far as e showing up of the exquisite design is concerned, my friend did t feel so delighted, for he found he had undertaken a task which he lly did not know how to execute, and I have frequently since, en speaking of such kind of work to amateurs, been struck by the apparent ease which they consider such a bit of work is done, and hardly one in twenty knows how properly to set about it, so as to show off the pattern cut upon it.

Then, again, another very common thing is a piece of plate or silver cup; it seems so easy, but in reality but very few know properly how to set about it. And I have seen an old china plate give no end of trouble also.

Of course the question of primary importance here is the lighting, but there are also no end of other dodges which are of the utmost service to the photographer, and which once known stand him in good stead for all future time; and this dodging cannot really well be discarded, no matter whether the work has to be done with the aid of daylight or by artificial light. When copying such things as articles of *vertu*, in many cases I prefer to use artificial light to daylight, for with its aid the light is more under control, and with suitable appliances for holding the various articles *in situ*, screens can be employed to diffuse the light, and other means employed whereby reflections are overcome quite as easily, if indeed in some cases not better, than is the case with daylight.

Of course another point of importance when photographing such articles is the employment of suitable backgrounds, but as a rule any worker of taste will find that the resources of most well-appointed households will furnish him with all he requires to accomplish this work. In some cases I use transparent supports for holding the object *in situ*, while in others a deal board covered with black velvet will be found most useful.

In my next I hope to refer more particularly to the photographing of such articles as cut glasses, decanters, coins, &c., by means of a similar mode of illumination as previously described by me for photographing book illustrations. T. N. ARMSTRONG.

PHOTOGRAPHY AND FICTION.

"THE OCTOROON." "UNCLE'S WILL."

FROM the earliest days of photography it has been used by the novelist in the construction of his stories, and the dramatist has found the art-science no mean agent in the development of his plans and plots. In looking into the photography of fiction, however, it is really astonishing to note the wild conceptions and general ideas that some writers advance as a sort of practical photography. In many descriptions a total ignorance of the subject is most marked, whilst others seem as if they had looked over the manipulations in a cursory way, a few only conveying a show of knowledge that would bespeak some practical experience.

One of the earliest dramatists that utilised photography was Dion Boucicault, who introduced it with great success into his play of the *Octoroon*, the main features of the plot hinging on the taking of a photograph. There is in the piece a little fellow named Paul, who, getting hold of his master's camera, which has been left in the open, desires to have a picture of himself; and as he was carrying the mail bag with the letters to the house, he loiters on the way for this purpose. He sets himself down upon the mail bag to be taken. His method for length of time for exposure is novel: he gets an old Indian friend to take off the cap, or apron—for it was a cloth—to run a given distance, then to return and replace it. When the Indian was away, however, and the boy was sitting motionless, a villain, McClosky, who is prowling around in search of this very mail bag, sees the boy sitting mute and steady as a rock with the bag underneath him, and seizes the opportunity by knocking the poor little fellow on the head and rifling the bag.

Now the idea is that the murderer is photographed in the act. The Indian in hot haste returns, covers the lens with the cloth, and goes up to his little friend, thinking he is shamming sleep; but to his horror he finds that he is dead. Raising his eyes, they fall upon the camera, which he thinks must be the cause of Paul's death; then, seizing his tomahawk, he smashes the camera to pieces. The plate, however, is not broken, but lies as it fell.

Boucicault evidently knew enough about the subject as to be aware that when the plate was left lying that there could not be any image upon it until it had been developed, and that no picture could possibly be seen until this operation had taken place. So, to get out of this dilemma, he introduces a new patent plate coated with a self-developer, and we are allowed to imagine that the plate went on developing all the time, until it was necessary to produce it again, when the image was then to be visible upon it. Every point in the working out of the plot goes to show that the Indian was the murderer of the boy, one serious piece of evidence against him being the fact that it was his tomahawk that had been used in the perpetration of the deed, and McClosky kept pressing on the matter so as to screen himself, when a nigger who had found the broken camera came along, and in the *débris* was found the plate, and behold, there were two figures upon it—one a representation of the child lying dead, the other McClosky standing over him with the weapon in his hand, caught in the act. Here was the silent witness, and the murderer's fate was sealed.

The self-developer was a weak point; but one of greater importance

than it even was overlooked by the dramatist, for he forgot to make the Indian close the door of the dark slide, so that the plate was really exposed to the light all the time, thus destroying any chance of an image being upon it.

The general public, however, not knowing anything about the matter, were pleased; they accepted the poetical justice of the *dénouement*. The innocent man was saved, and the guilty one was tracked to his doom, and all through a photograph.

In the play entitled *Uncle's Will*, where finished photographs only are used, the plot works out right well.

The deceased uncle leaves a will, the conditions of which were that two young relations of his must agree to marry before a given date mentioned in the will if they wished to participate mutually in the immense wealth left by him. If one refused and the other was willing, the willing one got all the money; but if both refused, then all the money goes to a Mr. Barker, an old gentleman who is left guardian to the young folks.

The pair were really very fond of each other before this, but no sooner were the contents of the will made known than an apparent dislike arises between them, and both assert that on such conditions they would not be married at any price. Here the old guardian begins to create a feeling of jealousy by the judicious use of photographs. He secretly places a photograph of a young gentleman in the lady's work-basket, with the intention of the male legatee finding it when prowling about amongst the lady's belongings, which he has a considerable habit of indulging in, quite unexplainable when taking into account how little he thinks of the lady. Then the guardian, with the same intention on the lady's part, places another picture—this one of a lady—in the gentleman's hat, which he finds handy for his purpose.

Of course, the pictures are found by the parties for whom they were intended by the deep old man. The plate worked well, and rapidly produced the desired effect, for jealousy was immediately produced on both sides, and in the midst of the jealous passion that issues from the supposed discoveries of other and secret lovers, in the midst of the quarrel, they both resolve to write renunciations, throwing up all the wealth rather than endure life-long misery by such a union. No sooner do they accomplish this act of surrender on paper than they become their old selves again, and their conversation becomes at once free and easy, with even a touch of affection here and there. Now that the bonds were broken, they began to feel that they really could not do without each other after all, so after a little "spooning" and loving talk they tore up the papers and resolved to get married according to the conditions of *Uncle's Will*.

MARK OUTE.

THE CHEMISTRY OF PHOTOGRAPHY.

THE following excellent lecture on the chemistry of photography was delivered before the Harrogate Naturalist and Scientific Society by Mr. A. A. Pearson, of Leeds. The numerous experiments by means of which the lecture was illustrated very much enhanced the interest and value of the paper:—

The whole science of photography depends on the fact that certain substances are acted upon by light. We all know how the sunlight fades the colours of our carpets, curtains, and upholstery, though very slowly; the bright aniline dyes with which many silk ribbons are dyed lose their colour more quickly. The market gardener is unconsciously familiar with this property of light. He sows a bed of lettuce seed; when it comes up he thins it into rows, and by the time the plants have grown a few good-sized leaves, he ties them up at the top to exclude the light; the result is a crisp, pale heart, the outer leaves of which are a pale green where the light has filtered through, yellow where less light has penetrated, and in the dark centre pure white. In the same way he blanches his celery by banking up with soil. The green colouring matter of vegetation is a compound called chlorophyl, which is only formed in the presence of white light, so that here we have colour formed by light; whereas in the case of dyes the colour is destroyed by light. These processes are very slow, extending to days and weeks, but there are certain metallic salts, notably some of the salts of silver, which show a visible colour-change in sunlight in a few seconds, and furthermore undergo an invisible change (which can, however, be rendered visible by the action of certain chemicals termed developers) in less than the 500th part of a second; nay, I have a photograph that I took of a single spark from a high tension electrical machine which cannot have lasted the 5000th of a second.

You will agree with me that it is a wonderful thing that a substance which keeps indefinitely in the dark, and remains unaltered a considerable time in a red or yellow light, should have its nature changed by exposure to white light for a shorter time than it takes you to wink. It is my purpose to-night to investigate this change and explain its theory. In order to do this I shall perform some experiments in visible changes, and argue from the visible to the invisible; just as when we see tree branches waving, or a hat scudding away from its owner, although we cannot see the disturbed atmosphere, yet we know there is a current of air in rapid motion which we call wind. As I mentioned at first, the substances most useful to the photographer are certain salts of silver, and those most readily altered by light are the compounds of this metal with three halogen elements—chlorine, bromine, and iodine.

The word halogen is derived from the greek, *halos*, salt, and *genuan*, I produce, because they produce compounds with the alkalies more or less resembling chloride of sodium or common salt, the salts of these three elements being called haloid salts, from *halos*, salt, and *eidos*, like. There is a fourth halogen, called flourine, which, however, is not used in photography, and need not be noticed. We have the three forms of matter represented here. Chlorine, gaseous; bromine, liquid; and iodine, solid. Chlorine derives its name from "*chloros*," green, because it is a greenish yellow. Bromine, which, with the exception of mercury, is the only element liquid at the ordinary temperature, is a dark red-brown heavy liquid, extremely mobile and volatile, so that the bottle is continually filled with red smoke, and derives its name from "*bromos*," a stink; alluding to its powerful, irritating odour. Iodine exists in black, shiny scales, remarkably like plumbago, and although solid, extremely volatile, the application of a little heat converting it into a splendid violet vapour, from whence it derives its name, "*iodes*," violet-coloured. I put a little iodine into this glass flask and heat it over the spirit lamp; the result is a splendid violet vapour. Each of these elements will combine directly with metallic silver. If I put a piece of silver leaf into the jar of chlorine it will be converted into pure white chloride. If I hold a piece of polished silver over the vapour of bromine or iodine it will be coated with a yellowish white film of bromide, or canary yellow iodide of silver. The easiest method, however, is by precipitation. I take a solution of any chloride and add a little nitrate of silver solution, the result being a white curdy precipitate of silver chloride. Pure silver chloride is unaltered by light, but if a trace of moisture be present it rapidly becomes bluish-purple on exposure to daylight; the presence of nitrate of silver quickens the action and deepens the colour. This is the haloid salt used in making the photographic print. It is quite insensitive to gaslight, and much too slow for use in the camera. Pure iodide of silver is unchanged visibly on exposure, but if nitrate of silver be present in solution, a momentary exposure to white light will so alter its molecular or internal structure that the addition of a substance capable of absorbing oxygen, such as sulphate of iron or pyrogallic acid, will decompose the adherent nitrate of silver and deposit metallic silver wherever light has acted on the iodide. This is the haloid used in the wet collodion process, and the cheap glass positives and ferrotypes or lintypes that are done while you wait at nine for sevenpence halfpenny. The intermediate haloid, however, the bromide, is the most remarkable one; if exposed to white light it darkens a little, but the important property possessed by it is, that if incorporated with gelatine the most instantaneous exposure to daylight induces a molecular invisible change, causing it to blacken over on immersing in a reducing solution—even gaslight will produce this change in the fraction of a second. This is the haloid used in the manufacture of modern dry plates—gelatine is dissolved in warm water containing bromide of potassium; nitrate of silver solution is added, causing a precipitate of silver bromide; the jelly is allowed to set, the soluble salts are washed out, the jelly remelted, and glass plates or paper coated with the sensitive emulsion. Strange to say, by boiling or not boiling the emulsion, and the addition of iodide, the emulsion can be made rapid or slow.

I have a piece of paper here coated with slow emulsion; if I immerse it before exposure in a suitable reducing solution, the silver bromide will remain unchanged, but if I expose it a few seconds to gaslight, and then immerse it, it will blacken over by the reduction of metallic silver. This piece is already spoilt by showing it to you. It is evident that if any part be protected by an opaque substance that part will remain unaffected, and on development we shall have a reproduction of the object in black and white. I will put a fern leaf in contact with a piece of this paper, and expose it three or four seconds to the gaslight, and then immerse it together with the spoilt piece and a fresh piece in the developer. The result is: 1st, a white image of the fern on a black ground; 2nd, black all over; 3rd, unchanged. All that remains now is to render it permanent by dissolving out the haloid salt unacted upon by the light, a process termed fixing, which we do with hyposulphite of soda.

I want to explain now, first, the chemical changes that have taken place, and, secondly, the action of light in bringing about these changes; but as this is purely a matter of theory, I must draw on your imagination, assisted, however, by suitable experiments. All substances can be reduced to a very fine state of division, generally the solid to a liquid, and the liquid to a gas. I can break up a block of marble into a coarse powder, and then grind it into a fine powder of carbonate of lime; by the chemical

method of precipitation I can get a finer state of division. I add a solution of potassium carbonate to one of chloride of calcium, and stir them well. We have such a copious precipitate of carbonate of lime that the two liquids become solid, and ultimately the chalk will settle down as an impalpable powder. It is possible to obtain a much finer state of division than this; but this powder would appear coarse under the microscope. I have here a glass tube containing metallic lead in such a finely divided state that when I break the tube and shake it out, the lead dust takes fire by contact with the air and causes a shower of sparks. Also I pour this solution of phosphorus on to paper. When quite dry the phosphorus takes fire by exposure of its fine particles to the air, and the paper bursts into flame spontaneously. Far beyond all visible division, however, we are justified in believing that matter is ultimately composed of infinitesimal particles called atoms, and these atoms are grouped together, two or more to form molecules—a molecule is the smallest piece of matter that can exist alone. Matter is divided into two great divisions—elements and compounds; an element is composed entirely of atoms of its own kind. You cannot get anything from hydrogen but hydrogen, nor oxygen but oxygen. Water is, however, a compound of the two; every single atom of oxygen is firmly united to two atoms of hydrogen to form a molecule of water, which can again be split up into their original molecules of oxygen and hydrogen. I could illustrate this by firing a mixture of these two gases, but the noise produced might upset your nerves and disturb my future experiments; we will demonstrate it by a quieter experiment (iodine and phosphorus). Some compounds are composed of atoms that have been forced to live together, as it were, against their wish, so that the least disturbing force will cause a break in the family circle, and each set of atoms will at once walk out and set up again in private molecules.

I have here a compound of iodine and nitrogen which is so excitable that merely touching it with this piece of wood causes it to explode violently, and you see the violet-coloured vapour of liberated iodine. Now I have shown how chemical combination can be effected by precipitation or by mere contact, also the dissociation of atoms by a mere touch. I will next show how two gases will combine by simply exposing to white light. White light is, however, composed of several colours, amongst which red and blue are prominent. The red rays have scarcely any chemical action, the blue and violet have most, and affect the photographic plate powerfully. I have a glass bulb here filled with chlorine and hydrogen gases, the atoms of which are very fond of each other, but are, as it were, blind. I burn a piece of magnesium behind a red glass, but still they do not see each other; I next burn it behind a blue glass, they immediately combine with an explosion, smashing the bulb to dust.

Now I come to the supposed action of light on these atoms. In order to do this we must have a clear idea of how light travels, and we shall understand this better by referring to the propagation of sound. If I draw a bow across this tuning fork, you hear a sound at the other end of the room; but how has it reached you? The fork is thrown into vibration, as you see by this button. The surrounding particles of air are obliged to vibrate with the fork. Each particle transmits the movement to the next, and so on through the room, at the rate of about 1100 feet per second. These impulses, jostling on the tympanic membrane of the ear, are translated by the brain into sound. Now, we believe all space to be filled with an extremely attenuated elastic fluid, which, for want of a better name, we call ether; it is so exceedingly subtle and thin that it penetrates in between the very atoms of every substance—gaseous, liquid, and solid. If we raise the temperature of a substance, this ether vibrates just as the air did with the tuning fork, and the impulses affect our bodies in the shape of heat. By raising the temperature the vibrations become more rapid, until they affect the eye, and the brain calls it light, the impulses travelling at the enormous rate of 196,000 miles per second. Furthermore, we believe the atoms of all substances are never at rest, but continually in vibration; so that by raising a substance to red or white heat, we have simply quickened the motion of the atoms, until the ether vibrates in unison, to produce the sensation of light on the eye, for heat is always the primary cause of light.

Let us see what happens when a ray of white light meets the extremely sensitive film of silver bromide. The ray of light is composed of several colours, from red to violet, and some invisible rays beyond that; the red vibrates the slowest, the violet and the ultra-violet the quickest. Those vibrations which do not correspond with the vibrations of the atoms of bromide are reflected, and we see them as reflected light; those that do correspond penetrate the film, and amplify the movement of the atoms to such an extent as to loosen the bonds of affinity, and they are ready to fly apart on small provocation, like the iodide of nitrogen. To prove that a vibrating body will affect another one which is in unison with itself, I will return to the tuning fork. I have another fork which is in exact unison with it. When I draw the bow across the first one, the second one is thrown into synchronous vibration, and sounds with it, and the boxes on which they stand infinitely reinforce the sound by vibrating in consonance. This would not occur if they were the least bit out of tune with each other.

A very similar action seems to take place when the white light strikes the film of silver bromide and gelatine (the photographic dry plate). White light, as you know, is composed of seven distinct colours—red, orange, yellow, green, blue, indigo, and violet—besides certain heat rays below the red, which we can feel, but cannot see; and also some invisible rays beyond the violet, which, however, affect the photographic plate powerfully. Each of these colours, and all the intermediate shades, are caused by different rates of vibration of the elastic ether, just as the different notes on a pianoforte are caused by the varying lengths of wire throwing the air into quicker or slower vibration. Some of these are sure to be in tune, as it were, with the molecules of silver bromide, and consequently augment their movement so much as to re-arrange the atoms, and, as it were, set them on the loose. In fact, a portion of the bromine appears to be set free, leaving the molecules in a very unstable position at the mercy of the developer. This is where the gelatine plays its part by absorbing the liberated bromine, for, as I explained before, single atoms cannot exist, but must have their affinities satisfied by company with other atoms, either of their own kind, or others they can combine with to form molecules. In certain cases, however, their loosened bonds can be loosely held together by the presence of a third party, which in this case is the gelatine. The gelatine does not combine with the liberated bromine, but absorbs it in such a manner as to prevent the structure giving way.

When the developer is applied it acts by robbing this mainstay of liberated bromine and all the other besides, and the edifice tumbles to pieces, leaving nothing but metallic silver, which forms the image. I will show by two experiments how the structure of a substance can be altered without destroying it, and also how the particles of a body may be thrown into a state of such unstable equilibrium that the least disturbance will upset it and cause it to tumble to pieces.

I rub some of this scarlet powder on a clean piece of paper to form a cross and heat it over the spirit lamp. The brilliant cross has disappeared, but where to? I have not destroyed it. Just as carbon may exist in three allotropic forms by altering its structure but not its composition, furnishing the crystalline diamond, the shiny plumbago, and the dead-black charcoal, so by heat I have converted this brilliant red powder into minute canary-yellow crystals, which are invisible by gaslight. I have only to rub them with something hard, as you see, to break them up once more into powder, and our red cross re-appears.

I have here a piece of glass whose particles are in a state of great tension. The glass has been dropped whilst melted into cold water, forming a pear with a long thin stalk or tail. The sudden chill has cooled and contracted the outer skin before the inner particles had time to contract. As a result, although a blow with a hammer does not break the thick part, yet if ever so little of the thread-like tail be snapped off and the skin broken, the whole thing flies to powder.

I have now only to conclude with a summary of the theory of the action of light on a sensitive dry plate in the process of taking a negative, as advanced by Captain Abney, Dr. Eder, Carey Lea, and others, and then bring this paper to a close by exposing a plate under a negative and then placing it in a developing cell in the lantern so that you can see the development take place on the screen. First of all our dry plates consist of a gelatine film in which is incorporated a compound of bromine and silver—the component atoms of this compound are in a state of vibration like a tuning fork, but infinitely more rapid—a ray of light formed of the subtle elastic ether, also in rapid oscillation at several different speeds, just as the air is when several music notes are when sounded at once, partially penetrates this film and augments the movement of the atoms of silver bromide that are in tune with it to such an extent that the attraction is loosened and some of the bromine is liberated and absorbed by the gelatine, leaving the molecules in a very shaky condition. The developer is applied which appropriates that absorbed bromine, and proves the last straw to the camel's back, for the structure breaks down, leaving more or less opaque metallic silver behind to form the visible image. The unaltered silver bromide is then dissolved out.

As regards the formation of the image, just as in the optical lantern, the front lens throws an image of the slide on to the screen, so the camera lens throws an image of the object on to the sensitive plate, the dark portions of which induce no change, the light ones induce a complete change, and the intermediate portions a partial change, giving rise to a negative in which all the lights and shadows are reversed. This negative is placed in contact with another sensitive surface, light is filtered through, and produces a reversed image or positive.

PROPOSED FEDERATION OF PHOTOGRAPHIC SOCIETIES.

A MEETING was held on Tuesday last, the 2nd inst., of deputies from various London and suburban photographic societies, who had been called together by circular to discuss a proposal for a federation of photographic societies. The proposal came, in the first instance, from Mr. L. M. Biden, President of the Toynbee Camera Club. The meeting was held in the rooms of the Photographic Society of Great Britain, permission having been granted on a requisition to the Council of that body.

Mr. Biden took the chair, and opened the proceedings by stating that, in reply to the circular which had been addressed to the metropolitan societies, there had not been any unfavourable replies. Communications favouring the proposal had been received from the Barnet Photographic Society, the Croydon Camera Club, and Croydon Microscopic and Natural History Society; the Enfield Camera Club, the Brixton and Clapham Camera Club, and Ealing Photographic Society; the Finsbury Technical College Club—Photographic Section, the Hackney Photographic Society, the Harlesden and Willesden Photographic Society, the North Middlesex Photographic Society, and the People's Palace Photographic Society.

The Chairman said that by federation he understood the union of societies for mutual support. In some societies where the number of members was small, and they were chiefly beginners, and seniors could not get up papers for many evenings, the secretaries of many societies had great difficulties in finding papers. On the other hand, some of the more advanced members were very willing to take pains over a paper if they could feel that they were addressing a large audience; a man would sometimes spend hours in experiments, and more hours in preparing a paper, and the end of it all would be the hour or so in which it was delivered and discussed by the few present. A very useful paper had recently been read at the North Middlesex Photographic Society on a subject peculiarly adapted to beginners. The Toynbee Society had been favoured with a loan of that paper. That was the sort of thing that might by system be made enormously to extend the usefulness of the smaller societies.

Another thing they might do by federation was to support the West London Photographic Society in its endeavour to obtain special terms to photographers from the railway companies. A further point was with reference to interchange of lantern slides. There were many hundreds of slides that, after being once exhibited at a society meeting, were put away and forgotten. Many of the members went about to various parts. The Liverpool Society had a trip to Iceland. The slides made might by loan be used to interest societies other than the one where first shown.

Then the Photographic Institute was to be considered. There had been a great difficulty amongst the smaller societies in getting answers to Sir Trueman Wood's circular respecting the proposed institute. By federation that scheme might be discussed and forwarded. He suggested that delegates should be appointed by the various societies to hold a meeting and choose a committee to have power to act for six months for the furtherance of the scheme as a whole, and eventually that proposition was carried, and the meeting fixed for the 23rd inst. at eight o'clock in the same room, provided that the Council of the Photographic Society of Great Britain would grant the use of it again.

The following resolutions were also carried:—That the following are desirable objects:—

1. The association or federation of the London and suburban societies.
2. The interchange of lectures, papers, lantern slides, &c.
3. To endeavour to obtain the reduction of railway fares to photographers on their outings.
4. To consider whether any proposal can be made to the Photographic Society of Great Britain for admission of the various societies as corporate members of the Photographic Society of Great Britain.
5. Generally to promote photographic knowledge and research.

A vote of thanks to the Chairman and one to the Photographic Society for the use of its rooms terminated the proceedings.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3319.—"Improvements in the Art of Photographing in Colours and in the Means employed therein." S. WATERS.—*Dated February* 24, 1891.

No. 3465.—"Improvements in Magazine and other Photographic Cameras." J. PUMPHREY.—*Dated February* 26, 1891.

No. 3603.—"Improvements in Photographic Cameras and Apparatus connected therewith." A. MILLAR.—*Dated February* 27, 1890.

No. 3623.—"Improvements in and relating to Masks and Binders, and Apparatus for Mounting same on the Glasses of Magic Lantern Slides, Photographs, Stereoscopes, and the like." D. A. CROMBIE and E. R. FLETCHER.—*Dated February* 27, 1891.

No. 3627.—"Improvements in Appliances for Optical Lanterns." T. J. SMITH, JUN.—*Dated February* 28, 1891.

No. 3648.—"Improvements in Photographic Cameras." J. BRADLEY.—*Dated February* 28, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 2628.—"Magnesium Flash Light." Communicated by Lansiaux and another. BOULT.—Price 8*d*.

No. 3393.—"Flexible Film for Photographic Purposes." FOXLEE.—Price 6*d*.

No. 5215.—"Photographic Shutters." BEAUCHAMP.—Price 8*d*.

No. 5436.—"Exhibition of Photographs." DEWÉ.—Price 8*d*.

No. 14,189.—"Photograph Films." PLANCHON.—Price 8*d*.

PATENTS COMPLETED.

IMPROVEMENTS IN OR RELATING TO APPARATUS FOR THE PRODUCTION OF MAGNESIUM FLASH LIGHT.

(A communication from Charles Lansiaux and Charles Merville, of 42, Boulevard Bonne Nouvelle, Paris, in the Republic of France, photographic apparatus manufacturers.)

No. 2628. ALFRED JULIUS BOULT, 323, High Holborn, Middlesex.—*February* 7, 1891.

THE subject of the present invention is a novel portable apparatus for the instantaneous production or generation of the magnesium light required for taking photographs in otherwise dark places.

This extremely simple apparatus gives a light sufficiently powerful to permit of the taking of instantaneous photographs in the open air and during the worst weather.

The apparatus consists of a small box, acting as a reservoir and containing a bent tube, which passes through the box and is connected at one end with a collapsible ball by means of a caoutchouc or other flexible tube. This box, intended to be filled with magnesium powder, is closed by means of a screw or equivalent stopper.

The bent tube within the box is cut away to admit the magnesium powder into its interior, and in addition has at its lower end a small conical tuyere covered by a single or double sheet of thin metal gauze.

The upper end of the bent tube is slightly pointed or reduced in area for the purpose of converging or directing the particles of magnesium powder issuing from the box against the burning portion of a fuse or fusee.

The fusee—the name of which indicates that it is a sort of match of which each portion remains a certain time in combustion after it has been lighted—is held in position by a socket soldered to the box and slightly inclined on one side.

The apparatus acts as follows:—

The reservoir box having been filled with magnesium powder through the removable stopper, a fusee is inserted into the socket or holder.

When the moment has arrived for commencing an operation, friction is applied to the phosphorus-coated end of the fusee by the box in which it is contained, by which means it is lighted. The ball is then pressed so as to cause the air it contains to traverse the tuyere and the holes in the metal sheet, and to propel all the powder contained in the bent tube, and which had been admitted by the before-mentioned opening in such tube, against the fusee. The magnesium powder ignites instantly on coming in contact with the red portion of the fusee, and produces the magnesium flash light.

If it is desired to take a second proof, it is sufficient to place another fusee in position and to light it, and to press the ball for the purpose of expelling a fresh charge of powder. It is thus possible to go on producing flashes until the box no longer contains any powder.

The object of the before-mentioned metal gauze is to permit the air to pass into the bent tube when the ball is compressed, and to prevent, by the fineness of its holes or interstices, the magnesium powder from being sucked into the flexible connecting tube and collapsible ball when the pressure is removed from the latter and when it re-inflates itself.

What is claimed is:—An apparatus for producing magnesium flash light by means of a match or equivalent, the said apparatus being especially characterised by—1. A metallic box or case forming a reservoir for magnesium powder, and in front of which is attached a holder or socket for receiving the fusee, the said box or tube containing a bent tube, of which the horizontal portion is open at the top to admit the magnesium powder, and of which the vertical portion is terminated by a slightly contracted end for the purpose of making the magnesium powder converge and come into contact with the part of the fusee or match in combustion, substantially as described. 2. A bent tube, the horizontal portion of which is connected by a flexible tube to an air ball, and containing a small conical nozzle, the point of which is covered by a thin perforated metal sheet or wire gauze, having for its object to permit the passage of air on the application of pressure to the ball in order to expel the magnesium powder and to prevent its being sucked in to the ball when the latter re-inflates itself, substantially as described. 3. The combination and arrangement of parts constituting the complete magnesium flash-light apparatus, substantially as described.

AN IMPROVED SENSITISED FLEXIBLE FILM FOR PHOTOGRAPHIC PURPOSES.

No. 3393. EDWARD WILLIAM FOXLEE, 22, Goldsmith-road, Acton, London, W.—*February* 7, 1891.

THIS invention relates to the manufacture of improved flexible films, to be used as a substitute for the ordinary sensitised glass in taking photographic negatives or positives.

It is well known that thin sheets of celluloid coated with a sensitive emulsion of gelatino-bromide of silver have for some time been in use, so also have thinner films of the same material, for what are known as roller slides. In the manufacture of the former, sheets of commercial celluloid are simply coated with the emulsion. In the manufacture of the latter, the celluloid compound is spread upon a rigid surface and afterwards coated with the emulsion, and when this is dry the film is stripped off. By either method only sheets of limited size can be produced. As celluloid is a highly electrical substance, it has been found that friction upon its surface, as when stripping it from the

rigid body, or by the rollers of the slide when in use, evolves electricity, the light from which is found to cause marking or fogging in the negatives.

When the celluloid film is very thin and flexible, it has a tendency to curl, owing to the expansion and contraction of the gelatine on being wetted or dried.

By my invention the film is made in continuous or long lengths or webs, and the celluloid is protected at the back with a coating of gelatine, which serves a double purpose—that of protecting the celluloid from friction, and by its expanding and contracting in the different operations of developing, fixing, washing, and drying the negative, counteracts the tendency of the film to curl from the expansion and contraction of the gelatinous film on the other side.

To make my improved film, I take a heavily calendered paper in the roll or web, or a "surfaced" paper; I then coat it in any convenient manner with a material which is impervious to water and which will not disturb the fibre or texture of the paper, such as a solution of indiarubber, for example. After the solvent has evaporated, I apply a solution of gelatine containing chrome or other alum sufficient to render the gelatine insoluble or partially insoluble when it is dry, combined or not with some soluble non-actinic matter. The proportion of gelatine to water may be about the same as that in the sensitive emulsion. This coating I apply in the same manner as in making continuous or long lengths or webs of carbon tissue for photography, or in coating gelatino-bromide paper. The indiarubber solution can also be applied to the paper in the same way as the gelatine.

When the gelatinous coating is dry, I apply the celluloid or pyroxyline compound (preferably prepared with volatile solvents), either in a fluid or in a plastic condition, according to the film required. When the celluloid or pyroxyline compound is employed in the fluid state, it can be applied to the web in the same manner as the previous coatings above referred to. When such compound is used in the plastic state it can be spread on the web in the same way as indiarubber and similar substances are spread. The celluloid or pyroxyline compound I employ is similar to what is known as xylonite, celluloid, &c., and is composed of nitro-cellulose and camphor dissolved in suitable solvents (the camphor being itself a solvent), of which there are many; those I prefer to employ for the compound, when the latter is used in the fluid condition, on account of their volatility, are such as methyl-alcohol (wood naphtha), methylated alcohol, ether, benzole, &c., or mixtures of two or more of the same. If the said compound is to be used in the plastic state, some of the other well-known and less volatile solvents are preferable; I would have it understood, however, that I do not confine myself to the use of any particular solvents or proportions, as they have to be varied to suit circumstances; a good proportion, however, for a fluid compound is from four to six parts of solvent to one of solid matter.

After the solvents have been evaporated the celluloid is coated in a darkened room with the sensitive gelatino-bromide of silver emulsion; when this is dry, the back of the paper is moistened with a solvent of the first coating, such as benzole in the case of indiarubber. The finished film is then separated from the paper support or backing; this may advantageously be effected by connecting the ends of the film and paper to two separate rollers, which, on simultaneous rotary motion being given to them, will act to separate the film from the paper and wind them up respectively thereon.

I would here remark that I am aware that a collodion film has been spread on paper whilst the latter has been attached to a sheet of glass, and such film has then been coated with sensitised emulsion; but in such case the paper has remained attached to the film, and was not separated therefrom until after the negative had been exposed, developed, and fixed.

I am also aware that paper has been coated with soluble gelatine, which has then received the sensitive emulsion rendered insoluble with chrome alum, and that the back of the paper has been coated with insoluble gelatine to prevent the film curling. In this film the paper has formed part of it until after exposure, development, and fixing, when the film bearing the image is stripped off the paper, which latter carries with it the insoluble gelatine backing. In this case collodion or celluloid is not used.

I am also aware that a photographic film has been prepared by first coating paper with insoluble gelatine, then with indiarubber containing grease or wax, then with collodion, on which is put a layer of gelatine, and on the latter the sensitive emulsion. Sometimes the plain gelatine is omitted. When using the above film the paper is not removed until the picture is finished.

It has also been proposed to produce photographic films by using a temporary support, such as waxed paper, which is first coated with soluble gelatine, then with algin, which is afterwards rendered insoluble, then with the sensitive emulsion, each coating being dried before the next is applied. In this case the paper backing may be detached from the film at any time by treatment with warm water, but no mention is made of the use of collodion or celluloid in the preparation of this film.

Photographic films have also been prepared by spreading a collodion compound upon glass plates, on which, when dry, the sensitive emulsion is applied.

I therefore lay no claim to the various methods of forming photographic films above referred to, nor do I claim any of the steps of the process herein described separately considered.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—A transparent flexible film for photographic purposes composed of a nitro-cellulose compound, with a coating of insensitive gelatine on the one side and a coating of sensitive gelatine emulsion on the other, made in continuous or long lengths or webs upon a temporary paper support, which is removed from the film before use of the latter, substantially as herein described.

Improvements in or Connected with Instantaneous Shutters for Photographic Purposes.

No. 5215. Francis Beauchamp, The Poplars, Chadwell Heath, Essex.—*February 7*, 1891.

This invention relates, firstly, to improvements in the construction and arrangement of instantaneous shutter mechanism, in which the shutter is intended to work in the ordinary diaphragm slit of a photographic lens, and the improvements under this head consist as follows:—

The casing or framework containing the mechanism for operating the shutter, and for regulating the time occupied in its opening and closing, is secured in proper position on the lens mount, and over the diaphragm slit thereof, by being screwed or otherwise fastened to a split ring, which is previously clamped on to the lens mount in such a position that when the said casing or framework is secured thereto the shutter carried by such casing or framework is free to work easily in the diaphragm slit of the said lens mount. The shutter is connected to a kind of crosshead, which works in or on suitable guides in the casing or framework. This crosshead has a slot formed in it at right angles to the direction of its motion. A crank or crank plate is arranged to turn on a suitable spindle, and a pin on the said crank or crank plate takes into the slot in the aforesaid crosshead, so that whenever the crank plate makes a revolution the shutter is caused by the crank pin to open and close. One end of a coiled spring is secured to the casing or framework and the other end to the crank plate, and means are provided for winding up the said spring. The crank plate is prevented from being turned by the spring, until required, by means of a catch or trigger which takes behind a stop or into a notch on the said crank plate, the said stop or notch being so placed on the crank plate that when the catch or trigger is engaged therewith the crank pin holds the shutter in its closed position. It will now be understood that, assuming the spring connected with the crank to be wound up, on releasing the catch or trigger the spring will cause the crank to make a revolution, and the crank pin acting in the slot of the crosshead will cause the shutter to open and close.

The invention relates, secondly, to improvements in mechanism for regulating the time occupied in opening and closing instantaneous shutters. For this purpose I employ a vulcanite friction disc arranged to turn on a centre fixed to the casing or framework, concentric with the axis of the crank operating the shutter. This vulcanite disc is rotated by the crank pin which engages therewith, or by means of any other suitable connexion with the crank axis, and friction is applied thereto by two plates, between which it is placed, being pressed together with any required degree of force by means of a screw and spring. The speed of movement of the shutter is thus made dependent upon the friction exerted on the vulcanite disc by the plates between which it is placed. Instead of the vulcanite friction disc, I sometimes employ an air cylinder mounted concentric with the axis of the crank, which axis passes through the centre of the said cylinder and carries a radial leaf or piston, which fits more or less closely to the ends and circumference thereof, somewhat after the manner of the pistons of certain kinds of rotary steam engines. A radial partition is fixed at a given point in the cylinder and extends from the circumference thereof to the crank axis or to the boss of the leaf or piston fixed thereon. This leaf or piston stands at one side of the partition when the shutter is closed and the crank actuating spring is wound up. When the spring is released and the crank makes its revolution, or partial revolution, in order to open and close the shutter to give the necessary exposure, the leaf or pistou rotates also in the air cylinder, driving the air before it through an adjustable hole in the cylinder, or through any suitable adjustable opening or passage, until it comes to rest on the other side of the aforesaid partition. By regulating the size of the hole for the escape of the air, the speed of opening and closing the shutter, that is to say the time of exposure, can be regulated at pleasure. Air enters behind the leaf or piston through an appropriate hole in the cyliuder to prevent the formation of a partial vacuum behind the leaf or piston, and the consequent retardation of the same. By the employment of the rotary form of cylinder and piston I am enabled to avoid the objectionable jerk that geuerally occurs in those time regulators now in use, which cousist of an air cylinder and reciprocating piston, when the crank driving the said pistou is passing its dead centre at the time when the shutter is full open and is about to be closed again.

Both the friction and air time regulating apparatuses above described are applicable to any shutter actuating mechanism iu which a rotating or partially rotating axis is employed.

The invention relates, thirdly, to improvements in the operating mechanism of instantaneous shutters, whereby a unmber of exposures, with any desired interval of time between each, can be made with one winding up of the shutter actuating spring. For this purpose I actuate the shutter by means of a crank rotated by a coiled spring in a manner well understood; but I make the spring with sufficient range to turn the crank the required number of times with one wiuding up of the spring, and in order to preveut the crank from making more than one revolution, and consequently one opening and closing of the shutter at a time, aud to allow of auy required interval of time between each revolution, I arrange an escapement lever, which can either be operated by hand or by the usual pueumatic releasing device; a finger rotating in concert with the crank or crank axis is retained by a pin or stop ou the escape lever until the latter is moved by hand or by the pneumatic releasing device, and the crank then makes a partial revolution sufficient to open and close the shutter, giving au exposure, the aforesaid finger being stopped by a second piu or stop on the escape lever. When the latter is pressed back by a spring into its normal position, the said finger slips past the secoud pin or stop on the escape lever and comes against the first pin or stop thereou, where it is retained until the escape lever is again actuated, wheu it is again released and the crank makes auother revolution effectiug another exposure, and so on, until the actuating spring has run down so that it will no longer drive the crank.

An Improvement in the Exhibition of Photographs.

No. 5436. John Dewé, Hotel Métropole, Northumberland-avenue, London.—*February 7*, 1891.

This inventiou is for au improved apparatus for the exhibition of photographs or other pictures by exposing them to a strong light and throwing on the back certain shades and colours, so as to enhance the perspective and scenic effects as viewed from the front.

It consists—

1. Of a frame adjustable (by hinges or other devices) to auy required angle

firmly fixed on a substantial stand, in the lower portion of which may be placed a drawer.

2. Of a removable shade which can be attached to the top of the frame, so as to exclude the light and to give effect to the picture placed in the frame as viewed from the front.

3. Of sliding panels on each side of the frame and at the top of the frame, so that the opening can be adjusted to the size of the picture or photograph to be exhibited.

4. Of arms attached to each side of the frame projecting backwards from the front, and furnished with notches, holes, or rings, for the purpose of holding wires on which can be suspended coloured media or shades, the arms being capable of elevation and depression, and adjustable to any angle that may be required.

5. Of a metal reflector or frame on which reflecting surfaces can be placed hinged on to the lower part of the back of the frame, and adjustable to any angle that may be required by means of a cord or other mechanical device worked easily from the front of the frame.

6. Of a second metal reflector or frame on which reflecting surfaces can be placed hinged on to the end of the reflector above described furthest from the frame, and adjustable to any angle that may be required by means of a cord or other mechanical device worked easily from the front of the frame.

7. The pictures or photographs to be exhibited should, as a general rule, be made transparent, although this is not in all cases required. They may also receive in certain cases a slight colouring at the back, either by paint or by the attachment thereto of transparent paper, on which the colours could be painted or chromographed.

Improvements Relating to Films for Use in Photography.

No. 14,189. Victor Planchon, Boulogne-sur-Mer, France.—*February* 7, 1891.

My invention relates to films for use in photography, and is designed to afford a support for such films, and thus render the same rigid and keep them extended during the operations to which they are subjected.

According to this invention, I add to the film at any moment in its manufacture, thin, rigid, and narrow frames, which form a body with the film when they are finished, and serve not only as supports but also as extenders.

These frames may be rectangular or circular, or they may be of elliptical or any other suitable form, whilst their size varies with the different sizes of apparatus employed in photography.

The thickness of these frames can also be varied. They must be quite plane, rounded, slightly stamped at their edges, or partially hollowed or perforated; they may, if desired, be varnished or coated with any substance which is susceptible of augmenting its adhesion to the film, preventing their oxidation and their chemical action upon the substances which constitute the film, or obviating their alteration in photographic baths.

It will be understood that I do not limit myself to any form or size of the said frames, the mode of manufacture employed, the means of applying them to the films or to the substance of which they are made, which may be any metal, or alloy, or any other rigid substance.

The above-described frames are employed in the course of the preparation of the films made by known processes. They are fixed by simple contact, pressure, or by means of an adhesive substance provided upon or between the layers which constitute the film.

These layers are formed of gelatine, guncotton, albumen, glycerine, varnish, fatty substances, or other translucid or transparent substances, modified or not by physical or chemical agents which are sensitive or insensitive to light, these substances being employed alone or mixed with each other.

The application of the frames is effected prior to the evaporation or oxidation of the liquid or syrupy agents employed, such as water, alcohols, ethers, oils, benzine, and any other volatile or siccative liquids, in such a manner that the substances hereinbefore referred to are applied in a humid, swollen, or pitchy state to the sides of the frames and will cause their intimate adhesion.

The frames may be fixed by one of their surfaces, or put between any two successive layers.

In practice, the operation may be carried out in the following manner, which, however, I describe only by way of example, as I do not limit myself to the same:—

Upon any even surface which has been provided with talc, collodion, wax, silicate, or the like, the substances constituting the film are spread by mechanical or other means; then either before the total evaporation of the solvents, or when the said substances are still in a humid, swollen, pitchy, or molten condition, the frames are applied and fixed in the manner above described.

After their complete desiccation the frames will retain the film and keep it rigid and smooth. The films thus directly extended are of very small weight and volume; they can undergo the necessary operations, such as exposure, developing, and fixing, without any more inconvenience for the operator than if glass or prepared plates were used.

The claim is: The application to photographic films of rigid frames forming one therewith, the said frames being designed to afford supports for the films, and thus render the same rigid and keep them extended during the operations to which they are subjected.

There is to be an exhibition of photographs and apparatus by members of the Croydon Camera Club, at the Braithwaite Hall, Wellesley-road, on Tuesday, March 31, and Wednesday and Thursday, April 1 and 2, 1891. Exhibits must be delivered at 96, George-street, between Monday, March 23, and Saturday, March 28, inclusive. Various medals are offered for competition.

Photographic Society of Great Britain.—On Tuesday, March 10, Sir D. Salomons will read a paper on the *Registration of Slides in the Optical Lantern*. On Tuesday, March 24, *Hand Cameras* will be the subject for discussion. On Tuesday, March 31, exhibition of lantern slides.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 9	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 10	Great Britain	50, Great Russell-st., Bloomsbury.
,, 10	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 10	Derby	Society's Rooms, Derwent-bldings.
,, 10	Bradford	59, Godwin-street.
,, 10	Manchester Amateur	Manchester Athenæum.
,, 10	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 10	Paisley	Committee Rm., Free Lib. & Museum
,, 11	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 12	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 12	Birkenhead	Association Rooms, Price-street.
,, 12	Cheltenham	
,, 12	Manchester Photo. Society	36, George-street, Manchester.
,, 13	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

February 26,—Mr. W. H. Harrison in the chair.

Mr. A. Cowan said that an article of Mr. W. K. Burton's having invited renewed attention to eikonogen and hydroquinone as developers for bromide prints, he had made a series of prints with these developers in varying proportions, and with Farrow's oxalate, and handed them round for inspection of the members. He found that the proportion of two of hydroquinone to one of eikonogen gave too intense an image for an ordinary negative. Eikonogen and sulphite of soda, without further addition, developed a print in eight minutes. Eikonogen alone, without any addition but that of the water to dissolve it, also developed an image, but required three-quarters of an hour to do it, and in one case he had given a development of an hour and a half. With a small proportion of eikonogen and a large amount of sulphite, a picture could be developed in about the same time as if alkali were used. A negative which was very good for developers—viz., eikonogen, eight grains; sulphite of soda, thirty-two grains; and carbonate of lithium, four grains to the ounce—also acted well with paper, and developed a print in twenty-five seconds. He recommended, however, for print development that it should be diluted to half strength.

Mr. T. E. Freshwater had had inquiries from India as to a developer for paper instead of ferrous oxalate which he would now be able to answer satisfactorily. He had also had great complaints of the fading of bromide prints in India. Some published in the almanacs had faded very much, and even some in company with prints upon albumen paper that had not faded.

Mr. Cowan showed a bromide print that had been left for a night in the fixing bath; the image was about half gone.

Mr. W. E. Debenham thought some protest should be made against the use of the word "permanent" applied to bromide enlargements issued to the public. The photographer who only issued platinum and carbon prints as permanent was placed at a disadvantage by those who offered the cheaper and unreliable bromide enlargements as permanent, a distinction they were not entitled to, and the public were misled thereby.

Mr. A. Collier then showed results from sample packets of material recently distributed amongst the members. He complained of the weak and dingy appearance of the print upon the artificial ivory compared with that on paper, and asked the reason.

A Member suggested that the emulsion had been made more rapid by coating on a film instead of glass.

Mr. Debenham considered that the dinginess was due to the want of opacity of the material of which the print was made, and inquired whether any one had ever seen a really bright photograph on a translucent material.

Mr. Cowan said that he never had.

The Chairman said that supposing it were true—on which he expressed no opinion—that an emulsion became quicker when coated on celloidine than on glass, he thought it would be due to absorption of oxygen by the organic substance. Camphor, which was contained in celloidine, was a solid essential oil. It already contained some oxygen, but would absorb more, though not so rapidly as an unoxidised essential oil.

Mr. A. Haddon produced a sealed tube containing eikonogen, water, and some air. Boiling for five minutes had sufficed to blacken the solution considerably.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The annual meeting of this Association was held on Friday last,—Mr. J. Traill Taylor (President), in the chair.

The following report of the Committee was read and unanimously adopted:—

In reviewing the work of the year 1890, and in presenting the balance sheet, it will be desirable to recall the position of the Association at the commencement of the past year. At the annual meeting, and at the subsequent adjournments thereof, the new rules were passed, and they have since been duly registered. These rules, it will be remembered, were framed with the object of extending the limit of the Association's usefulness, as it was then felt that the sum of 18*l.* distributed in relief would hardly justify the continued conduct of its affairs on the same lines as hitherto.

It will be seen by the balance sheet that the new scheme has had the effect then anticipated, and we, your Committee, can now point with satisfaction to the fact that, after proper inquiry into each case brought before us, we have disbursed in grants and loans nearly seven times the amount thus distributed in 1890. With regard to expenditure, the printing of the new rules and providing collecting boxes and printed boards setting forth the objects of the Association necessitated an exceptional outlay, which accounts for the large amount put down for printing, &c. The balance carried forward to the present

year, in consequence of the large increase in the grants, shows a considerable reduction, being 84*l.* 4*s.* 10*d.* compared with 125*l.* 12*s.* 11*d.* brought forward from 1889.

Turning now to the receipts, if we exclude the sum transferred from the abandoned "Orphans' Fund," which exceptionally inflated the receipts for 1889, it will be seen that the donations and subscriptions have exceeded those of the previous year by 11*l.* or 12*l.* It is with much satisfaction that we refer to the amount derived from the annual benefit at the Exhibition of the Photographic Society, from the Chester Convention, from the Drapers' Hall Exhibition, and from the entertainment given by the Photographic Club. These are signs of appreciation of the position and work of the Photographers' Benevolent Association, which may well be expected to act as an example and a stimulus to others.

But, while the Association cannot be too grateful for the support given by these Societies, and by donors and subscribers, many of whom are old contributors, it is incumbent on us to call attention to the fact that unless we receive still further help it will be impossible to meet the claims for assistance which are now constantly coming before us, and which are likely to increase rather than to diminish. The Pension Fund, except for accrued interest, still stands as at the commencement of 1889, though we had hoped to be in a position to add to it on the present occasion, but this course is manifestly out of the question while our expenditure so largely exceeds our income.

Now that the Association can show what has been done during the past year, it is hoped that its claims to support will be recognised by many of those who have hitherto held aloof, and we earnestly trust that all photographers and all who are interested in photography will consider those claims, and will respond liberally to the appeal we now make for further funds, as it is only by a cordial recognition of our aims followed by a liberal response to our appeal, that the objects of the Association can be carried out with thorough efficiency.

It is with much regret we record the death of Mr. T. J. Collins, who for many years served the Association as Deputy Chairman of Committee.

The balance-sheet shows that the receipts for the last year came to 103*l.* 18*s.* 10*d.*; the balance from 1889, 125*l.* 12*s.* 11*d.* The expenditure was 145*l.* 6*s.* 11*d.*, the grants amounting to 121*l.* 18*s.* 6*d.*, the balance being for stationery, printing, and other expenses.

The following officers were elected for the ensuing year:—*President:* Mr. J. Traill Taylor.—*Trustees:* Captain W. de W. Abney and W. S. Bird.—*Committee:* Messrs. W. Bedford (chairman), W. Benham, R. P. Drage, F. H. Berry, T. E. Freshwater, G. T. Harris, A. Mackie, J. S. Rolph, H. D. Atkinson, J. D. O'Connor, — Parfitt, and — Hindley.—*Honorary Solicitor:* Mr. W. Benham, 4, Great James-street, Bedford-row, W.C.—*Treasurer:* Mr. Jno. Spiller. F.I.C., F.C.S.—*Honorary Secretary:* Mr. H. J. Beasley, 65 and 66 Chancery-lane, W.C.—*Auditors:* Messrs. Cox, Farrington, Tabrun, and Holt.

The scrutineers were Messrs. Cox and Rapson.

WEST LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 27,—The President (Mr. W. A. Brown) in the chair.

Mr. J. A. HODGES brought forward the question of the advisability of the Society entering for the Crystal Palace Challenge Cup, and it was determined that the Society should enter, and that the Secretary be instructed to send a circular to the members, inviting them to send pictures to be selected from by a committee of the Council on the Saturday following the next ordinary meeting.

The SECRETARY stated that he had received replies from seventeen societies, representing over nine hundred members, favourable to the proposed Railway Rates Memorial, and only one unfavourable. The Camera Club had so far sent no reply.

CROYDON CAMERA CLUB.

MARCH 2,—The President (Mr. H. Maclean, F.G.S.) in the chair.

Messrs. Burroughs and Goddard were elected members.

Particulars respecting the anniversary dinner to be held at the "Greyhound" on the 9th inst. were announced. There seems every probability that this gathering of local photographers will be a notable success.

A whole-day excursion was announced for Easter Monday. It was proposed that two parties be formed—one to visit Shoreham and district, the other Penshurst.

Mr. C. F. OAKLEY gave a demonstration of the various manipulations connected with the making of lantern slides. Some samples of Mr. Oakley's work were subsequently shown on the screen.

The next meeting will be on March 16, when Mr. A. E. Isaac will discourse on *Lenses*.

The arrangements for the forthcoming exhibition are being pushed forward. Local photographers who desire to exhibit should lose no time in joining the Croydon Camera Club, as only the work of members will be shown. Professionals as well as amateurs are eligible.

BATH PHOTOGRAPHIC SOCIETY.

FEBRUARY 25.—Annual meeting.—Mr. W. Pumphrey presided.

The Rev. C. Reay Pughe was elected a member.

The SECRETARY read an audited cash account and the following report, which, upon the motion of the CHAIRMAN, was adopted *nem. con.*:—

In presenting a report for the year 1890 your Committee can again congratulate you on the success that has continued to attend the operations of the Society. During the winter months of the year the meetings of the members have been well and regularly maintained, and many communications of great interest have been made During the summer months various excursions were arranged and carried out; the occasions are of considerable value to those who take part in them, as they are opportunities for observing how different operators treat the same subject, and they admit of a comparison of the results. We subjoin a list of the places visited, and also of the papers, &c., communicated to the Society at its various meetings:—Paper, *Photography in an Age of Movement*, illustrated by an ingeniously contrived machine for exposing a flexible sensitive band rapidly, Mr. Friese Greene. Discourse, *Photomicrography*, Mr. W. Pumphrey (President). Lantern exhibition of photographic transparencies produced by members of the Society; eight contributors. Paper, *Stereo Photography*—this was well illustrated and comprehensive—Mr. George F. Powell. *Views on a Tour through the Channel Islands*, by Mr. W. Pumphrey (President). Lecture, *Photo-micrography*, with special apparatus designed by the lecturer, Mr. Philip Braham. Paper, *A Description of a new Machine for Printing and Illustrating a Paper by Photography alone at the rate of fifteen to eighteen thousand an hour*, Mr. Friese Greene. Demonstration, *The new Printing Process named Kallitype*, Mr. A. C. Bristow. Demonstration, *Enlarging by means of Hume's Cantilever Enlarging Apparatus*, Mr. W. Pumphrey (President). Demonstration of *Enlarging without Condensers*, Mr. W. Pumphrey. Lantern exhibition of photographic transparencies by members of the Society, including a competition for the award of the best set of six slides and of the best individual slide. Photographic objects of interest have also been introduced at the meetings by the President, Miss Ashley, Messrs. Appleby, Bristow, Dugdale, Hippisley, Friese Greene, Maton, Peacock, Perren, Rev. E. A. Purvis, Swift & Son, Talbot, Rudge, Wells, and the Secretary. Besides the foregoing, several contributed to the success of the *soirée* given by the Literary and Philosophical Association in November last.

The first outing of the season took place on April 24. The place chosen was Box and its immediate neighbourhood.

June 28.—The members visited Lacock Abbey by the invitation of Mr. C. H. Talbot. Rain fell steadily throughout the afternoon, rendering it difficult to secure many photographs. The party were generously provisioned *en route* by the Vice-President, Mr Austin J. King.

July 26.—The Society met at Prior Park by the invitation of Canon Williams, who most hospitably entertained the members during their visit.

August 21.—Norton St. Philip and Bradford-on-Avon were the scene of the Society's work. Despite the inclemency of the day, over a hundred good negatives were known to have been secured.

September 8 was the day appointed to visit the President and Mrs. Pumphrey at their residence, Lyncombe Vale, where a most enjoyable evening was spent. Those who were able attended a bye-excursion, under the leadership of Mr. Pumphrey, earlier in the day, to Claverton and Widcombe Manors.

September 25.—The eighth and last outing of the season. On this occasion river scenery was chosen in the district of Newton Bridge, Swinford, and Saltford.

Since our last reports the arrangements with the Royal Literary and Scientific Institution, which were then in progress, have been completed, and we have now, in addition to the dark room in the basement of the buildings, a convenient room for a library and for meetings of committees, &c., while our ordinary meetings are held in the large lecture room of the Institution.

Some addition has been made to the library of the Society, and now that we have a suitable place we should be glad to receive any contributions of books that may serve to illustrate either the history or the practice of the photographic art. Well-arranged photographs of Bath and its surroundings, a good series of the points of geological interest in the district, incidents in the progress of our city which would serve as mementoes in the time to come, would be of great value.

The present number of members is eighty-one. In the course of the year there have been seven resignations and twenty-one elections.

The Treasurer's statement shows that the Society is in a sound financial position, and we look forward to the coming season as likely to be in every respect as successful as those that have passed.

The CHAIRMAN stated that Bath would be visited next July by the Photographers' Convention, and he hoped the Society would extend them a hearty welcome. All present who could help should send in their names so as to form a local committee.

The forthcoming exhibition at the Crystal Palace was next referred to; also, that most deserving institution, the Benevolent Association. Election of officers for the ensuing year was next proceeded with, those who served during 1890 being unanimously re-elected.

Mr. A. F. PERREN drew attention to the Watkins exposure meter, describing it in detail.

Captain Harrisson (Cheltenham) showed some skating and other studies of winter work.

The Secretary showed a Samuel's patent hand camera for twelve quarter-plates, the policeman hand camera, Ballard's actinometer, and a time and instantaneous shutter.

Mr. H. G. P. WELLS then discoursed on *Lantern Slide Making*. Before entering on the main subject of lantern transparencies, it might be as well, he said, to briefly glance at the history of the optical lantern. That its origin dates far back was obvious, for Kircher in the fifteenth century describes a lantern, of which the fundamental principles were similar to those of the present instrument. Until the middle of the present century the optical lantern was used as an amusing toy for children, but with the development of science it became so much improved that people of mature growth delighted in witnessing the exhibition of its pictures. The transparencies first used were of the crudest kind, being mere daubs in transparent oil colour of comic subjects; but as the lantern became more popular the public exacted better work on the pictures shown, and artists of repute began the painting of slides, which were really works of art, but even in these there was a coarseness in the detail that compelled the slides to be of large size (some which were shown on the screen being 6 × 6) to attain anything like sharpness. Until the introduction of the limelight by Lieut. Drummond, oil had been the only illuminant, and enlargements of small diameter could only be shown, but with the new light fresh power was in the hands of the operator, and the piercing rays of the incandescent lime showed up the defects of the hand-painted slide. It was then that the introduction of the wet collodion process by Archer worked a revolution, and photography stepped in to the aid of the lanternist. By its aid reduced positives on glass were made from large negatives, which were full of detail and rendered the most charming enlargements, everything being sharp and keen. The size was then reduced and a smaller condenser used. A wet plate slide was here shown. The lecturer next dealt with the various processes for slide making, mentioning Barnard's litho transparencies, the Woodburytype, autotype, gelatine chloride, gelatine citro-chloride, and the gelatine bromide. He said that the introduction of dry plates had worked a reformation in the lantern, for now tourists can carry a small camera with them on their travels and reproduce on the screen the spots visited to the entertain-

ment and instruction of friends. Mr. Wells then practically demonstrated the making of slides by contact, and by reduction in the camera, the results, after developments, &c., being exhibited on the screen.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 26,—Mr. Paul Lange (President) occupied the chair.

The following were elected members:—Messrs. Robert W. Hill, James H. Wood, T. F. Lloyd, Thomas Cook, William Cook, J. Bardsley, Joseph Robinson, and Mrs. Marriott. Mr. Sinclair was elected an honorary member of the Association.

Mr. CADE (Messrs. Marion & Co.'s representative) exhibited and explained their new hand camera, "The Radial."

The evening concluded with a paper and demonstration on *Eikonogen* versus *Pyro*, by Dr. JUMEAUX, of the Manchester Amateur Photographic Society.

MANCHESTER PHOTOGRAPHIC SOCIETY.

LANTERN SECTION.

FEBRUARY 25.—A series of slides of the scenery and life of the South African colonies were exhibited. Mr. H. M. WHITEFIELD explained to those present, many being visitors, that the pictures to be shown were sent over from South Africa by Mr. Fuller, of King William's Town, on loan, in exchange for a set to be lent by the Society; and he was pleased to say that the members had responded very well to the request for slides to form the set. He then introduced Mr. J. Wood, who read the descriptive lecture sent with the African slides. The audience were entertained for an hour and a half by the hundred pictures and highly interesting descriptions of the principal frontier towns and surrounding scenery of Cape Colouy, together with photographs of the natives and incidents in life at the Colony. A number of friends who had visited the parts depicted contributed particulars, and expressed their enjoyment of the lecture.

It was the wish of the meeting that thanks be tendered to Mr. Fuller for the opportunity he had accorded his English friends by seuding over the slides for exhibition.

The evening concluded with a set of commercial slides of various subjects, selected by Mr. M. W. Thompstone.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

FEBRUARY 26.—Ordinary meeting.—This was the first of a series of meetings to be held in the Midland Institute. There were seventy-nine members present. Mr. Alexander Tucker, C.E., in the chair.

Mr. G. A. THOMASON replied to a question as to ceramic euamels, and said he believed the manufacture was extinct in this country.

Mr. H. M. SMITH (Eastman Company) said no doubt Mr. A. L. Henderson, of London, having made them for years, could give some information on the subject.

Mr. A. J. LEESON then gave a paper on *Photographic Shutters* [see p. 148]. He remarked that the object of the paper was to bring before the members some of the different shutters at present in the market, with explanations of their mode of working. Many of them he had tested—in conjunction with Mr. Jerome Harrison—by means of Underwood's new shutter-testing chronograph. The following are the speeds of some which were tested:—Marion's (Bain's patent) "Crown" shutter registered a speed of one hundred and fiftieth of a second; "Caldwell," one hundredth of a second; Kershaw's (three and one-tenth of an inch aperture), one seventy-fifth of a second; Underwood's Instantolux, one sixty-sixth of a second; Shew's Eclipse (and their Mattioli Eclipse), one-sixtieth of a second; Thornton-Pickard, one-sixtieth of a second; Thornton-Pickard (double blind, two and a half inch aperture), one thirty-eighth of a second; Voigtlander's "Sector," one fifty-fifth of a second; Sands & Hunter, one thirty-eighth of a second. Other shutters were exhibited made by Messrs. Wratten & Wainwright, Wray, Marion & Co., Thornton & Pickard (including their new Fan-break), Shew & Co., Tylar, Place, Underwood, &c., and also the "Guerry Flap," Wollaston's "Diaphragmatic," Newman's, the new "Kodak," &c.

The CHAIRMAN anuounced that the large number of shutters which were on the table would be on view after the discussion instead of handing them round the room during the paper.

Mr. W. JEROME HARRISON then gave a short paper on *Instantaneous Photography*. He said that Goddard first made instantaneous photography possible in 1841 by his discovery of the extreme sensitiveuess to light of silver bromide. Five things were necessary to secure an instantaneous picture, viz., a good light, suitable shutters, lens, plate, and camera. The time of the year when instantaneous work could be best practised was from March to September, and the time of day between ten o'clock and three o'clock. Speaking of shutters, he said most of his successes had been achieved by means of the "Grimstone." Mr. Harrison exhibited the new double hand camera by the Stereoscopic Company, and took several flash-light pictures of the audience by means of Hibbert's repeating flash lamp.

EDINBURGH PHOTOGRAPHIC SOCIETY.

FEBRUARY 26.—Mr. G. G. Mitchell presided.

This was a popular evening, and the works exhibited were entirely those by members, who numbered about twenty, and the pictures exhibited amounted to about one hundred and twenty. From the rather inarticulate tones in which Mr. T. Barclay (Secretary) spoke, it was difficult to make out the names of all of the exhibitors, but familiarity with the style and subjects of several of them, and more especially as prints from the same, or similar negatives, in the recent exhibition, were sufficient to point out the works of several of the medallists there, such as W. Mitchell, J. G. Paterson, J. C. H. Balmain, as well as other prominent exhibiting members, such as Dr. Stewart, J. Patrick, James Crighton, and others. Many of the medalled works appeared to greater perfection when enlarged upon the screen than when seen as small prints.

A very effective series of views of the late exhibition were those of Mr. Alexander Inglis, which embraced views from all the salient points of the interior. They were much admired and deservedly cheered. Among the very few figure subjects those of Mr. Brebner may be quoted, although they were not all that could be desired in point of tone, being rather cold; they were otherwise good. It is a pity a greater number of figure subjects were not attempted now that we have so many chances of them, as well of accidental as of studied groups. It might be well in an exhibition such as this of members' work, and in an audience of them and their friends, that the lecturer, by pointiug out the beauties of composition and other qualities of artistic excellence, should make these meetings valuable in an educational point as well as what they are.

The lantern was under the charge of Mr. J. M. Turnbull, and was well managed.

A party, under the leadership of Mr. D. Macarthur of the Western Choral Society, discoursed sweet music, such as solos and part-songs, several of which were encored. The attendance was a very large one.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.

THIS recently formed but active body held its third popular exhibition of slide-work of the members in Junction-street Hall on the evening of Tuesday, February 24, and before noticing the pictures it should be noted that the late Secretary, Mr. A. D. Guthrie, has been succeeded by Mr. Alexander Pitkethly, 8, Wilkie-place, Leith, the 1891 ALMANAC giving the name of the former. It already numbers over forty members, who claim to be entirely amateurs.

On this occasion the chair was occupied by Mr. William Dougall (President), and the large hall was well filled. In his opening remarks he gave a short sketch of the rise and progress of the Association, and, in emphasising the desire of the body to increase its membership, stated it was open to ladies, of whom they already had two as members. He trusted their efforts that evening to please would be successful, and so might be the means of inducing both young men and maidens fair to join the Association.

The lantern was managed by Mr. A. D. Guthrie and the pictures described by Mr. R. Hunter.

When it is mentioned that about two hundred slides were shown, and several songs were sung, it will be seen that the programme was much extended—perhaps too much.

While many of the slides were passably good and several very fine, the majority showed that in this rather difficult department of photographic manipulation sufficient study has not been given to their production. The opening slide, by Mr. W. M. Smith, was from a prettily designed drawing giving the name of the Association and the objects of the meeting.

Without wishing to particularise any special member's work, it might be well for those who have exhibited and who may wish to do so in future to give close attention to the exhibit of one member, comprising the last twenty or so which were shown. They were all—in their departments of animals, figure subjects, vessels in full sail and motion, and landscape with figures—just what perfect slides should be, none of them being taken from negatives unsuited for the class of work, and all showing the great care with which each had been treated. These observations are made with the view of making such meetings photographically educational as well as entertaining, and apply specially to amateur societies.

Correspondence.

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

DURATION OF DROP-SHUTTER EXPOSURE.

To the EDITOR.

SIR,—As a few weeks ago a somewhat complicated mathematical problem was answered in your columns, I feel encouraged to ask if any of your readers will have the goodness to give me the duration of an exposure made under the following conditions:—Aperture in diaphragm, ·4 of an inch; square aperture in drop shutter, 1·7 inch; fall of shutter before commencement of exposure (that is, distance from bottom edge of shutter aperture at rest to top edge of diaphragm aperture), ·75 of an inch; motive power, unassisted gravity.—I am, yours, &c.,

Halifax, March 3, 1891. EDWARD J. SMITH.

DETAINING SPECIMENS.

To the EDITOR.

SIR,—In supplementing the letter published in last week's JOURNAL on the subject of *Detaining Specimens*, perhaps you will allow me to make a few remarks upon the peculiar method in vogue with photographers when engaging their assistants.

In what other trade or profession can one point to a demand on the part of the employer for "specimen of the applicant's own work," the only authentication of the fact seeming to be the fact that he has them in his possession? The system of "specimens required" makes it necessary for an assistant to be constantly on the look out for copies of the best results of his work, and also of, in many cases, having to surreptitiously appropriate the same, besides the continual temptation to occasionally include pictures not, or only partly, his own production. Very few employers care to allow *carte blanche* in the matter of having a print from any negative the assistant may have produced which he may think likely to prove useful.

Supposing an assistant by fair means to have made a reasonably complete collection of specimens, and to be on the look out for a situation, his first step is to examine the situations vacant, and perhaps advertise himself. As a result, he may have six or eight employers to whom he

may feel desirous of writing fuller particulars, each with their demand for specimens. How is he to decide to which he is to send his perhaps limited collection?

Added to this comes very often the chagrin at losing the *use* of the greater part of them for many days, and sometimes weeks, and thereby losing an engagement through not having them to his hand for an employer who advertises for an assistant at once. I say nothing of the occasional total loss of them through neglect or wilful appropriation.

Surely a fairer and more reasonable method can easily be devised, and I would suggest that you, sir, lend your aid to have this vexed question once and for all settled.

Supposing that in his letter of application the candidate should be required to state, (*a*), short particulars of former engagements; (*b*), reference and copies of any testimonials; (*c*), photograph of self and age. Can any reasonable employer, who is a man of business, expect any more?

The last point I have to urge is that in all cases a week's trial should be given and required, with option on the part of the employer of immediately retaining or dispensing with the candidate's services at the termination of the first week, at the end of which time the employer should be easily able to gauge the capabilities of the candidate.

I have heard photographers express the opinion, and myself thoroughly believe it from previous experience, that one can judge in half an hour whether a man is capable by the way he handles his work. Certain it is that with the present cumbersome system of specimens it is quite an ordinary thing for the carefully selected operator or retoucher to turn out a regular duffer, and the first-class printer, who is "accustomed to manage the printing department," a man who has only made vignettes, or sensitised paper, perhaps. These dishonest assistants only keep deserving men out of place whilst being tried and whilst their notice is being worked out, to say nothing of the loss of temper and money and delay to the employer, who relies on the specimens received. I trust this will evoke further correspondence.—I am, yours, &c., EMPLOYER.

THE PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—In Mr. A. Field's short reference to my last letter concerning the above, he says he hates to be misrepresented. If he referred to myself it would have been more satisfactory had he mentioned in what way or manner I had done so. For myself, I might remind Mr. Field that I did not say that the Union was going to try to paralyse the photographic profession; I simply asked whether the strike of a hundred printers would be likely to have that effect. Mr. Field says, "We simply reserve the right of working where good terms are forthcoming." Exactly so; the very plan I have adopted all along. If I want 3*l*. weekly I only engage with the employer who will give that sum; and so acts every other assistant, I should imagine. I still maintain that a Union of some 400 assistants, comprising, as it is intended, such a variety as operators, retouchers, printers, reception-room ladies, photo-process workers, in their various lines—I consider such a Union of such a number is absurd; leastways, I think so, and many of my brother assistants will, I believe, agree with me. Mr. Field does not seem to take criticism kindly; but surely he must admit the right of every photographic assistant to judge of the merits of a society that has been established for his supposed benefit, and I consider also that I have a perfect right to look at it in a monetary or business point of view. If I am going to pay eightpence per week I want to feel that I am going to receive market value for that eightpence; and with only ten per cent. going towards the fund that would be likely to prove the most useful and be most desired, namely, the out of employ benefit, while the remaining ninety per cent. going for something that the majority of assistants will never require—well, I can't see that the eightpence would be a very sensible weekly investment.

Now concerning the other advantages. Will Mr. Field kindly inform us what he considers is the average per hundred of photographic assistants who require legal assistance in connexion with their employment, say, over a period of ten years' service; also, how many in a hundred ever have any form of written agreement with their employers; and also what proportion are unfortunate enough to have their specimens unreturned (a real grievance, by the way, whenever it occurs)? Now if there are only a small minority of assistants who would require the aid of the Union on these matters, why should nearly the whole of the funds go for their benefit?

Now as regards influencing the salaries. What possible effect can Mr. Field think that the combination of a paltry sixty or seventy of either operators, retouchers, or printers, will or can have in that direction? If the operators, retouchers, or printers, are only worth 30*s*., 25*s*., and 20*s*., respectively, they may combine till the crack of doom before they will ever get employers to pay them more than they are worth, when it will be so easy to fill their places.

Mr. Field says in the JOURNAL of February 6 that "we shall simply, wherever fair terms are constantly evaded, withdraw our members from such establishments and secure them work elsewhere." A large order, truly! But perhaps Mr. Field will kindly explain how it will come about that the members of the Union will be found working for those establishments "where fair terms are constantly evaded." I thought that was one of the things that the members were not going to do I might remind Mr. Field that. I am still waiting for a reply to some of my other objections to some of the aims of the Union. I might tell Mr. Field that I *have* chosen my benefit society, and I will let him and my brother assistants know what benefits I am entitled to for 1*s*. 0½*d*. per week. (I did not join till I was twenty-six.) I should get during illness free medicine and doctor, and 20*s*. per week for first twelve months, and 10*s*. per week for remainder of illness, however long, and 27*l*. 10*s*. will be paid at my death. Now I think that will compare very favourably with the eightpennyworth of the Union. Good name *Union*, which reckons on numbering nearly "*four hundred members in five years*." Prodigious!—I am, yours, &c.,

Manchester. A. J. E.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the EDITOR.

SIR,—Will you kindly allow the Committee to thank, through the medium of your pages, all those ladies and gentlemen who so kindly gave their services, vocal and instrumental, at the very successful entertainment on Tuesday, the 3rd March? With reference to the demonstrations on colour, polarisation, and the lantern microscope (which were alluded to in an announcement during the evening), they will be given on Thursday evenings, in April, by Messrs. Debenham, Haddon, Briginshaw, and Freshwater. All interested are invited to attend.—I am, yours, &c.,

THE HON. SECRETARY, L. & P. P. A.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—

Arthur Cox, Seacombe.—*The Waterloo coursing.*

ROW.—Write to Friese Greene.

OBAN.—Probably the mounts have caused it.

A. S.—Stephen's stains for wood will answer well for your requirement.

1. 3. 5.—Better write direct to Sir Howard Grubb. His address is Rathmines, Dublin.

J. W. WEBSTER.—Either Burton's or Wilkinson's works are the best published in English.

C. B.—Procure a condenser a little larger than the diagonal of the plate that is to be enlarged from.

SIGNALLER.—We are not acquainted with No. 3 on your list, but Nos. 1 and 2 possess features very much in common.

DURHAM.—Why not coat the parchment paper yourself, and use the contrivances you have at hand, as suggested?

WET COLLODION.—All information that has been published appeared in our back volumes. All workers in block processes keep their method as a trade secret.

G. R. J.—We cannot enter the name on the "black list" unless you authenticate your communication with your full name and address, though not necessary for publication.

BLACK LIST.—A. E. (Stratford-on-Avon) writes that in December last he sent some specimens to a firm in Limerick, and cannot, after repeated writing, obtain their return. The name of the firm has been put upon the register.

THOMAS B.—The formula for orthochromatising plates, by Drs. Mallmann and Scolik, on page 745 of the current ALMANAC, is an excellent one in practice. We believe it is largely used by those who prepare their own plates for colour work.

PATENT.—Almost any process can be used for producing transparencies on such mediums as talc, celluloid, &c. But if your friend is "positive that he knows better than all the journals in the world," why does he not act upon his own opinion?

TIMOTHY.—You do not say anything about the aspect of the study, or whether you have direct sunlight to deal with. If you have, thick dark blue or green blinds will be the best; if not, white or unbleached calico will do. Any pale colour will do for the side walls.

R. C. WARNER complains that his Mackintosh focussing cloth has a tendency to stick in the folds if left folded up for any length of time, and wishes for a remedy. The best remedy is to apply French chalk liberally on the rubber side before folding. This, unless the rubber is very bad, will prove a remedy.

SAWBONES.—For pathological subjects a decided advantage will be gained by using orthochromatised plates and a colour screen. In many cases plates specially sensitised for the red rays (with cyanine, for example) will be advantageous. On the other points alluded to, you cannot do better than follow your present system of working.

W. C. R.—We think you have parted with your money rather hastily. It looks very like a swindle. If you have not received the apparatus by the time you see this, communicate at once with the Superintendent of Police of the district in which the man resides. Merely address "The Superintendent of Police" of the district; that will be sufficient.

PLUMBUM writes as follows: "Some years back you published an excellent formula for intensifying negatives which was composed of a solution of lead. Might I ask if you would kindly say in your 'Answers to Correspondents' its composition?"—We do not know the particular formula referred to. But the following answers well for dry plates: Nitrate of lead, half an ounce; ferricyanide of potassium, three-quarters of an ounce; water, one and a quarter pints; glacial acetic acid, two and a half ounces.

C. W. BENNETT says: "I wish to make an article of pure rubber in a certain form. Can you tell me how to make a thick solution, so that by pouring in a mould it shall assume the desired shape, and afterwards set to its original consistency? Also where I can obtain about half a hundredweight or so of virgin caoutchouc."—Obtain masticated rubber and dissolve it in benzole, making the solution as thick as possible. Masticated rubber may be obtained from Hancock's, Goswell-road, or Mackintosh's, St. Bride's-street. Masticated rubber is pure and more soluble than unprepared rubber.

IMPROVER writes: "I have an oxalate of potash bath for developing platinum prints which I keep in a large bottle in a dark place. I have used it a good many times, and lately, when it gets cold in the bottle, it crystallises to the extent of two or three inches at the bottom. Is it necessary to dissolve the crystals each time I use the bath? Also, should I add a little carbonate of soda to the bath occasionally to keep it alkaline?"—1. The cause of the crystallisation is that by continual heating the water has evaporated, and so rendered the solution super-saturated when cold. A little water should be added when the solution is hot.—2. Not necessary, so long as the bath works well.

J. J. G. W. writes:—"With reference to the *Easy Means of Imparting to Ordinary Gelatino-bromide or Silver Plates Orthochromatic Qualities*, in your current ALMANAC, on page 670,—1. Could you tell me if the stock solution is sensitive to light in its liquid state?—2. Also, will it deteriorate if kept in stoppered bottles?—3. Also, would the bath after using serve again, that is, could it be returned to the stock solution, or should it be thrown away after the plates have been immersed?"—1. The solution had better be kept in the dark room.—2. It will keep for some time with care.—3. Make a fresh bath from the stock solution when the plates are to be treated.

O. P. Q.—All workers of photo-mechanical processes treat the details of the methods they employ as trade secrets, and these you must not expect to obtain by purchasing a treatise on photo-mechanical printing. Such a work will, of course, give an insight, but the details will have to be worked out. After all, the great secret is the experience and skill of the worker, rather than in the process itself. In one firm we know, the same workman has been engaged for many years in doing nothing else than transferring "photographic transfers" to stone in photo-lithography. Here is one of the secrets of success with this firm.

CHAS. HAWKINS writes: "I should be greatly obliged if you will kindly give me particulars regarding the silver washing of prints. 1. Is it worth saving more than the first washing?—2. As I have no means of saving much, how can the silver be thrown down, and will it hurt to see the light?—3. And what is the best market to dispose of it?"—In reply: 1. Yes, if many prints are washed in it. The second and—when many prints are treated at a time—the third are generally saved.—2. Precipitate the silver with common salt, or, better still, with commercial hydrochloric acid (spirit of salt). Light will not hurt, but rather facilitate, the subsidence of the chloride.—3. Send the residue to a respectable refiner for reduction, and he will return the value of the metal recovered.

A. CORNWELL says he has just opened his camera, which has been stowed away during the winter, and he finds it and the slides quite unworkable, although the room in which they were stored is by no means damp—indeed, it is considered a dry room. He wishes to know the best method of procedure. Clearly the apparatus was made of badly seasoned wood, or it would not have behaved in the way indicated. The best way to deal with it now will be to leave it exposed for a week or two in a dry room where a fire is burning daily, though on no account must it be exposed to any heat, or the wood will warp and render the shutters, &c., unworkable. With patience, and the treatment suggested, the things may again become usable.

AMATEUR (Annan) puts these queries: "1. Would *proto-sulphate* of iron answer for developing enlargements on bromide paper (Ilford) instead of *sulphate* of iron, as I have a large quantity on hand, which I would like to use up?—2. Could you give a formula for developing Ilford plates in which I could use the dry pyro as wanted, as I find the stock solution recommended by the Company gets much deteriorated before I get it used?—3. Could you recommend me to a good half-plate portrait lens at a moderate price?"—1. They are one and the same thing.—2. Use the same formula, but add the proportion of dry pyrogallic that would be contained in the solution.—3. We do not recommend any particular makers; it is against our rule. Consult the advertisement columns.

H. R. PROCTER says: "I am likely within a week or two to have to pay a hurried visit to Germany and Austria, and have thought of taking a small hand camera and a few dozen lantern-size plates. Could you kindly inform me through your 'Answers to Correspondents' if there are any restrictions in either of these countries on the use of hand cameras, and if I am likely to have any trouble with the Customs as regards the plates, which will have to be opened and repacked to receive paper backing, or if there is any precaution I can take to avoid it?"—So far as we are aware there are no restrictions except on the frontiers—particularly on the Franco-German ones, and in the neighbourhood of forts. See sub-leader in another column. There will be no difficulty with the Customs if the boxes are properly labelled, and their contents explained to the officials.

C. RAYNOR.—We know nothing more of the alleged "discovery of photography in natural colours" than has been published. If you think the process be, as you consider, practicable in the way stated in your letter, by all means put it in practice, and let us know the result. No one knows how much, or how little, he can accomplish until he tries.

H. A. puts the following queries: 1. Could you inform me the cause of the spots on enclosed photograph? The photograph has been finished about six months, and the spots have recently appeared. (Ready sensitised paper).—2. Is home-prepared paper considered better than ready-sensitised paper as regards its keeping qualities? I mean, of course, from fading.—3. Is fuming the paper liable to cause the photograph to fade sooner than otherwise?—4. What is the best system of fuming the paper?"—In reply: 1. Impossible to say. They may be due to the manipulations in making the print, the mountant, or the mounts, or the whole combined.—2. Opinions differ on this point.—3. No.—4. Hang the sheets of paper a little distance apart in a box, and place a dish of liquor ammonia at the bottom. Close the box and allow to remain for about fifteen minutes.

ROBERT BRUCE says: "I will feel obliged if you will enlighten me with regard to the following:—A party brings to me a number of photographs of notabilities, say, politicians, clergy, or anything else, and asks me to copy this group of photographs all together, making one large picture of the lot. Now some of these photographs have 'copyright' printed underneath, and I want to know if in selling this combination reproduction I become liable in any way, and if the Copyright law is infringed upon in a case like this. Another thing: it is possible that photographs may not have been registered, although the mounts bear the printed word 'copyright.' You might kindly advise me how I should act in this matter."—If any of the photographs are copyright our correspondent will render himself liable to a penalty. It is quite possible that photographs bearing the word "copyright" are not registered, and we know many are not, and this is an infringement of the law. The only way of ascertaining the fact is by searching the register at Stationers' Hall.

P. R. O. writes:—"Having read the articles in your JOURNAL *re Printing in Coloured Inks*, will you kindly inform me if I am prevented by any rights from working this process commercially unless I purchase the "autocopyist," which consists of a box containing eighteen articles, fifteen of which I have on the premises, and none of which, excepting, perhaps, the varnish, have any claim to patent rights. The price of a set is simply outrageous, reminding one of a 'glass-paper-the-back' affair. I notice, too, that the copying press in the engraving does not enter the list. Does the use of one's own incur 'rigorous proceedings,' or necessitate a second outlay at the same rate?"—So far as we know, there is no patent for printing collotypes from parchment paper, nor do we see that any such could be taken. If we mistake not, Mr. Bolas described this method of working many years ago. Possibly the autocopyist apparatus for copying letters may be patented, but it is obvious that several of the means used by artists and others for stretching paper will answer as well; so will all the rollers, inks, &c., in general use, as well as any copying press.

E. W. asks: "How are the colours used by the first-class slide painters made or prepared? There have been many replies on lantern slide painting, but all recommend the colours—water or oil—as ordinarily sold. These, however, although producing good results, do not come anywhere near the professional style. A professional told me that it was very little use for an amateur, however skilful, to try and get these results, as the colours were specially made, and the secret kept as much as possible. If any one doubts this, let them try to get a deeply dabbed and clear, say, pink or yellow."—Without being able to say how *all* first-class painters prepare their colours, we know that some employ the ordinary oil colours sold in collapsible tubes, taking care, however, to select only those that are transparent, such as Prussian blue, Italian pink, gamboge, burnt sienna, crimson lake, and others possessing similar characteristics. But it is of importance that a good "medium" be mixed with them in order to impart brillancy. Of these, megilp, mastic varnish, and "Robinson's medium" are most suitable. If any correspondent can impart further information, we shall be glad to publish it.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—March 12, lantern night; March 19, demonstration on *Gelatino-Chloride Paper*, Mr. J. Howson. March 26, *High Speed Shutters*, Mr. A. S. Newman.

THE Birmingham Photographic Company, *apropos* of the report of Mr. Lewis's kallitype demonstration at Bristol, call our attention to a slight error on the fifteenth line. Instead of "the detail of the *clearest* parts of the negative should be *first* indicated," should read "the detail of the *densest* parts of the negative should be *slightly* indicated."

MR. W. ENGLAND directs our attention to an omission in our report of the technical meeting of the Society of Great Britain in which no mention is made of a portable tent for developing dry plates he there exhibited.

PHOTOGRAPHIC CLUB.—Subject for discussion, March 11, *Printing on Rough Surfaced Papers:* March 18, *Estimating the Speed of Shutters.*

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THE INTERNATIONAL EXHIBITION IN LIVERPOOL.

RANTING, as we ungrudgingly do, that the exhibition now pen in Liverpool is one of the best that has yet taken lace, undoubtedly the very best of any that we have een, there are certain things which have conduced to render so.

First of all, the Walker Art Galleries, in which it is held, ntain several noble rooms *en suite*, well lighted, and admirably lapted for displaying pictures to perfection. Then, again, the hibition is not annual but triennial; and this shows wisdom the part of the executive, for a too frequent repetition of en such a good thing as a display of photographs is apt to gender, if not apathy, at least a sense of satiety and in-fference nearly akin to it. But perhaps one of the leading ctors which have conduced so greatly to the unmistakable ccess of this exhibition is the undoubted zeal, energy, and ecutive ability displayed in its organization and management. what extent Mr. Paul Lange, the President of the Liverpool sociation; Mr. Thomas S. Mayne, the Exhibition Secretary; r. Tompkinson, Vice-President, the hanger of the pictures; d others of their co-labourers, have sacrificed their time d comfort in connexion with the exhibition we can only rmise, but it must have been done to a considerable cent. Taken all in all, enterprise and enthusiasm have en manifested in a manner and to an extent worthy of h admiration.

The judges had completed their work previous to the formal ening of the exhibition, which took place at a *conversazione* on day evening. Several invited guests, including the judges, sidents of photographic societies, editors and representatives the journals devoted to the art, had been previously enter-ned at dinner by the Liverpool Society. The *conversazione* s crowded, and an orchestral band played during its con-uance in one of the many galleries in the building. A porary platform having been erected in the principal llery, Mr. Paul Lange in a happy manner introduced several akers, all of whom had the good sense to give in a condensed n sentiments which might have been fittingly expanded to a nsiderable length.

s this is a somewhat dull season of the year, especially as rds professional photography, we would urge on those of our readers who can make it convenient to do so to "run n" as far as Liverpool and study this choice and large ection of photographs, feeling assured that "as iron sharp-eth iron," so will the inspection of the works there exhibited mulate to increased endeavour.

ome notes on the exhibition will be found in another pe.

ENLARGED NEGATIVES FROM INFERIOR ORIGINALS

An article in last week's issue by a contributor, on the subject of copying and enlarging (see page 149), is one that many, perhaps, have read with some degree of surprise, inasmuch as the writer advocates enlarging from a paper print in preference to working from the original negative by the aid of a transparency. This is certainly contrary to the general opinion of most workers. Hitherto it has been considered that far better results are obtainable by working from the original negative, however good or inferior that may be, than from any paper print therefrom, however excellent it might be. As hand cameras are just now so much the rage, and as so many of the negatives taken with them leave much to be desired in regard to quality, further, as enlargement negatives are frequently required, it may be well to make a few comments on the subject.

Our contributor says, "It is not every negative that will yield a good transparency suitable for reproducing other negatives, but it must be a very poor negative that will not yield a passable silver print, and in a passable silver print we have all that is necessary for the purpose." Now it is, we think, within the experience of most practical photographers that many negatives—we are now alluding more particularly to those taken with hand cameras—are of such a character that it is impossible to obtain anything like presentable prints from them. They may be so thin and feeble that the best prints obtainable, when toned and finished, are only poor, flat, grey, and mealy things, and of about the worst kind of photograph for copying. Or, on the other hand, the negatives may be of the hard or "soot-and-whitewash" type, so that the prints yielded, if they are printed deep enough to obtain detail in the lights, have the shadows but little better than opaque black masses without any gradation whatever. If such negatives were printed for the shadows, then the lights are left white and chalky. Yet we know that not only passable, but really very good lantern slides are daily produced from negatives of each class; and if good transparencies can be obtained for the lantern, why not others for enlarging from?

Let us in the first instance, however, consider the characteristics required in the enlarged negative. Is it desirable that it should give prints resembling those from sharp negatives taken direct in the camera? or should they be of the "fuzzy" order advocated by some just now? We rather gather that it is this class of work that the writer of the article advocates, inasmuch as he says that if the enlarged negative be focussed very sharply there may be an excess of "hardness," and when the degree of amplification is considerable, excessive sharpness should be avoided. In the last paragraph, again, it is mentioned that these enlarged negatives "seldom give good silver

prints, but, fortunately, in carbon, bromide, and platinotype, we have all we require, and any coarseness in the negative will disappear in the bromide or platinum print." If our surmise be correct, then the system advocated by our contributor is, perhaps, on the whole, the best, and least troublesome. It is easier and requires less skill to make an albumenised paper print than a good transparency. Furthermore, the particular kind of fuzziness sometimes wanted can be more easily obtained when working from a paper print than from a glass transparency. Hence it will be seen that the system advocated, for a certain class of work, possesses some advantages.

If, on the other hand, impressions from the enlarged negatives are required to resemble those made from negatives taken direct, then a far better result will be secured by working from the original negative, however inferior that may be, by the aid of a transparency. Indeed, by this system of working it is quite possible to obtain enlarged negatives of infinitely better quality than the small originals, and, what is more, it is done daily.

Suppose, for example, the original negative is excessively thin and weak, as many amateurs' instantaneons pictures often are, and quite useless for either silver or platinum printing, this may be easily remedied in the reproduction. In the development of the transparency, if a minimum of exposure is given, the contrasts can be very considerably increased, and, if necessary, still further augmented by intensification. Then, again, in making the enlarged or reproduced negative the same course may be pursued if required. Hence, from a negative so feeble that it is useless for printing on albumen or platinotype paper, it is quite easy to obtain an enlarged one possessing almost any degree of vigour.

Next, supposing the negative be the reverse of that just referred to, namely, of the "soot-and-whitewash" type, the opposite method of treatment is adopted. A full exposure is given and density kept back in the development of the transparency, and, if necessary, also in the development of the enlarged negative. By this means soft and harmonious enlarged, or reproduced, negatives may be obtained from the hardest and crudest of originals. No such scope for improving an inferior original exists when a paper print has to be dealt with.

It is scarcely necessary to mention that the transparency required for reproducing from must be of a different type from a lantern slide. It must be considerably more exposed, so that it shows no bare parts when laid on white paper except just at the *extreme* high lights.

Some further extracts from letters by Professor Victor Schumann to the editor of the *Chemical News*, bearing upon the photo-chemical researches of the former, are published in that journal, and as they contain matter specially interesting to experimenters in emulsion, we give the following copious extract from them :—

"H. W. Vogel, in opposition to Abney, maintains that there exist two modifications of AgBr photographically distinct. One of them, if previously dried, and if it had been precipitated in alcohol, cannot be suspended in gelatine. The other, it is alleged, which has been precipitated from watery solutions, can, on the contrary, not be diffused in collodion. Extended experiments have convinced me that no such difference exists. It may easily happen that the phenomenon observed by Herr Vogel is manifested, especially if too high a temperature has been used in drying the precipitate. AgBr always becomes incapable of suspension if dried in hot air. This is the case whether it has been precipitated from alcohol or from water. If one precipitate has been treated at a much higher temperature than another, the phenomenon reported by Herr Vogel may easily have been manifested.

"This, in fact, happened to me in the outset of my experiments on this subject, but on going to work more cautiously, and drying both precipitates quite equally, at the respective temperatures of 15°, 80°, and 160°, I arrived at opposite results.

"At 15°, the aqueous and the alcoholic AgBr were found capable of suspension in collodion and in gelatine. At 60°, the capability of suspension of both is much reduced, and at 160° I attempted in vain to emulsify AgBr. I cannot, therefore, admit the statements of Vogel, the less as, on the other hand, his allegation that gelatine is only a feeble sensitiser in my recent series of experiments encounters still stronger contradictions. I shall, at an early date, demonstrate that gelatine is absolutely a powerful sensitiser.

"I have, likewise, been unable to detect a spectral difference of the two precipitates when they are suspended in gelatine. In all proofs there appeared the same spectrum which the ordinary silver bromide gelatines display. The slight displacements which occur in my spectrograms are solely due to atmospheric fluctuations. I have not yet succeeded in a simultaneous and contiguous illumination of both emulsions, and it might hence be inferred that the photographic action of the sunlight in my proofs had varied exceptionally, and thus occasioned the difference from the observations of Herr Vogel. But however justifiable such an argument might seem, its validity is at once enfeebled by the circumstance that the spectral proofs from both emulsions were taken in rapid succession. Hence so considerable a displacement as Vogel calls is exceedingly improbable. On the other hand, it is not conceivable that my instrument can have occasioned the discrepancy. I have, in these operations, used only the most accurate and sensitive spectrographic apparatus which my cabinet includes."

Those deficient in experience in wood-working, who wish to make small pieces of apparatus without the intervention of an expert workman, often find with surprise that even the smallest piece of wood joinery is beyond their power. Above all does the handsaw seem to mock their efforts at guidance in a particular direction. Mr. Bruce Warren, however, has invented a new method of sawing by what he terms "an electrical handsaw." By means of a simple contrivance he sends a continuous electrical current through a piece of platinum or platinised iron wire, and uses the heat generated instead of a to-and fro motion for cutting purposes. "It will be found," he states, "to cleave the hardest wood with great facility, insomuch that a large number of useful appliances may be thus manufactured in a short space of time." The apparatus is made of two upright pieces of very stout brass or copper wire, connected at the lower extremities by a non-conducting medium, while across the top is secured a piece of moderately thick platinum wire. The apparatus is then connected up with four Bunsen batteries, and is ready for use. On account of the breakages arising from the use of thin platinum wire, Mr. Warren uses iron wire, coated with that metal by placing the wire in an ethereal solution of platinic chloride, and passing through it an electrical current.

At the Chemical Society's Jubilee, recently held, a variety of objects connected with the early history of chemistry, including the actual instruments employed by some of the most celebrated investigators, among them photography was not unrepresented. Mr. Crookes, whom our readers may remember was one of our honoured predecessors in the editorial chair, exhibited a photograph of the solar spectrum taken by Dr. Draper, given by him to Sir John Herschel. There were also exhibited, in memoriam of Sir John Herschel, first known photographs on glass taken on precipitated silver chloride by Sir J. Herschel (Slough, 1839). "Having precipitated muriate of silver in a very delicately divided state from water very slightly muriated, it was allowed to settle on a glass plate; after forty-eight hours it had formed a film thin enough to bear drawing off the water very slowly by a syphon and drying. Having dried it it found that it was very little affected by light; but by washing with weak nitrate of silver and drying, it became highly sensible. In this state I took a camera picture of the telescope on it. Hyposulphite of soda then poured cautiously down washes away the muriate of silver and leaves a beautiful delicate film of silver representing the picture. If, then, the other side of the glass be smoked and black varnished the effect is much resembling Daguerreotype, being dark on white in nature, and also right and left as in nature, and as if on polished silver."—(Sir J. Herschel: *MS. Journal of Chemical Experiments*. (Exhibited by Professor A. S. Herschel). Frame of early specime

of the cyanotype and other photographic processes. (Exhibited by the Science and Art Department, South Kensington.)

A FEW weeks ago we gave an account of Professor Minchin's remarkable experiments in connexion with light electricity, as given in a paper read at the Physical Society. The experiments were actually shown at a later meeting, and an interesting discussion took place. Professor Burton pointed out that in these batteries the E.M.F. may generate a current, and therefore energy, and the important question seemed to be, Where does this energy come from? Is it a chemical change, precipitated by the action of light? or does a direct conversion of light into electrical energy occur? Professor Minchin, in his reply, replied affirmatively; he thought his cells really transformed the incident energy. If this really be the true explanation, it undoubtedly marks a new departure in physics.

THE President of the Royal Society, Sir William Thomson, D.C.L., LL.D., does not disdain to bend his mind to so simple (apparently) a thing as a water-tap, which yet, even in its commonest form, when examined closely, is seen to be an ingenious piece of mechanism—the one piece of mechanism, indeed, which is handled by almost every civilised being. Photographers have an exceptional experience of its use, and too frequently suffer from the evil effects of a leaky tap. Sir William Thomson, however, has designed one that cannot get out of order, and which never requires repairing. These taps have been in use over a year in various parts of the country, and are stated to be a perfect and complete success. There are no perishable parts. The particular portion that does wear is actually improved thereby.

HAND CAMERAS AND THEIR FITTINGS.

IT seems at the present time a bare impossibility to suggest anything new in connexion with hand cameras, as so much ingenuity has been applied and misapplied in their construction that inventors would be wise to turn their ideas in other directions. Without attempting to bring forward any novelty, it may not be amiss to look at one or two of the points that require consideration in the selection of an instrument of the kind in question.

With regard to the name, "hand camera" is, I think, undoubtedly a great improvement on "detective," for though the camera may be employed under favourable circumstances for detective purposes, those are not by any means its only, or indeed its best, uses. Very probably the not distant future will see the hand camera further developed, and instead of the ingeniously complicated, if compact, instrument now used for outdoor purposes, we shall have a return to the simplicity and comfort, but not the weight, of the landscape cameras of thirty or forty years ago.

What I mean is this. The amateur who only employs his camera for picture-making purposes scarcely needs to handicap himself with a "battery" of lenses, as the professional must do who has to be in a position to cope with any kind of work at a moment's notice. The former, if his *penchant* be landscape, will select the lens that is best suited, so far as his own judgment is concerned, for that purpose, and so also in the case of architecture or figure studies. He will select and compose his pictures in accordance with the capabilities of his tools, and perhaps in the long run will lose little artistically by limiting himself to a single objective for each size of picture. The "battery" of lenses dispensed with, all necessity for a camera with extensive range of focus ceases, and nothing is lost in weight or bulk, while a great deal is saved in the time wasted in unpacking and packing, by making the camera itself the packing-case in which lens, shutter, plates, or films, and, if necessary, focussing cloth, are carried. In fact, the hand camera of to-day, instead of being confined to sizes up to 5×4, will extend to larger dimensions.

During the past twelve or eighteen months I have had occasion to see and study a great many cameras of the "hand" or "detective" type—some of the well-known commercial articles, others of amateur construction, and I have been able to form a judgment of the advantages and otherwise of the different types for general as well as for special purposes. Of course it can be readily understood that what will answer perfectly well for one class of work may be wholly unsuited for another, so that it would be unwise, even if it were possible, to point to any one instrument or class as being absolutely the best. At the same time, their individual points may be considered and compared.

Before proceeding to other matters, it will be well to dispose of the one feature which, more than any other, goes to individualise the instrument or distinguish it from its fellows—the feature, moreover, with which in this article I have perhaps least concern. I allude to the method of changing the plates or films. It is this, of course, chiefly upon which the inventive faculty has been expended, and upon which all the patents are based; it is upon this, in a great measure, that the bulk and weight of the camera depend, as well as the comfort in use, but it has nothing whatever to do with the quality of the ultimate result, and therefore I pass it over briefly, feeling that I shall thus avoid, as far as possible, hurting any one's feelings.

For ordinary work—that is, assuming the hand camera to come into use, as I predict, for landscape and similar purposes—plates or films used in the ordinary dark slides seem to me to offer the greatest advantages, as there is no necessity for rapid changing and far less risk of accident, double exposures, or complications generally, as in the case of some of the "magazine" cameras. On the other hand, the numerous "automatic" changing arrangements, including roll holders, become extremely useful when it is essential that the plates be rapidly changed after exposure; and where large numbers of exposures have to be carried, there appears as yet nothing to compete with the roll holder. The choice depends in all cases upon the perfection of mechanical construction of the individual instruments.

But in many of the other details of construction the quality of result, as well as comfort in working, may be seriously concerned Perhaps in no respect is this more the case than in the question of "fixed focus" or adjustable cameras. It is all very well to say that with a lens of a certain focus and stop all objects beyond a certain distance are in equally good focus. This may be, especially with lenses of very short focus, practically true; but in using an instrument so fitted the photographer is bound to eschew objects within a certain distance of the camera, and practically also those at an extreme distance. But it may happen that he has occasion to work at extremely close quarters, in which case he is helpless. Fixed focus cameras may be useful for a limited class of subjects, but cannot be considered as scientifically perfect.

Let us by all means, then, have an adjustable focussing arrangement, particularly as it is so easy of application. Most of the better class of hand cameras are now so fitted, but I regret to say that very few of them can be considered satisfactory. The focussing may be done either by means of a graduated scale of distance or by actual focussing on a screen, or, better still, by *both* means; but how many cameras now on the market possess the last advantage? Focussing by the scale is in many cases merely guesswork, at least so far as the precise effect that will be produced; for though it may be possible to get any particular objects at a known distance into accurate focus, it is left entirely to judgment to select which plane will produce the best general result when so sharply focussed, whereas with the advantage of a *practical* ground glass a glance would satisfy the eye.

Now, with the majority of adjustable focus cameras, even when provided with a focussing screen or "finder," the latter is only a "dummy," and of no use for focussing purposes, since it has no connexion with the lens that actually takes the picture. The twin lens camera was the earliest solution of this difficulty, and on this principle was constructed Bolas's first "detective" camera. (By the way, how many of the users of hand cameras at the present day know or remember who invented the instrument and gave it its name?) But the same idea had been previously adapted, in 1879, by Mr. Wratten to a camera for instantaneous work, and was again used in Sands & Hunter's "photographic gun," in all of which a pair of similar lenses are used—one to take the picture, the other to act as a finder, the two being actuated by the same focussing arrangement, a plan that necessarily adds greatly to the bulk of the instrument.

Another method by which the focussing can be done, either by the scale or by the eye, is that in which a reflecting mirror placed inside the camera receives the image and throws it on to the focussing glass until the moment of exposure. This is very convenient, but unfortu-

nately for fine focussing quite useless, as the slight indistinctness caused by the double reflection from the mirror utterly destroys the fine definition. For the class of work usually done with the hand camera, the sharpness obtainable in this manner is, no doubt, sufficient, unless the negatives are intended for enlarging; but, as already stated, fine focussing is impossible, for which reason this cannot be considered a perfect solution of the difficulty.

It is not clear how matters are to be remedied, so that perfection of focussing can be secured, without adding to the bulk of the instrument on the one hand or separate focussing on the other, which is out of the question in the case of "snap shots." But for ordinary purposes, where particular combinations of moving figures are not in question, the best plan seems to me, after trying a number, to be a separate focussing glass to be used when required, with a place for it in the camera when not in use.

The focussing arrangement may be, and should be, supplied with a graduated scale of distances for use under circumstances where actual focussing is impossible; but it should be also capable of independent use in conjunction with a focussing screen. A short time back I was using an adjustable focus camera provided with a scale up to, I think, two hundred feet, but as my subjects were all such as came under the heading of "distance," and included no objects within considerably over two hundred feet, I could have done much better if the camera had had a usable focussing screen, which it had not. As the working parts of the focussing were hidden, it was impossible to judge what would be the effect of moving the pointer beyond the limit of the scale, so I was compelled to "let well alone" and believe that objects at 1000 yards would come to focus on the same plane. That particular camera would have been improved if, at any rate, the extreme point to which the indicator had to be moved to bring it to the correct focus for "an infinite distance" had been marked, as then there would have been some guide to the judgment. But of course that would involve a degree of accuracy to which manufacturers as a rule do not care to commit themselves.

From focussing to "finders" is but a step, and I know there are various opinions as to the utility or otherwise of the finder. Theoretically there cannot be a doubt as to their desirability, at any rate; but practically, and frequently when they are most urgently needed, how difficult, if not impossible, it is to use them. One of the most grotesque objects I ever saw was an elderly gentleman of respectable appearance and considerable height, whose eccentric movements attracted my attention one sunny afternoon in Trafalgar-square. On investigation, I found that he had a "detective" tucked under his arm inside his coat, and that his vagaries were caused by his ineffectual efforts to see his picture on the finder, with the result that he resembled some curious bird trying to get his head under his wing and go to sleep. As a matter of fact, if you want to attract attention to what you are doing, to use the finder in public seems about the best way to secure that end. What then becomes of the "detective" character of the camera? On the other hand, if you want to properly arrange your subject, and get a careful focus, a proper finder is a *sine quâ non*, but in order to secure its benefits it is necessary to throw off all restraint and act openly. In other words, you may just as well throw a focussing cloth over your head and work in comfort.

When the work is landscape or architecture, the instrument will, in most cases, cease to be strictly a "hand" camera, as I imagine a stand would be used; and here the ordinary focussing glass again seems to be the best to use. For moving objects the mirror system is, I think, undoubtedly the best where the bulk of the instrument is a consideration, or the twin lens when extreme accuracy of focus is concerned. The first application of the mirror in this manner to cameras for instantaneous work was, so far as I know, by Sir Howard Grubb, who some eleven or twelve years ago showed me a camera he had specially constructed for photographing animals in motion. The late Thomas Sutton had, years before that, used the inclined mirror chiefly for the purpose of *erecting* the image on a horizontal focussing screen. In Sir Howard Grubb's camera the mirror itself, as in Van Neck's and Loman's cameras, acted as the exposing shutter, which, together with the focussing, was worked with a double trigger underneath, the two first fingers of the right hand being employed, as in the case of a double-barrelled gun, the left hand being used to hold or steady the camera.

The lever or cam arrangement for focussing seems to me superior to that in which the rack and pinion are employed, as with equal smoothness of working it is much quicker, being, in fact, practically instantaneous. It is so simple that I wonder it is not more generally employed both for cameras and lenses, and it is by no means *new*, for I have a French portrait lens that has been in my possession nearly twenty years, and is probably nearer forty than thirty years old, which is so fitted. One end of the lever is fixed to the lens mount or camera base by means of a screw, on which it works as a fulcrum; a pin working in a slot in the sliding portion of the tube or body secures the adjustment. The free end of the lever is provided with a pointer or indicator, which traverses the arc of a circle on which are marked the distances in feet. In the case of a camera the lever may be of such a length that the scale may easily be divided to single feet, indeed, I have a camera so fitted with which I can focus for objects at distances of three feet to infinity, the nearer gradations being to each three inches—a somewhat unnecessary refinement.

And now with regard to shutters. How great the choice and yet how few are the really suitable ones for the purpose of a hand camera! As I take it, the principal requirements are simplicity sufficient but not too great rapidity, and constant readiness for action. With many of the hand cameras in the market, the chief aim in connexion with the shutter seems to have been to make it as complicated and the next as rapid as possible. Taking rapidity first, hand cameras are not frequently required for "scientific" exposures or for feats of extreme rapidity, but rather for pictorial purposes, street scenes, groups, and such-like, where the chief requirement is to get enough light on to the plate, not to make the quickest exposure possible. But too many of the users of hand cameras trust too much to the "you-touch-the-button" principle, and fancy they have nothing to do but look upon a picture and secure it, regardless of light or anything else. I came across not long ago a sanguine young gentleman who had just become the possessor of a new "detective." The make was strange to me, but I could see it was one of "the cheaper kind," and it was fitted with a shutter which gave, he informed his friends, an exposure of the "one-hundredth of a second." With this "lightning" instrument he was bold enough to have "shots" at two friends in a railway smoking carriage on a particularly bright winter afternoon. I wonder if they "came out," and I expect he and his friends wonder why they didn't.

If the rapidity is adjustable, the ignorant or careless manipulator is sure to set the shutter at its quickest, and then blame everything but himself for the result; and so it is ever likely to be. Makers would therefore be wise to make their shutters just as quick as, and not quicker, than is likely to give a fairly quick plate a chance under ordinary circumstances; or, if adjustable, to set them at the really practical exposure, and leave it to the intelligent user to discover the extra power he possesses when required. One-tenth of a second is, I think, quick enough for any ordinary purpose, perhaps too quick for most, and such was the opinion of the late Mr. Dallmeyer. If you want to photograph a "dead heat" for the Derby, or the "Flying Dutchman," "broadside on," or "catch" a swallow in a gale, you must have a quicker one; but those are not every-day performances.

Then, again, most of the shutters are too complicated, and require too much "setting." The ideal shutter for a hand camera is one that never wants setting, and cannot get out of order; or, if it want setting at all, that operation should not entail *uncovering the lens*, but should be performed by putting tension on to the spring, or other motive power, without shifting the shutter. There are several such in the market that approach more or less closely to the ideal. The simplest, however, to my idea, consists of two metal plates, connected by a flexible band passing over a roller, so that they move in opposite directions, and each pierced with a square or oblong aperture. A catgut band is attached to the loose end of each of the plates, and these are passed through the body of the camera in any suitable position, and a ring or button attached to each, their length being adjusted that when one is pulled as far as it will go the ring or button of the other is close to the camera body. To make an exposure it is only necessary to pull the shortest string, when the plates slide over one another, opening and closing the lens, and leaving the shutter ready for the next exposure by pulling the opposite string.

When both strings are pulled out an equal distance, or half way, the ens is fully open, and "time" exposures may be thus given.

A camera on the principle I have sketched, and for $7\frac{1}{2} \times 5$ plates, neasures about $13 \times 9\frac{1}{2} \times 6\frac{1}{2}$ inches for a $10\frac{1}{2}$-inch focus lens. It arries inside it a Hare's changing-box and slide, and has separate ocussing glass and lever focussing arrangement for objects from even feet distance to infinity. It forms a lighter and less bulky ackage than my $7\frac{1}{2} \times 5$ "kit," with three double slides and the ecessary bags or cases, and is far less trouble to get into action.

W. B. Bolton.

COPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY MEANS OF ARTIFICIAL LIGHT.

VI.

Although, undoubtedly, the most important part in the operation f photographing such subjects as china, silver plate, glass vessels, oins, &c. &c., is the employment of a proper method of lighting the bjects—for owing to the great dissimilarity in the shapes of such rticles, hardly any two objects being alike, or fail to be treated in recisely the same manner—still of almost equal importance is the reparation or preliminary treatment of many of such articles pre- aratory to their being copied; and here we have a very wide field or the operator to exercise his ingenuity in.

In the case of such articles as glass jugs, tumblers, or decanters, here the main object is not only to show off the beauty of shape, ut likewise to depict in many instances the exquisite designs cut pon their surfaces, it stands to reason that were any one to proceed nd merely photograph the same straight away, without having re- ourse to some method of preventing the designs on the further lanes of the glass articles from interfering with that on the immediate ide next the lens, nothing but a confusion of the various designs ould ensue by the one overlapping or interfering with the other, ence one of the first steps to be taken is to so arrange the vessel as o prevent this. And in cases where the shape of the article is such s to permit of its being filled with a liquid, perhaps there is no better lan than that of filling it up with some semi-opaque liquid, which cts virtually as a backing or background to sides of the vessel. In he selection of such liquids a proper discrimination should be shown n the choice only of such liquids as are in keeping with the nature nd shape of the various articles being photographed. It will require ut little thought for an intelligent worker to understand that what ould be quite suitable in the case of such an article as a cream jug, ould be quite out of place in the case of a wine decanter, hence the ecessity of selecting only such liquids as are in keeping with the rticles being copied. There are, however, numerous fluids to choose om. Skim milk, in some cases, comes in very handy, so also does aret, port, and sherry wine in others, and an intelligent worker will, oubtless, be able to think of many more quite as suitable, such as eer and stout.

When following out this plan, it will be found that mere natural sults are secured when the vessels are not filled right up to the top.

So much for glass vessels. Now let me refer to the copying of lver cups and plate. In this class of work the main thing to over- me is the bright reflections for the burnished portions of the objects. me writers advocate the use of ice when such is practicable, others commend that the burnished parts receive an application of putty deaden the surface and prevent the objectionable flare spots. I ve used both these expedients with success, but latterly have dis- rded the use of them for a much simpler method. Simpler because does not necessitate any tampering with the objects being copied, d, in cases where such are of a very delicate order, this becomes an portant item, for with putty there is always a fear of damaging e surfaces.

The plan I adopt is merely to keep breathing on the object. This quires to be renewed after every few seconds during or at intervals the exposure, but the cap of the lens can be easily put on and off permit of the breathing being applied.

With some commercial firms, when any important object is being anufactured, and it is desired to have the same photographed, it is nerally arranged for such being accomplished previously to the rnishing of the parts. This is a great advantage, but, of course, is t feasable in the great majority of cases.

When developing silver objects, the amount of pyro used should be ry small, and the exposure given a very full one, and I have always t the best results on a dark background.

Medals and coins require some consideration in the selection of table backgrounds also, and the mode of their being held *in situ*. y best results with bronze medals and coins are got by using as a background a sheet of opal glass, and by placing the medals right on the surface with the aid of a very thick solution of powdered gum almost to a jelly. Silver medals are best fixed up in the same way against a sheet of ordinary plain glass, whilst at some distance behind is placed a black velvet background. Gold medals and coins are best on opal, because they get more relief. China plates, and such like, are best relieved by black velvet placed at a distance.

So much for the necessary arrangements as to suitable backgrounds. When the best results are to be obtained attention must be given to this point.

In lighting, there are also numerous points to be considered, and here, at the outset, the first thing to be thought of is the shape of the object being photographed. When using artificial light, such as I have described in the previous articles, I know of no better place for an amateur, or professional either for that matter, to use than his long dining-room table placed under his gasalier. From such he may with convenience lead the gas to his argand burners on their pedestals on the table by means of the rubber tubing, and when it is deemed expedient to throw in as much top light as possible, the gasalier, when fully lit, will render good help in this respect. Some objects are best lit by reflected light alone. In my practice I use my own invention, which is a plaster of paris chamber when copying some classes of subjects, but a very good and simple makeshift can be rigged up by any one without any great cost. Say it is desired to copy a china plate so as to show off the design. Now here we have just a case in point that is best done by reflected light. This I would put into my chamber and so arrange matters that the lights are not in front of the object, but that the strong, bottled-up light briliantly surrounded it.

A similar mode of lighting can be arranged for by merely cutting out a centre in a large mounting board. This aperture should only be large enough to permit of the lens viewing the plate through. The china plate is then placed in position, and the two argand lamps, one at each side, but not in front, so as to throw only reflected light from the white cardboard on it. In very many cases, when photographing by artificial light, it will be found that this intervening screen, placed so as to reflect light only on the object, will give much better results than by throwing the light directly from the gaslamps in front. One great advantage is that reflections are not nearly so liable to arise, and if the brass fittings of the camera and lens are covered up with a black cloth, there should be no reflections at all to contend with.

T. N. Armstrong.

SURFACE EFFECT.—IN TWO CHAPTERS.

Chapter I.

In all probability many others besides myself have hesitated in deciding which of the two, a rough or smooth-surface paper, would be best for some special picture, it being undesirable to put the matter to actual test by printing one of each kind, although it is an obvious method of getting over the difficulty, if waste is not objected to.

There is no doubt but that some negatives are more suited than others to the quality of the surface on which they are impressed; some will produce very effective and excellent results, and some the very reverse on the same kind of paper, the negatives being equally good, although of a different character. Surface effect seems to be deserving of somewhat more attention with regard to photographic printing than it has at present received. Every now and then rough-surfaced papers have risen rapidly in photographic estimation, and have been as suddenly lost sight of. The principal virtue claimed is that they are "artistic." Now "artistic" is an exceedingly elastic definition, and may be applied to almost anything—from a doormat to a drawing. We have only to look round us to see many things whose chief claim to notice is their intense ugliness or out-of-the-common appearance called artistic, a catchword, which seems to answer the purpose tolerably well of securing a certain amount of attention.

If we should enter rather deeper into the matter, and ask why artistic? the reply is not always readily forthcoming. One definition of it is that it is a quality appreciated in different degrees by educated people by reason of their culture, and by the more uneducated masses unknowingly. It is also an undoubted fact that the artistic feeling is in some utterly wanting, as well as incapable of development, except in the most rudimentary degree. Fortunately, these are very much in the minority, and the gradual spread of education will continue to reduce their numbers. The term "artistic" is a word representing an intangible something that affords various degrees of pleasure to differently constituted minds. It is frequently misapplied, as many good words are; in many cases grotesque would be the more appropriate term. To return to our paper: Rough-surfaced papers have been used for the avowed purpose of destroying photographic effect and substituting that of hand drawing. We have most of us heard people

say that a photograph on rough paper is not like a photograph, but like a sepia drawing, as if there were something very meritorious in disguising the fact of its being a photograph. This opens up another question, the art claims of photography, and one that will never be satisfactorily answered if only looked at from one point of view. The camera and lens form the starting point for, say, two entirely distinct classes of work; the ultimate result of one is extreme accuracy of delineation, and the other the groundwork for the picturesque. In the first case no modification by hand is permissible, and in the latter any that may be deemed desirable. That the two are seriously muddled together at the present time will not be disputed. Rough-surfaced paper is calculated to destroy the understood photographic character of the print; therefore this kind of paper is unsuitable where microscopic definition is required, or for anything in which detail is a necessity. It particularly lends itself to large work—portraits, landscape, or architecture, and very pleasing results may be obtained upon it.

Starting with the idea I have already expressed, that an approximate effect to a monochrome drawing is the *principal* reason for the use of rough-surfaced paper, let us see what use the water-colour artist makes of this surface, and compare it with the use to which the photographer puts it. In a water-colour sketch the roughness is made use of to give transparency and aerial effect to the picture by breaking up an otherwise even tint; a wash put on to the uneven surface runs off the little projections and settles in the depressions, giving a sort of grain. This is often supplemented by scraping, which removes the colour entirely from the highest parts without touching the hollows; the shadows from the raised portions also add to the effect when viewed in a proper light. In the photograph the result is to produce a kind of grain by more or less definition. The raised parts of the paper coming into closer contact with the negative than the depressions, the difference of effect between the two will be readily appreciated. In one it consists of more or less colour, and in the other more or less sharpness. To examine a rough-surfaced picture to advantage, whether a photograph or a painting, its distance from the observer must be greater than when a smooth surface is used—just the distance required to merge the surface inequalities into the work will be found right. It will be easily understood that under these conditions fine detail, even if it could be rendered, would be superfluous. Therefore, to get a pleasing photographic result on rough paper, more attention must be paid to the lighting than to the detail. The proper massing of the lights and shadows is, I was inclined to say, the only thing required to make a satisfactory picture; at any rate, it will go a very long way to secure that desirable consummation.

This is, of course, treating the photograph from a strictly pictorial point of view, and by doing so it opens the doors to hand work of any and every kind—doors that are supposed to be strictly closed, but with keyholes that let in a flood of that ostentatiously deprecated article. It is certainly more honest to acknowledge that a negative or print has been worked on or doctored with a view to its improvement than putting it before the public without remark, and by this very reticence inferring that it is the result of pure photography, as generally understood.

Pure photography indeed! I question if one thoroughly good photograph in a hundred can claim to be this, if the meaning is untouched except by the light; and if *any* supplementary work is used, no line can be drawn other than that the picture shall chiefly owe its existence to photography, leaving the artist free to touch, shade, reduce, or intensify, at his own sweet will and in any manner he may think desirable. The idea is to make a *picture* chiefly by the aid of the camera and lens, helped by any other contrivance he is clever or ingenious enough to devise. EDWARD DUNMORE.

INTENSIFICATION.

[Read before the Photographic Society of Philadelphia.]

IN presenting to the Society this evening these few notes on intensification, it is not my intention to offer anything new, but merely to call attention to some of the most important details of an old and well-known process—namely, that with mercury and sodium sulphite.

It has been tacitly considered by many photographers that the practice of intensification is a rather reprehensible one, and not to be depended upon for satisfactory results. Yet it should be an orthodox and thoroughly reliable method of procedure. In the days of wet-plate photography, intensification with acid pyro and silver was a routine part of the process; now, in the days of rapid plates and thin, soft negatives, full of detail but lacking in density, a reliable method of intensification is just as much of a necessity, and often required. The following method, therefore, many of the details of which were elaborated by Mr. John Bartlett (a member of this Society), can be depended upon to give certain and satisfactory results in every case. The details are as follows:—

The negative (film or glass) should, after fixation, be thoroughly washed and then dried. The dry negative is then placed in a suitable dish, film side up, covered with clean water, the face swabbed over thoroughly with a tuft of absorbent cotton to remove air bubbles, allowed to soak for a few minutes, and then the water poured off, and sufficient of the following solution poured on to cover the plate. The solution is composed of—

Citric acid	60 grains.
Perchloride iron (dry)	60 „
Water	1 pint.

This is kept in constant agitation over the plate for about a minute, and then returned to its bottle, and the plate washed under a running stream of water for about five minutes. This solution can be used repeatedly for a long time before becoming exhausted. Its use is twofold: it tends to remove any thin film of fog upon the surface of the negative, and also furnishes a groundwork for the subsequent deposit of mercury. The plate is now bleached by being placed in the following solution:—

Mercury bichloride	½ ounce.
Common salt	½ „
Water	1 pint.

The plate must be frequently rocked while in this solution, and allowed to remain in it until sufficiently bleached. This is regulated by the amount of intensification required. If considerable density is desired, it must be allowed to remain until quite white. This solution is then to be poured off, and can be either thrown away or used for several more plates; the best results are obtained, however, by using fresh solution for each negative. The plate is next covered with a sufficient quantity of the following solution:—

Common salt	2 ounces.
Water	2 pints.

This is allowed to remain on the plate for about a minute, then poured off and thrown away, and the plate well washed under the tap for about five minutes. The object of the salt is simply to dissolve out any mercuric chloride remaining in the film, and prevents the clear portions of the negative from becoming clogged up with any reduced mercury in the next operation. The plate is now returned to the dish, and a sufficient quantity of the reducing solution poured on it to just cover it. This is made as follows:—

Sodium sulphite, cryst.	3 ounces.
Acid sulphuric, conc.	2*f* drs., or ½ ounce by weight.
Water	1 pint.

The sulphite is dissolved in twelve ounces of water, allowed to cool, and then the acid, previously mixed with four ounces of water, added. I should say just here to those not familiar with chemical manipulation that in mixing sulphuric acid and water the acid should always be poured gently and in small quantities into the water, not the water added to the acid, as in the latter case, owing to the violence and heat of the combination, some of the acid might be thrown in the face of the operator.

As soon as the reducing solution is poured on the plate it commences to turn brown and then black. The operation is complete when the *back* of the plate is perfectly dark, showing no traces anywhere of the whiteness caused by the mercury. The negative should then be perfectly bright and clear, and of a brilliant bluish black colour. It is then to be placed under the tap, washed for five or ten minutes to free it from all traces of sulphite, swabbed off with a pad of cotton, and set up in a rack to drain and dry. The reducing solution can be used several times until it becomes exhausted, and is then thrown away. It should never be returned to the original stock bottle. This process can be depended upon to yield in every case good and satisfactory results, and the intensification produced is perfectly permanent in character. The main points to which attention must be directed in order to secure good results are these:—

1. All solutions used must be filtered, clear and free from specks.

2. The negative must have been previously *well washed*, so as to *thoroughly remove all traces of hypo.*

3. The negative must be moistened before the solutions are poured on, so that they will act evenly and uniformally on the plate.

A negative can, if necessary, be intensified immediately after development, fixation, and washing, without being allowed to dry, but in this case the density obtained will not be so great as if the plate had been previously dried. CHARLES L. MITCHELL, M.D.

INFLUENCE OF EXPOSURE AND DEVELOPMENT ON THE TRUE RENDERING OF COLOURS.

ERHAPS at no period in the history of photography has the subject which eads these remarks occupied men's minds and exercised their ingenuity ıore than at present, when, gelatino-bromide processes having attained) such perfection in point of rapidity, their enlarged capacities as com- ared with collodion processes enable things to be attempted which the ld workers would have considered impossible. Time was when the only ensitive salt of silver used on plates was the iodide, comparatively peaking a very slow compound, and sensitive only to the violet and blue ays, unless a very prolonged exposure was given, which ended in solar- ation. But the introduction of silver bromide, which can be made sen- tive to the green, yellow, and even the red rays of the spectrum, brought bout not only a greater general sensitiveness, which we call rapidity, but lso a sensitiveness to those colours which photography had hitherto iled to render, especially green.

First, it may not be out of place to consider what is the true rendering f colour, by which, of course, is meant the translation or conversion of arious colours into the monochrome of a photographic print through the ıedium of a negative. Let me ask a question. If we photograph a ndscape in summer, and if we tone our print to a black and white so as) assimilate it to the characteristics of a woodcut or engraving, how will ur print accord with a woodcut or engraving of the same subject? If we onsider that in our landscape there will be red, orange, yellow, green, lue, indigo, and violet visible to the eye, as well as black (deep shadows), nd white (sky, &c.), to say nothing of the host of intermediate shades nd *nuances* of a nondescript order, it will at once be seen that, as many of ıese colours possess visual intensities out of all proportion to their ıemical activity on our dry plates, a photograph is unlikely to render the ıbject in the same manner that an artist would who with pencil or mono- hrome brush might simultaneously be delineating the identical landscape. 'his is admittedly *one* of the great drawbacks of photography, and which itherto been held as a reproach by those who love to find fault with our rt; but they forget that in all probability their own method or technical tyle of depicting on white paper with black lines, dots, or washes, objects ontaining colours, is after all a mere conventional manner, which has rown to what it is by reason of our eyes being trained to comprehend 'hat we see in monochrome pictures, whereby we understand what the bjects are which are so depicted, notwithstanding the absence of colouring, orm and shape oftentimes atoning for lack of colour. The question I ave asked above I must leave my readers to answer for themselves. uffice it to say that the limited space at my disposal in *Scraps* forbids my llowing this branch of the subject any further here, and I must at once ddress myself to the more urgent question—the chemical—of how to pproach truth in rendering colours by the means at our present disposal, *e.*, a highly sensitive gelatine plate.

I have already alluded to the relative sensitiveness of two of the haloid alts of silver, the iodide and the bromide, and I might also have included hloride; however, as this is a topic which concerns mostly the emulsion ıemist, it will be needless here to allude to these further than to explain ıat although a given plate may contain all three salts locked up in the elatine, the colour-sensitiveness of that plate may be totally at variance ompared with another make of plates. Sufficient is known by the non- echnical users of plates that a very slight impact of light will generally ct upon nearly any gelatino-bromide plate; they also know that the sky nd high lights are usually developed, even when nothing else can be got ut, and they know, too, that a too prolonged exposure will make their icture rush up under the developer, and probably fog. But the causes 'hich operate in these various results have not been entertaining study to he bulk of photographers, who have left the subject pretty much in the ands of *savants* and dry-plate manufacturers, until at a recent date the ontroversy has begun to assume more importance and a wider recognition rom a large number of those who are to-day interested in raising the tatus of the art-science.

Some ten years ago Eder published a small book (subsequently trans- ated by Abney) entitled *The Chemical Effect of the Spectrum* (Harrison, 'all Mall, 2*s.*), which is well worth careful perusal by all who wish to know 'hat is the action of light upon the sensitive surfaces used in photography. 'rue, the experiments were made with, and the first thirty pages of the ook related to, collodion as a vehicle for the sensitive salts of silver; but ievertheless, the general principles and conclusions arrived at by the uthor may be accepted as holding good as regards gelatine, in so far as oncerns the behaviour of gelatino-bromide plates when submiteed to the ays of the spectrum.

Gelatine of commercial manufacture may be stated roughly to be sen- itive to the rays of the spectrum, beginning with the blue, indigo, violet, ess to the green, and still less to the yellow, orange, and red, *unless pro- onged exposure be given.* Now, if we expose a plate for a very brief period known as under-exposure), on development we get merely the high lights, r such as reflect blue rays; by giving more exposure we get evidences 'hat the green rays have affected our plate, and if we still longer prolong ur exposure we get effect from the yellow; but by this time, generally, ver-exposure begins to show itself, and here steps in one of the great rawbacks of our modern photography, viz., the difficulty of making lates sensitive to the rays near the red end of the spectrum without nvolving troubles of a counterbalancing importance.

Space forbids the detailed consideration of a large number of experiments which I have recently made in pursuance of this interesting subject, in which the spectroscope has played a very important part, the object being to ascertain some of the conditions necessary to the attainment of the title of my paper. Considerable sensation, even amounting to consternation, has been caused in scientific circles by the publication of Hurter and Driffield's *Photo-Chemical Investigations.* With many of their conclusions I may humbly be allowed to differ, but am chiefly concerned at the moment with one which bears on the subject in hand.

They assert that "the only control the photographer has over development lies in securing a greater or less density of image, and that he has no control whatever over the gradations of the negative." Now common sense, and the practical experience of every-day work, utterly refute such a theory, as any photographer who has more than a few weeks' experience will testify.

Well, I will leave these gentlemen alone whilst I throw out a hint or two on the subject at present occupying our attention. I am one of those old-fashioned photographers who not only believe in relative value of exposures, but I attach a very great importance to the judicious use of stops or diaphragms in lenses, which bears upon the character of the image quite as much as concerns definition, or the covering power of the lens. If I am about to take an instantaneous picture I naturally employ as large an aperture as the lens will permit, consistent with adequate definition; but if I am about to photograph a vase of flowers I unhesitatingly *put the smallest stop in my lens.* By this proceeding I consider that by reducing the whole of the light in the camera I am enabled *to give a long exposure, which gives the rays of lesser refrangibility a chance,* without much fear of solarisation of the high lights. All my experience and experiments confirm my belief that this is one of the methods well calculated to obtain an approach to correct rendering of colour graduation. I have access to a good conservatory where I have just photographed some flowers, and have succeeded in getting a yellow azalea very well, and that very difficult flower, the narcissus, by twenty seconds' exposure with *f*·28 on a "rapid" plate. There is every indication that matters would have been improved by even a longer exposure and smaller stop. To arrive at exposures under such conditions and requirements, calculate what the stop in question would require; if it is twenty seconds, then simply doubly it and give forty seconds, and I have no doubt no harm will be done be over-exposure, where colour has to be estimated for.

Then as to development (Messrs. Hurter and Driffield notwithstanding), I have a firm belief in my ability, by a judicious use of the components of the developer, especially of the ammonia, to help out the difficult bits —the greens and yellows. I should always keep the bromised pyro low under such circumstances, and use ample ammonia to the fullest extent of safety. A small stop cuts off the intensity of the light from the blue end of the spectrum, and, combined with a long exposure, gives the reds and yellows time and opportunities of acting on the plate before the blues are greatly over-exposed.

I caution *beginners* that this rapid development is rather a risky process with which it would be best to experiment before trying serious work. I would also advise great care in the matter of development light; in all attempts to photograph colours the plates ought never to be manipulated in any but a dark-red light—deep ruby. TECHNIQUE.

—*Photographic Scraps.*

THE LIVERPOOL EXHIBITION.

PREVIOUS to speaking of the exhibits, it is in order to say that the various invited visitors—such as the Judges, the Presidents of several leading societies, and the representatives of the press—met with a cordial reception at dinner at the hands of the Liverpool Photographic Association, a social gathering which took place three hours anterior to the opening *conversazione.* Concerning what took place at this dinner we curtail from a local daily.

The Chairman (Mr. Paul Lange) gave the toast of "The Queen," which was cordially received. The next duty which fell to the lot of the Chairman, and which he spoke of as a pleasurable one, was that of proposing the health of "The Judges," who, he added, had willingly undertaken their duties. He said that the Judges would be recognised as gentlemen of eminence, and the Executive of the Associatlon felt proud at having them in their midst. He was sure that two-thirds of the success of the Exhibition would be due to their names being associated with the undertaking.

Mr. H. P. Robinson, who responded, said he was glad to have the opportunity of congratulating them upon their magnificent Exhibition. He had seen many similar exhibitions, but this was the largest and certainly the finest he had ever visited. It was worthy of the country in which everything of value in photography had been invented, originated, or discovered. In saying that, he did not forget that an Italian lady had carried off the chief prize in the Exhibition.

Mr. Gale said it had been a great pleasure to him to go through the Exhibition. He had also had the pleasure and privilege of visiting many

such undertakings, but in very few had he seen the average of merit so high as in this. He trusted that the Exhibition would be a success.

Mr. Gibson also referred to the excellence of the exhibits, and wished the Association a prosperous career.

The Chairman then gave the toast of "Our Friends and Presidents of Kindred Societies." He remarked that at the last exhibition of this kind they had not half the number of friends present. That day they had got amongst them representatives of some of the finest associations that the United Kingdom could boast of, including gentlemen from London, Dublin, Manchester, Newcastle, and Glasgow. He welcomed them all, because he believed in exchanging views and ideas, and wished to cultivate a spirit of brotherhood.

Mr. G. Watmough Webster spoke in high terms of the inventions and discoveries of amateurs in the art of photography.

Mr. Henry Moore, R.A,, gave the sentiment of long life to the amateurs, which was received with applause.

The toast of "The Press," which was proposed from the Chair, was acknowledged by Mr. J. Traill Taylor and Mr. C. W. Hastings.

Mr. G. Watmough Webster proposed the toast of "Success to the Liverpool Photographic Exhibition," coupled with the name of Mr. T. S. Mayne, the Hon. Secretary, who, he said, had done so much to secure the success of the undertaking.

Mr. Mayne, in responding, said that the greatest pleasure in life was to give pleasure to others, and the Exhibition just opened, he felt sure, would give pleasure to a number of people. He looked upon this Exhibition as a distinct advance on that of 1888. The Judges had had a most difficult task, because they had to face such a lot of good work. He, however, was confident that merit was their standpoint, and he did not doubt that the Exhibition would prove a success.

The health of "The President" having been pledged, the proceedings terminated.

At the termination of the dinner the party adjourned *en masse* to the Walker Art Galleries, where the opening was formally celebrated at a *conversazione*, the Art Gallery being crowded with a great throng of visitors. In the Grosvenor room a small platform was placed, and here Mr. P. H. Rathbone presided, being supported by Mr. Lange and Mr. E. R. Russell, editor of the *Liverpool Daily Post*.

Mr. Lange first welcomed the visitors, and said their presence amply assured him of the success of the Exhibition, and all the troubles of its promotion were fully repaid. Mr. Mayne, in his excellent sketch given in the catalogue, had told them all what photography had done, was doing, and would do, and the results they saw around them. He must thank the Liverpool Corporation for the use of the fine galleries, and he was glad they had Mr. Rathbone, who was a prominent member of the Arts Committee, with them that evening.

Mr. Rathbone, in the course of a speech which caused great amusement, said they had around them the results of a comparatively unknown artist —the sun. For many years the sun had done great work in agricultural and other departments, but it was only recently that he had turned his attention to art. Yet none could gainsay that at the present time he was one of the greatest artists they had. He trusted the result of this young artist's work would have a successful season in those galleries.

Mr. E. R. Russell, whom the President called upon, observed that as Mr. Rathbone had in some measure spoken for the Corporation, he thought he (Mr. Russell) might be allowed to speak for the people of Liverpool, and to bid all photographers from a distance welcome to that splendid suite of rooms. The art of photography was one which of late years had, so to speak, entered into our homes, and had indeed become the favourite of amateurs, the amusement and hobby of a large number of intellectual and artistic people. Its progress was now watched with interest, its triumphs admired, and they all hoped that the noble specimens upon those walls were only the promise of still greater things. It was quite impossible to walk through the rooms without experiencing very great interest, for it was apparent to all that in landscape portraiture, and other life studies, there was now obtained a perfection of artistic feeling which at one time it seemed quite hopeless to expect. They trusted that even greater advances in this direction would be made, and they felt that artists would be encouraged to further successes by those already achieved. He was sure he might give a hearty welcome to photographers in the name of the people of Liverpool, and he expressed a cordial hope for the prosperity and success of the Exhibition.

Mr. J. T. Taylor, of The British Journal of Photography, said that the art owed a great deal to Liverpool, where a revolution in method was instituted some years ago. The names of Sayce and Bolton would live long in the annals of photography for what they had done. As a member of the Council of the Photographic Society of Great Britain, whose headquarters were in London, he felt somewhat chagrined that Liverpool had managed to have an exhibition such as they never saw in London, but he hoped nevertheless that it would be a successful one.

Mr. C. W. Hastings, of the *Amateur Photographer*, congratulated Liverpool upon its wonderful Exhibition, and spoke particularly of Mr. Robinson's collection of sixty-three artists taken in their own homes. That of itself formed a valuable collection, such as they had never seen before, and probably would never see again.

Mr. Henry Moore, A.R.A., and Mr. G. Watmough Webster, both expressed opinions highly laudatory of the Exhibition.

Mr. T. Mayne, the Hon. Secretary, who was received with applause, thanked all who had helped to make it a success. He said that one of the greatest pleasures in life was to give pleasure to others, and therefore the executive were very happy.

Mr. Hastings alluded to the great service Mr. Mayne had done photography in organizing such an exhibition, and joined the name of Mr. Tomkinson with the Hon. Secretary's in proposing a vote of thanks, which was heartily accorded.

Mr. Moore, A.R.A., proposed a vote of thanks to the Chairman, the passing of which closed the proceedings.

The Judges in this Exhibition were Captain W. de W. Abney, C.B., &c. (London), and Messrs. J. Gale (London), H. P. Robinson (Tunbridge Wells), Andrew Pringle (London), J. Pattison Gibson (Hexham), and G. Watmough Webster (Chester).

The awards are as follows:—

List of Awards.

Class.			
1.	Portraits	Silver Medal	A. Vandyke.
2.	,,	Bronze Medal	Harold Baker.
3.	,,	,, ,,	Window & Grove.
4.	,,	,, ,,	W. J. Byrne.
5.	Landscape	,, ,,	E. Lloyd Edwards.
5.	,,	,, ,,	F. D'Arces.
6.	,,	Silver Medal	Wm. Tomkinson.
7.	No Award, Medal withheld.		
8.	Landscapes	Bronze Medal	Thos. Zacharias.
9.	No Award, Medal withheld.		
10.	Marine & Cloud Studies	Silver Medal	S. Bourne.
10.	,, ,,	Bronze Medal	Thos. Glazebrook.
11.	Animals	Silver Medal	Chas. Reid.
12.	Groups (Outdoor)	,, ,,	F. M. Sutcliffe.
12.	,, ,,	Bronze Medal	F. Bremner.
13.	Architectural	,, ,,	C. Court Cole.
14.	,, (8×5)	,, ,,	G. E. Thompson.
15.	Scientific	Silver Medal	R. Paulussen.
15.	,,	Bronze Medal	Cecil V. Shadbolt.
15.	Flashlight Pictures	Gold Medal	Countess Loredana de Porto Bonin.
16.	Genre	Silver Medal	Shapoor N. Bhedwar.
17.	Enlargement	Bronze Medal	Chas. W. Huson.
18.	Stereoscopic	Silver Medal	H. J. Houghton.
19.	Lantern Slides	,, ,,	G. E. Thompson.
19.	,, ,,	Bronze Medal	John Carpenter.
19.	,, ,,	,, ,,	F. Anyon.
20.	,, ,,	,, ,,	W. L. Howie.
21.	,, ,,	Silver Medal	Priestley & Sons.
21.	,, ,,	Bronze Medal	J. W. Wade.
21.	,, ,,	,, ,,	F. Anyon.
22.	Hand-Camera Work	Silver Medal	John White.
23.	,, ,,	Bronze Medal	A. G. Bristow.
23.	,, ,,	,, ,,	J. M. Nicholson.
24.	,, ,,	,, ,,	W. D. Welford.
25.	Instantaneous	Silver Medal	Karl Greger.
25A.	General Section	,, ,,	H. McMichael.
25A.	,, ,,	,, ,,	W. J. Byrne.
25A.	,, ,,	,, ,,	A. Vandyke.
26.	Ladies' Work	,, ,,	Miss Lil W. Tomkinson.
26.	,, ,,	Bronze Medal	Mrs. Janie N. Hignett.
26.	,, ,,	,, ,,	Mrs. S. Francis Clarke.
27.	Beginners	,, ,,	Vincent Fothergill.
—	Champion	Gold Medal	Shapoor N. Bhedwar.
—	,,	,, ,,	J. B. B. Wellington.
—	General Collection	Silver Medal	Chas. Scolik.
—	,, ,,	,, ,,	R. S. Redfield.
		Gold Medal	Ralph W. Robinson, for his Unique Collection of Eminent Artists (which forms so prominent a feature in the Exhibition), together with his other work.

From the above it will be seen that local exhibitors have come well to the front, one local artist, Mr. A. Vandyke, of Liverpool, having been awarded two silver medals for portraiture. Nobody will grudge him this honour, for his series of 15×12 direct portraits are certainly fine works, representing every-day commercial portraiture, in which the services of the retoucher have been but sparingly had recourse to. A gold medal is

awarded to several flashlight pictures by the Countess Loredana. These are universally conceded to be the finest of this class that have yet been publicly exhibited anywhere. They represent groups of children at school, the posing, expression, and lighting being perfect.

In this collection there are 1500 "frames," containing 4200 individual pictures. These have been sent by 230 exhibitors, of whom 40 are foreigners. There is also a fine display of apparatus.

The catalogue deserves a word of recognition. It is prefaced by a few pages of historical matter by Mr. T. S. Mayne, and is illustrated by twelve phototypes of the work of the Judges and others.

But we shall reserve further notice of the exhibits till next week.

Foreign Notes and News.

We learn that M. Reutlinger in Paris has introduced a new method of retouching for platinum-toned photographs, the clouds being sketched in with a mixture of graphite and fine pumice-stone. The process is said to be very rapidly executed and to be extremely effective. A Parisian colleague of M. Rentlinger employs the same method on the negative, which is said to give to the prints the effect of etchings.

Herr Conrad Ruf, of Mannheim, Freiburg, and Bale, a prominent member of the Vienna Photographic Society, has been presented by H.R.H. The Grand Duke of Baden with the gold medal for Arts and Sciences of the Duchy.

Professor Lippmann's discovery still continues to form the subject of discussion at the meetings of most of the foreign societies, and the more it is discussed the more difficult does it become to comprehend the explanations of the phenomenon hitherto offered. Every one seems to agree that interference has *something* to do with the matter, but as to what and how much there seems no consensus of opinion. Most of the explanations hitherto offered are in flagrant contradiction with the elementary principles of wave movement.

Of more interest, however, than theory of the matter, are the illustrations of M. Lippmann's apparatus which have been given. It appears, in fact, to be an upright cell, the ends and bottom of which are of indiarubber, the sides being formed of two glass plates, one of which is the sensitive plate with the films turned *inwards;* the mercury is poured into the space between the two, and is, consequently, in immediate contact with the gelatine.

Our Editorial Table.

We have received from the Frederick Crane Chemical Company, of Birmingham, samples of certain productions in the form of varnishes which they are manufacturing:—

Protectaline is a negative varnish which is applied cold, and when dry is quite unaffected by water or dampness. Unlike many other varnishes it does not become tacky on exposure to heat.

Enameloid partakes of the same general features as Protectaline, only whereas the former is transparent this is a dead black. It adheres with great tenacity to metals, and is, of course, suitable for wood or anything else.

Letherole is another of these preparations. It is intended for renovating and preserving leather, and is well adapted for the bellows of cameras, caps of lenses, cases of stops, and, in short, anything in which leather has a part.

These are of American origin, and we are glad to see them introduced into this country.

We presume that these useful preparations may be obtained from dealers in photographic requisites.

Mr. G. Renwick, Burton-on-Trent, has sent us samples of a lock catch which he has invented for the purpose of ensuring the fastening of the shutter of the dark slide. This catch seems certain in its action, and is not likely to get deranged.

A novel style of mounting photographs has been introduced by Mr. M. Guttenberg, of Manchester. The specimens which he submitted to us were prepared as follows:—In the first place, a transparency was made on Eastman's transferotype paper, which, being cut closely round, was laid upon the surface of a mirror and its outline carefully marked, the space within that outline being painted over with a white pigment. On this the transparency is attached; it is then coloured or finished in monochrome, according to the taste of the owner. The effect of a portrait thus standing on the surface of a mirror is very excellent.

Messrs. Perken, Son, & Rayment have issued a small book—*Intensity Coils: How Made and How Used.* It forms an excellent beginner's guide to electricity, describing the way in which batteries, coils, &c., are made. The previous editions of this work have evidently found much favour, for the present is the sixteenth edition. It contains numerous illustrations.

Mr. T. Stokoe, of Clare, Suffolk, has introduced a new style of printing photographs with floral borders, which he claims will enable photographers to produce a variety of localised, birthday, and other cards.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3727.—"New or Improved Figures or 'Puppets' for Magic Lantern Displays, and Apparatus or Mechanism for Actuating same or the like, and in connexion therewith." W. Cheffins.—*Dated March* 2, 1891.

No. 3781.—"An Improvement in Hand and other Cameras." C. C. Gill.—*Dated March* 3, 1891.

No. 3823.—"Improvements in or appertaining to Photographic Cameras." T. E. C. Wilson.—*Dated March* 3, 1891.

No. 3866.—"Improved Photographic Camera." T. Scott and J. Davenport.—*Dated March* 4, 1891.

No. 3876.—"Improvement in Photographic Apparatus." A. M. Gillham.—*Dated March* 4, 1891.

No. 3942.—"Improvements in Photographic Apparatus." J. Naylor.—*Dated March* 5, 1891.

No. 3950.—"Improvements in Photographic Cameras and Stands." W. J. Spurrier.—*Dated March* 5, 1891.

No. 4040.—"Improved Means for Producing Photographs in Colours." S. H. Crocker.—*Dated March* 6, 1891.

No. 4049.—"The Improvement in Photographic Camera Stands." F. L. Perken, E. T. Perken, and A. Rayment.—*Dated March* 6, 1891.

No. 4062.—"Improvements in Photography." W. P. Thompson.—*Dated March* 6, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 5193.—"Photographic Cameras." Dickinson.—Price 11*d.*

No. 5458.—"Photographic Cameras." Hume and Parfitt.—Price 8*d.*

No. 9118.—"Photographic Apparatus." Communicated by Krügener. Lake.—Price 8*d.*

1891.

No. 585.—"Photographic Cameras." Communicated by Ardern. Calvert.—Price 8*d.*

PATENTS COMPLETED.

Improvements in Hand or Detective Photographic Cameras.

No. 5458. Henry Robert Hume, 6, Allen-terrace, Kensington High-street, London, W., and Edward William Parfitt, 18, Gatcombe-road, Tufnell-park, London, N.—*February* 14, 1891.

This invention relates to improvements in hand or detective photographic cameras, and has for its object affording increased facility for successively bringing into position the sensitive films or plates employed.

According to our invention, we mount each of the sensitive plates or films within the well-known holders or carriers, preferably constructed of thin sheet metal, or other suitable material, and provide each of the said holders or carriers with a pin or pins projecting laterally from each side of the upper part thereof, for the purpose hereinafter described.

Within the outer case of the camera is a sliding frame or tray, the upper edges of the sides of which are provided with corresponding equidistant notches or slots.

The sensitive plates, contained within their respective holders or carriers, are placed one above the other in a horizontal position, the projecting pin or pins of the lowermost holder or carrier engaging with the rearmost notch or slot upon each side of the sliding frame before referred to, whilst the front of such holder or carrier is supported by a convenient stop or stops carried by the case.

The said sliding frame or tray is connected with a suitable arrangement of mechanism operated from the exterior of the case, which we shall hereinafter describe, in such manner that it may be shifted backwards (or away from the lens) by successive operations a sufficient distance at each time to free the lowermost holder or carrier from the before-mentioned stops supporting one end thereof, and allow it to swing upon its projecting pin or pins and drop into a vertical position, at the same time bringing the next pair of notches or slots in the upper edges of the sliding frame beneath the projecting pins of the next holder or carrier, and so on throughout the series.

To effect the shifting of the sliding frame or tray, we prefer to employ the following arrangement:—

In the bottom of the sliding frame are formed a number of depressions or notches, corresponding as to number and distance apart with the before-mentioned notches or slots in the upper edges thereof.

Mounted between suitable guides on the exterior of the outer case (preferably at the bottom) is a sliding plate carrying a spring pin or plunger, which passes through a slot in the case and engages with the said depressions or notches in the bottom of the sliding frame or tray.

This sliding plate may be moved in either direction by means of a pivoted lever extending across the same and engaging with projections or stops formed thereon upon either side of such lever (the lever having a slight amount of play between such projections).

Upon moving the lever forwards, the said pin or plunger is caused by its spring to descend into a suitable chamfered or bevelled recess, formed in that side of the lever nearest the sliding plate, the lever will then come into contact with one of the stops on the sliding plate and move such plate forwards, bringing the spring pin or plunger beneath the next depression or notch in the bottom of the sliding frame; upon moving the lever back again, the pin or plunger is first raised and caused to engage with such depression or notch, the lever then comes into contact with the other projection upon the sliding plate and moves such plate, together with the sliding frame, backwards, sufficient movement only being permitted to the sliding plate at each backward motion of the lever to move the sliding frame the distance of one depression or notch.

A convenient spring is arranged to hold the sensitive plates and holders when in their vertical position, and we also prefer to employ a spring pressing upon the top of the pile of horizontally disposed plates.

It is obvious that, if desired, in lieu of the arrangement above described for shifting the sliding frame or tray, a rack and spring pawl or detent, or other convenient arrangement, might be employed; but we prefer the arrangement described.

The claims are:—1. In a photographic camera, successively shifting the sensitive plates or films employed from a horizontal to a vertical position by means of a sliding carriage or drawer provided with notches or slots, which engage with laterally projecting pins or pivots formed upon the carriers containing the said sensitive plates or films, as specified. 2. The combination of the carriers having laterally projecting pins or pivots, and the sliding carriage or drawer, provided with racks, substantially as described. 3. The combination of the carriers having laterally projecting pins or pivots, the carriage or drawer provided with racks and notches or depressions, and the peculiar arrangement of mechanism by which the drawer may be moved backwards or away from the lens step by step substantially as described and illustrated. 4. In a photographic camera the combination of the lever, inclined recess formed therein, sliding plate provided with projections, and spring pin or plunger substantially as and for the purpose described and illustrated.

Improvements in and Relating to Photographic Apparatus.

(Communicated from abroad by Dr. Rudolf Krügener, of Bockenheim, near Frankfort-on-the-Main, in the Empire of Germany.)

No 9118. Henry Harris Lake, 45, Southampton-buildings, Middlesex.—*February* 14, 1891.

This invention relates to photographic apparatus, and comprises devices for exposing, measuring off, winding up, numbering, and cutting off sensitive celluloid film which is wound upon a roller.

The film is conveyed from the receiving roller upon which it is wound between a glass plate and a wooden plate. By the latter plate, which is under the action of springs, a certain tension is given to the film before it passes upon the winding-up roller, and a ratchet mechanism prevents the winding-up roller from turning backwards, thus ensuring on the one hand a firm and sure winding up, and on the other hand an absolutely plane film in the focus. In lieu of the plane glass plate use can be made of one which is a little curved and against which bears a small wooden plate that is curved in like manner. This arrangement has for its object to obtain a greater distinctness at the edges of the picture.

The above-mentioned winding-up roller, which takes up the exposed part of the film, regulates the length of film necessary for an exposure, inasmuch as the periphery of the same corresponds to one or to two such lengths. For example, when the said roller makes half a revolution the exact length for an exposure is wound up and unwound from the receiving roller. As the film is only one-tenth of a millimetre thick, and as the winding-up roller has a great circumference, the latter is only slightly increased by the further winding up of the film, the difference in the length of the first and last being only six millimetres, which, considering the simplicity of the measuring-off operation, can be disregarded. In order to automatically regulate each half revolution, with the winding-up roller is firmly connected a disc which carries a projecting tooth. This tooth is stopped after each half revolution of the winding-up roller, one time by a slat on the left-hand side and the other time by a slat on the right-hand side. The two slats are connected with each other by a spring, but they are held apart at a definite distance by means of a slide. They are provided with notches with which the aforesaid tooth on the disc engages alternately and stops the winding-up roller.

On pressing the slat which has stopped the tooth on the disc to one side by means of the above-mentioned slide, the said tooth is liberated and the other slat will bear against the disc. Now the roller can be turned again until the tooth engages with the notch in the other slat, preventing the further movement.

In case the winding-up roller is to be stopped after each complete revolution, instead of after each half revolution as already described, the spring and the slide hereinbefore referred to may be replaced by a bar connecting the two slats, and neither of the two slats is provided with a notch. The stopping is effected by the tooth on the said disc bearing upon the upper surface of one or the other of the slats. When the tooth is liberated after a stoppage by the displacement of the connected slats, and the winding-up roller is then turned, the tooth on reaching the other slat must force the latter to one side, thereby causing a bar to pull the opposite slat against the disc, so that the tooth after a complete revolution will again be stopped by the upper surface of the first slat.

The disc provided with the above-mentioned tooth has also for its object to cause in each of its revolutions an escapement wheel to turn one tooth, but this must take place only when the disc turns in a certain direction, for instance, to the right. As soon as the disc is turned to the left-hand side the escapement wheel must not be acted upon. For this purpose, I arrange beside the aforesaid disc a slat provided with a slot, which is designed to enable the said slat to be displaced and turned a little. On the latter is a nose or projection, which on one side forms a sharp angle with the slat. When the tooth in the turning movement of the disc strikes against the one side of the nose or projection, the slat (forced by a spring against a stop) is displaced in a straight line, thereby causing the escapement wheel to turn one tooth, whereupon the slat, when the above-mentioned tooth on the disc leaves the nose or projection, is pulled back to the original position by another spring. When, however, the tooth on the disc strikes from the other side against the nose or projection (when the roller is unwound) the aforesaid slat is only raised, and the escapement wheel is not acted upon.

In order to enable the several exposures to be separated from each other for developing in a simple manner, a metallic bar, in which is formed a slot serving as a guide for a knife, is provided close to the point where the picture is bounded, and where in the case of other roller devices the marking is effected. To unwind the exposures from the roller, the film is first cut by means of a pocket-knife guided in the groove, then the slide hereinbefore referred to is moved to one side, the ratchet mechanism of the winding-up roller is lifted with the right hand, and the film is pulled with the left hand until the roller is stopped. Exactly an exposure has now been unwound, and this is cut off along the said metallic bar. The above-mentioned slide is next pushed to the other side, film is again unwound until the winding-up roller is stopped, and thus all the exposures are separated from each other with the greatest certainty, as the winding-up roller is invariably stopped in the same place. No inconvenience results from the fact that the pieces of film wound up last are a little longer.

The claims are:—1. The employment of a plane or somewhat curved glass plate and a small wooden plate, between which the film is conducted, the wooden plate being forced by springs against the film and the glass plate itself bearing with its edges upon a support. 2. The employment of a winding-up roller, the periphery of which is such that in one case it corresponds to the length or width of an exposure, and in the second case to the length or width of two exposures. 3. A disc secured upon the axis of the winding-up roller and carrying a projecting tooth which is stopped by an escapement after each half revolution of the winding-up roller by the former, the escapement being alternately moved to and fro by hand. 4. A numbering device consisting of a slat provided with a nose or projection, which seizes the latter by the tooth on the disc coming from the right-hand side, whereby the slat is displaced laterally and engages with the escapement wheel, whilst the tooth coming from the left only lifts the slat without acting upon the escapement wheel. 5. For separating the several exposures in the unwinding of the winding-up roller a slat wherein a slit is cut lengthways which serves as a guide for a knife, and which slat is close below the film at the place where the picture has its boundary line, and in which, in the case of other roller devices, the mark is placed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 16	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 17	North London	Wellington Hall, Islington, N.
,, 18	Bury	Temperance Hall.
,, 18	Hyde	
,, 18	Manchester Camera Club	Victoria Hotel.
,, 18	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 18	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The capacity of the rooms of this Society at its new quarters in Great Russell-street was taxed to the utmost on Tuesday evening, March 4, by an audience assembled to witness the demonstration of *A Simplified Collotype Process* by Mr. Leon Warnerke.—The President occupied the chair.

Mr. Warnerke said that this lecture was the beginning of a series intended for instruction. There was a movement in the air for the establishment of a photographic institute. Thanks to the Photographic Society of Great Britain having entered upon their new premises, they were enabled to commence the sort of work which the institute, when formed, would take up. In the present instance the hearers must not expect anything new, but a demonstration of a process that was little known and used, and might be extensively applied. The name "collographic" applied to the process of printing from a gelatine film was a good one; it had been adopted by the Congress at Paris, and, unlike some of the resolutions of that body, he thought the title would remain. It was better than collotype, as type implied printing from a raised surface with a platten press. In France collography was principally carried on with roller presses, and in Germany with lithographic presses, but the process he was about to show was worked with an ordinary letter-copying press. In the ordinary collographic process thick glass was generally used, and a certain temperature had to be observed, upon which the character of the image depended. The process lent itself to a great variety of effects. The prevailing fashion just now was for black tones and a matt surface; this was now considered to be artistic. That was the fashion of the time. Well, that effect could be very well produced with collography. The quality of the prints producible was not equal to but better than those with silver, or with platinum, or any other process. He proposed to show the process from beginning to

end. He took a sheet of vegetable parchment coated with gelatine, such as is commercially obtainable, and showed how by immersing for three minutes in a three per cent. solution of bichromate of potash to which a little ammonia had been added the film was sensitised. It was then squeegeed on to glass that had been previously rubbed with talc and stood in an ordinary warm room to dry. If sensitised over night it would be dry and ready to use in the morning. It could then be peeled from the glass and was ready to expose behind the negative. The exposure was carried on until the details in the more opaque parts of the negative were visible. The film was next exposed with the back to the light—to diffused light—for a period which might average five minutes. The effect of this exposure was, first, to harden the gelatine next to the parchment, and so to prevent the film from being torn off in the press; and, secondly, to lessen the relief of the gelatine surface. The film is then placed in water for about two hours to remove the bichromate, and afterwards immersed for an hour in a mixture of glycerine, seventy parts; water, thirty parts; ammonia, three parts. After this the film was stretched upon a wooden frame and rolled up with ink. There should be ink of two degrees of stiffness; the first, or thick ink, adhered only to the deepest shadows, and the next, or thinner ink, was to render the half tones. By adjusting the character of the inks various results could be obtained as desired and differences of the negatives allowed for. A film which had been exposed under a negative of a trying subject—a marble figure with a background of dark foliage—was then inked and printed from in the presence of the meeting, and it was explained that the first print pulled was always defective and had to be rejected. After half a dozen pulls or so the plate would get into working order. The use of the process for various purposes—printing on canvas, on woodblocks, and on transfer paper for transfer to porcelain for burning in—was then illustrated by examples of the various methods. For ordinary work, a reversed negative had to be made, and this he preferred to do by the powder process. An original and the reversed negative were handed round.

The Chairman having to leave before the conclusion of the demonstration, the chair was taken by Mr. JOHN SPILLER, who, at the conclusion of Mr. Warnerke's remarks, proposed votes of thanks to him, and to the Autotype Company, the Stereoscopic Company, Messrs. Bemrose & Co., Waterlow & Sons, Romanlee & Co., Rovillé, and Shevoy & Co., for sending the numerous collection of examples of collographic work on the walls. These would remain for a month and form an exhibition of that class of work. It was mentioned that at the next technical meeting the process of collography would be under consideration.

FEBRUARY 10.—Ordinary meeting.—Mr. James Glaisher, F.R.S. (President)' in the chair.

Sir DAVID SALOMONS read a paper on *Standard Registering Slides and their Mode of Use*, in the course of which he mentioned that the magic lantern was no longer a toy, but had taken its place as an aid to science. It was desirable in using a multiple lantern to be able to bring slides into true register at whichever part of the apparatus they might be shown, and to do this, method was necessary. The old plan of doing this, by using picture slides for the purpose, had been superseded by standard registering crosses, introduced by Messrs. Steward. These, although an improvement, he had not found sufficient for exact work, and had therefore adopted a form consisting of a square ruled on the glass with lines bisecting vertically and horizontally. Such squares could be etched, and thus produced in number all to one standard. It was necessary that two edges of each standard should be true—the lower edge, which rests upon the runner, and the edge which is to stop against the stage stop. Registering slides of the pattern described were shown and their use illustrated in a triple lantern. A series of effect slides was then put through the lanterns, and the accuracy of the registration as well as the beauty of some of the slides themselves were much admired.

Mr. J. SPILLER (Vice-President) by this time having taken the chair vacated by the President, said that he had early taken great interest in lantern matters. He had known the late Mr. Pepper, of the Polytechnic, and been admitted into the secrets of the dark chamber of that institution. He called on Mr. W. E. Debenham to show some colour screens in the lantern.

Mr. DEBENHAM said that it had been suggested to him that it would interest the members to have these screens, which he had recently used before another society, projected by the triple lantern in use that evening. In the first place, the idea was to demonstrate that red and green light made a yellow, and that the so-called primary colours should not be ranked as blue, yellow, and red, but as blue, green, and red. The blue, however, should be inclined to violet. Discs of the three colours were thrown by the separate lanterns on the screen, showing white where all overlapped, and yellow where the green and red overlapped. He next showed blue and yellow discs overlapping and producing, not green, but white, which he said might be anticipated if yellow was looked upon as green and red, for they then had the effect of all three, which had been shown in the first set to produce white. The next slide was, he said, for the comfort of those who knew, whatever might be said, that blue and yellow did make green, for they had mixed them numberless times on the palette and found them to do so. This slide was one containing overlapping circles of blue and yellow. Another slide showed overlapping discs of three colours recognised as composite, namely, purple, bluish-green, and yellow, the colours coming through any two of which were the so-called primaries, red, green, and blue. How this difference was to be explained there was not time to go into that night, but he had undertaken to occupy an evening with the subject at the London and Provincial Photographic Association, and the well-known hospitality of that Association justified him in saying that if any members of this Society were interested in the subject they would be welcomed as visitors.

Mr. CHAPMAN JONES asked whether the warmth of the lantern threw the slides out of register. He said that it might be inferred from Mr. Debenham's remarks that all yellow was a compound of green and red, but there was, in fact, a pure spectrum yellow.

Mr. DEBENHAM had not intended to convey that meaning. He had felt himself limited in time on this occasion, and could not go much into explanation at that hour.

Sir DAVID SALOMONS, in replying to Mr. Chapman Jones, said that the heat of the lantern did have an effect to some extent in putting slides out of register. It was also important to have the slides themselves of one temperature. For this purpose they should all be brought into the exhibition room together and kept there some time before being exhibited.

The CHAIRMAN proposed votes of thanks to Sir D. Salomons and to Mr. W. E. Debenham, which were passed. He then announced that at the next technical meeting, to be held on March 24, the subject would be *Hand Cameras*. Members were requested to bring various patterns for comparison. On March 31 there would be a lantern night; on April 14 a demonstration of *The Platinum Process* by Mr. W. Willis; on April 28 the subject would be *Animal Photography*; and on May 12 M. Léon Vidal, of Paris, would read a paper on *Photographic Methods of Obtaining Polychromatic Impressions*.

Messrs. J. C. Braham, H. Young, G. McDonald, and W. Grove were elected members.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 5,—Mr. A. Collier in the chair.

A presentation for the library was received from Mr. Chang, together with a large parcel of photographic works from Messrs. Piper & Carter.

After due acknowledgment, Mr. A. HADDON moved the best thanks of the Association to all who had taken part in the concert, entertainment, and scientific and lantern display given on the preceding Tuesday evening, mentioning particularly the names of Messrs. F. A. Bridge, J. B. B. Wellington, J. J. Briginshaw, T. E. Freshwater, and W. E. Debenham.

This motion being seconded and carried, the SECRETARY reported that he had, as requested, attended the meeting called by Mr. Biden on the preceding Monday with reference to a proposed federation, and related the proceedings thereat. No immediate action was decided upon.

It was then announced that there would be lectures and demonstrations on subjects connected with light, to commence in April. Mr. A. Haddon would deal with polarisation, Mr. W. E. Debenham with colour, Mr. T. E. Freshwater with the lantern microscope, and Mr. J. J. Briginshaw would give a demonstration with the lantern polariscope.

Mr. A. COWAN said that it had been suggested with reference to the pictures which he had developed with eikonogen and sulphite of soda only, that the action of the sulphite of soda was due to its alkalinity. He had, therefore, made a fresh trial with some neutral sulphite furnished by Mr. Haddon, and now showed the result. The picture had developed in eight minutes without addition of alkali. Eikonogen alone without the sulphite took ninety minutes to develop. He concluded either that eikonogen was itself alkaline or that it acted as a developer whilst neutral.

Mr. HADDON contended that it was desirable to use sulphite that was either neutral or the condition of which as to the amount of alkalinity was known, so that a formula given by one experimentalist could be realised by another.

Mr. P. R. NEWMAN then read his paper on *Pictorial Composition* [this will appear subsequently], illustrated by lantern slides and other works.

At the conclusion of the paper several members expressed their approval of the instructive character of the lecture, but there was no formal discussion.

Mr. J. Désiré England was elected a member of the Association.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 3.—Technical evening.—Mr. Few in the chair.

The Rev. E. HEALY exhibited a hand camera, and said that Messrs. Adams & Co., of Aldersgate-street, were bringing out a new and improved camera upon the principle of the one now shown.

The members agreed that it would be one of the most simple and compact hand cameras in the market.

Mr. Healy also exhibited his small camera with single lens for taking stereoscopic negatives, and Mr. W. BISHOP explained how, by exposing each half of the plate in its true relative position, the negative could be printed from and the pictures mounted with true stereoscopic effect without cutting and remounting them.

Mr. Hudson exhibited one of Newman & Adams' latest instantaneous and time shutters with pneumatic brake.

The annual exhibition, which was unavoidably postponed from March 3, will take place in the Wellington Hall on Tuesday evening, March 17.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 6,—Mr. Edwards in the chair.

A paper on the subject of *Shutters* was read by Mr. GROVES, and illustrated by diagrams which he had prepared to show the efficiency of the various shutters at present in the market.

Messrs. Marion & Co., George Houghton & Son, and Watson & Sons kindly lent a number of specimens, and, with those brought by the members, fully twenty different styles of shutters were on view, a most instructive evening being passed.

The Society resolved to take part in the exhibition to be held at the Crystal Palace in competition for the challenge cup.

HOLBORN CAMERA CLUB.

THE above Club held their second Annual Exhibition on Saturday last, March 7, when a very fine display of pictures were brought together. The President, Mr. T. C. Hepworth, and Mr. F. A. Bridge acted as Judges, and the prizes fell to the following members:—Class I. "For the best exhibit of pictures that shall be the most numerous and meritorious." 1st, Mr. Fred Brocas; 2nd, Mr. S. T. Chang: 3rd, Mr. H. Beckford.—Class II. "For the best six quarter-plate pictures." 1st, Mr. W. H. Osborne; 2nd, Mr. T. C. Phillips.—Class III. "Enlargements." 1st, Mr. J. E. Smith; 2nd, Mrs. J. E. Smith.—Class IV. "For the best six pictures taken by a lady member."

Mrs. J. E. Smith. Mr. F. Brocas's set of twenty-two whole-plate pictures made a most excellent show. Mr. S. T. Chang's set of eight whole-plate pictures were in his usual careful style. Mr. H. Beckford's set of six half-plate pictures contained some of his very unique and excellent photographs of the interiors of cathedrals, which this gentleman makes a special study. In the quarter-plate competition Mr. W. H. Osborne comes well forward, especially as he is quite a beginner.

For the lantern-slide competition, the first prize fell to Mr. S. T. Chang for a fine show of architecture, Mr. Beckford coming second, Mr. Bayston taking third place.

In spite of the bad weather, there was a very good attendance of members and friends (about seventy); but probably this was because of the "Cinderella" which the Club always adds to its Exhibition. A great feature was the dance programme, which was printed on bromide paper, and contained the portraits of the officers of the Club. There were about two hundred pictures, very tastefully arranged by the energetic Treasurer, Mr. Albert Bell; and Mr. S. T. Chang, as is his wont, brought his flash lamps and cameras, and made half a dozen exposures. The prize pictures will be on show at the Club room on Friday, the 20th, when the prizes will be distributed to the successful competitors.

CROYDON CAMERA CLUB.

March 6.—Annual Dinner.—The chair was occupied by the President (Mr. H. Maclean, F.G.S.).

Letters of regret were received from Messrs. J. Traill Taylor, C. A. Hastings, Gambier Bolton, Reginald Ryley, Major Fortuné Nott, and others.

During the evening appropriate toasts and responses were made, music and general geniality prevailed, and a most enjoyable evening was spent.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

March 6,—Mr. W. Low-Sarjeant in the chair.

Mr. W. S. Fry demonstrated to a crowded and appreciative audience on *The Uses of Bromide Paper*, illustrated by a fine series of examples, both contact and enlargements. Some good examples of warm tones obtained by toning with uranium were also exhibited, illustrating that bromide prints are not confined to the usual cold grey when brown tones are required.

On Monday, March 16, a general meeting of the Photographic Section will be held to discuss and arrange the summer excursions and rambles.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

At the weekly meeting on Friday, the 27th ult., Mr. C. H. Davis in the chair, the accounts of the recent lecture by the President (Major J. Fortuné Nott) were submitted, showing a balance of 4*l.* available for the Richmond Hospital.

Failing a promised demonstration, there was no special subject on the programme, but an interesting discussion took place, turning chiefly upon dodges in the development and mounting of lantern slides.

The conditions were settled for a lantern-slide competition.

March 6.—Lantern night.—Mr. F. P. Cembrano presided.

Mr. C. Hussey, of Croydon, having happily recovered from his recent indisposition, gave his postponed demonstration of *The Collodio-bromide Process*, which accordingly preceded the usual lantern business. Mr. Hussey, after a few general remarks upon lantern-slide work in general and the advantages he claimed for his favourite process, went on to describe very lucidly the *modus operandi*. Starting with the cleaning of the glass, he first showed how to coat a plate, his practice being to use no mineral acid in cleaning and no substratum in coating the glass, for fear of contaminating the emulsion. Next, three plates were successively exposed, developed, and fixed, and the demonstrator proceeded to illustrate the great advantage which he claimed for his process, namely, that whereas a gelatine plate after development and fixing passes practically out of control, a collodio-bromide plate is at that stage as a *cliché* to work upon, being readily susceptible of almost unlimited variation in density and tone.

After a few remarks from the Chairman on the merits of the rival processes, the limelight was turned on, and one of the newly-made slides was the first to be passed through the lantern, proving to be of admirable brilliancy and tone. Other slides by Mr. Hussey followed, showing a wonderful range of tone, and there were then exhibited slides by others.

Next meeting, Friday, the 13th inst., *Photometers and Actinometers.*

SYDENHAM AMATEUR CAMERA CLUB.

March 3,—The President in the chair.

The Hon. Secretary reported that at the request of the Committee he and Mr. Rumble had attended the meeting of the London and Suburban Photographic Societies to consider the question of federation, and on Mr. Piggott's proposal these two gentlemen were requested to again attend as delegates on behalf of the Club, and to act for it as they thought best in its interests.

At half-past eight the lantern was started, and a number of slides by various members were exhibited.

LEEDS PHOTOGRAPHIC SOCIETY.

On Thursday evening last the *Amateur Photographer* prize lantern slides were exhibited before the members of this Society, the President (Mr. Godfrey Bingley) in the chair.

Altogether a very enjoyable evening was spent, many of the slides exhibited betraying considerable artistic feeling, combined with technical excellence on the part of the exhibitors.

The Hon. Secretary (Mr. S. A. Warburton) described the slides as they were thrown upon the screen.

EALING PHOTOGRAPHIC SOCIETY.

March 5,—The President in the chair.

Mr. George Willis was elected a member.

A paper on *Intensifying and Reducing Gelatine Negatives* was read by Mr. Rowland Whiting.

LEWES PHOTOGRAPHIC SOCIETY.

March 3,—The President in the chair.

Demonstrations were given as follows:—The President (Mr. J. G. Braden), *Matt-surface Prints Toned with Platinum;* the Vice-President (Mr. J. Tunks), *Silver Prints Toned with Gold;* Mr. G. J. Wightman, *Hot Bath Platinotype.* Specimen prints by each process were shown.

A special meeting was held on the 7th inst., when members and their friends were shown the *Photography* prize slides.

Next meeting, April 7, lantern slide competition—the last lantern night of the season.

BOLTON PHOTOGRAPHIC SOCIETY.

The above Society celebrated the opening of their new rooms in Rushton-street, off Corporation-street, on the 5th inst., by the holding of a dinner and subsequent "talk" in the new premises. The Society has been in existence since 1879, and has now a membership of over seventy. They used to meet in the Baths, in Bridgeman-street; but the arrangement was found to be very inconvenient, and after due consideration it was determined the Society should have rooms of its own, where the members could work when unable to go outside owing to climatic influences, and also where specimens of different classes of work executed by the members might be exhibited. A couple of rooms were secured in Rushton-street, and which overlook the Co-operative Society's premises in Bridge-street; and one advantage about this selection is that, besides having a good light, there is opportunity afforded for extension when funds will allow. At present there are two rooms, one of which is to be a dark room for the use of members, and the other a general conversation and lecture room. In the latter room there is a screen made in the wall of plaster of Paris, and upon which subjects under discussion will be illustrated by the aid of the oxy-hydrogen light.

SHROPSHIRE CAMERA CLUB.

March 2.—Following up the idea so successfully carried out last year, the members of the Shropshire Camera Club gave another exhibition of photographs in the Music Hall, Shrewsbury, which was occupied by a large company of ladies and gentlemen, who appreciated to the full the invitation extended to them by the executive of the Club.

The chair was occupied by the Mayor, who opened the proceedings with a few preliminary remarks, in the course of which he expressed his thanks to the Club for having asked him to be present, and said he was sure, from what he knew of the results achieved by the members, that a treat was in store for the audience. His Worship then introduced Mr. Councillor F. W. Williams, who had kindly undertaken the post of "showman."

Mr. Williams explained that the object of the Club in inviting their friends to meet them that evening was not to listen to any lecture on photography, but simply to show them some pictures utterly disconnected one with another, just as if they were looking through a scrap-book, and to give them an idea of what their friends and neighbours who had taken up the fascinating art of photography could do, in a short time in many cases. They hoped also to induce others to join them in a very fascinating recreation, combined with which there was a great deal of instructive enjoyment.

The "show" then commenced with a collection of pictures from photographs taken in this and the adjoining counties by members of the Club, whose work met with the well-deserved plaudits of the audience, showing, as it did, a great improvement on that of last year.

Slides were contributed by Mr. J. Della Porta, jun., Mr. R. J. Irwin, Mr. Davies (St. Julian's Friars), Dr. Cureton, Mr. W. E. Harding, Mr. Frank Marshall, Mr. Butler (Ludlow), Mr. W. Burson, Mr. Pyefinch, Mr. and Mrs. Naunton, Mr. Wallace Heath, Mr. Alltree, Mr. Bidlake, Mr. J. M. Harding, and Mr. Greatorex.

During the second half of the exhibition was shown a fine set of slides lent by the London Camera Club, and Mr. Brookes, of Reigate. A good musical programme was then gone through.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

March 5,—Mr. Craig Annan (Vice-President) in the chair.

One new member was elected.

Mr. F. Mackenzie gave a practical demonstration of the collodio-bromide emulsion process for lantern transparencies, and successfully exposed and developed a plate prepared according to this process.

Rolland's cameos were exhibited, and a series of Woodbury and members' slides were shown by means of the Society's lantern.

EDINBURGH PHOTOGRAPHIC SOCIETY.

February 4.—Mr. A. F. M. Powell, L.R.C.P.E., read a paper, and gave demonstrations thereof, on *Intensification and its Chemistry*, in which he explained the various changes which take place during the process of intensifying negatives on bromo-gelatine dry plates, describing it as "that process by which we either alter the colour or add to the existing image so as to render an otherwise thin negative of a good printing quality," and explaining that this could be brought about in a variety of ways, mechanical and chemical, but dealing with the latter only. Taking the mercury and ammonia process first, he illustrated the chemical changes which take place during the conversion of the image, by bleaching it into the insoluble mercurous salt and silver chloride, both salts being white, the bleaching being due to the action of the chlorine. But although the density of mercury is associated with silver, and the image

is really denser, it does not appear so, but shows rather decrease than increase in consequence of its colour. By the addition of ammonia—about ten to fifteen drops to the ounce of water—silver chloride is dissolved, and the mercurous salt changed into a double salt of mercury and ammonia, with the probable production of a little metallic mercury or perhaps mercurous oxide, this being uncertain, the ultimate result being, however, the blackening of the image. In the case of the use of sodium sulphite of ten to fifteen per cent., its action on the bleached image is to change the mercurous salt to the metallic state, the silver chloride into silver sulphite, a soluble salt which is removed. This renders the image darker, but not so dark as in the previous, or ammonia, method, probably because the mercury is somewhat translucent. When the bleached image is treated with ferrous oxalate, in this instance the developer used for bromide prints may be used, and is so well known that it need not be particularised. We arrive at a reduction of both the mercurous and the silver chloride to the metallic state without removing either, and thus get twice the density obtained in either of the other instances, because the silver is not removed as in them, but the density of the mercury is added to the previously existing silver image. This is not the only advantage, however, as this form of the image is as capable of re-intensification as the original one was. The silver in it will again react to a further treatment of mercuric chloride, and probably so does the metallic mercury deposited by the previous treatment; and these salts are again reduced to their metallic states by a reapplication of the ferrous oxalate solution, thus rendering this process of intensification very valuable, especially in the case of very thin negatives, as a good printing plate can be built up, so to speak, out of a very poor one. The processes involving the use of uranium or lead depend upon the fact that silver reduces the ferricyanides of those metals to their ferrocyanides, which are insoluble, that body becoming also a ferrocyanide, and associating itself with them probably as a double salt. In the case of uranium, the image, being of a chocolate colour, requires no further treatment; but with lead it is white, and this may be changed with a number of chemicals, and among these ammonium sulphide and sulphuretted hydrogen blackens the image, and thus intensifies it sufficiently. With hydroquinone the salts of mercury and silver are reduced to their metallic states by development, that substance being oxidised into various bodies, the changes being, to a great extent, unknown. This method was not recommended by the speaker, in consequence of its liability to staining. The paper and demonstrations, which were pretty exhaustive, were terminated by the expression of a hope that those present, and especially the amateurs, had derived "some knowledge of the chemical changes that take place during the operations attending the intensification of a negative."

At the meeting on March 4, the President (Mr. H. J. Blanc) occupied the chair.

A number of new members, including one lady, were admitted.

The Chairman then stated that the Council, having had under their consideration the comparative falling off in the interest shown by members in the annual show of work, and with the view of stimulating an interest therein, had decided to offer for competition two medals for the best pictures produced by members during the current season, and he stated that he would supplement these by another from himself. The Council had not yet decided upon the conditions on which the medals would be granted, and to aid them in their deliberations they would be glad to receive for consideration any suggestions from members of the Society, and these should be sent to the Secretary not later than the 14th of March. They had also decided to revive the outdoor meetings, which had been so popular and marked a feature of this Society, but which had been discontinued for the last few years. Three of these would be held this year. The first was to be held on the afternoon of Saturday, May 9, and the intention in the meantime was to make it to the old town of Inverkeithing, going, of course, by the Forth Bridge. The other two would be on Saturday, June 6, and Saturday, July 4, and the Council would be glad to have the views of the members on the places to be chosen for them. As at least one of the medals will be for pictures taken at these meetings, the hope was expressed that an increased interest in them would thus be secured. The pictures would be shown, and the medals awarded, at the next Society's annual exhibition of selections from the year's work, which would be held at the beginning of the next winter's session.

A paper was then read by Dr. Wm. Stewart, L.R.C.P.E., on *Gelatino-Chloride Papers and their Manipulators*, in which he showed the different methods of treatment necessary to produce the final finished effects on this class of photographic print.

Mr. W. T. Bashford, while admiring the fine shades and great variety of tints which it was possible to produce with them, stated that he had found considerable difficulty in the mounting of them from the quantity of water the gelatine necessarily held in suspension or took up in that process.

Mr. J. M. Turnbull stated that the principal brand in use took its name from the maker (Obernetter), a German manufacturer, who was the first to revive its use and place it in the market. It was invented by an Englishman, he thought, Mr. G. Wharton Simpson. He was not aware why collodio-chloride paper was not more taken up by makers in this country, but he supposed it was from the disagreeable nature of the manufacture, the operator getting intoxicated by the fumes of the chemicals. In trying it he had to adjourn to the open air every few minutes. He had been told that in the German manufactory the workmen had to wear a mask and get fresh air pumped to them.

A few other remarks having been made, Dr. Stewart replied, and received the thanks of the meeting.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A stated meeting was held on Wednesday evening, February 11, the President (Mr. J. G. Bullock) in the chair.

Dr. Charles L. Mitchell read a paper on *Intensification*. [See page 166.]

Mr. Carbutt presented for examination some positive prints on thin sheets of celluloid, to which he had given the name of "Cellugraphs." The prints were made by an exposure in diffused daylight of one to one and a half seconds. It was recommended to tone them in the following bath:—Sixteen ounces of water and three grains of chloride of gold.

Mr. Bell exhibited a few pictures on the same material as that shown by Mr. Carbutt. His first trial had failed from his own lack of knowledge how to develop them. By weakening the developer down very much and timing fully, the operator could have the development under perfect control, could stop anywhere, and could use quite a quantity of light in developing. He had not tried them by gaslight; they were all exposed by daylight.

Mr. Bell showed a negative made on a Cramer 50 plate, with very brief exposure. It was about twice as dense as should be, but was shown to illustrate the value of a developing formula which he had devised. By weakening the developer a negative of proper density could readily be obtained, and the difficulty sometimes experienced in getting full density with very rapid plates was entirely overcome. His formula had been published in Wilson's *Photographic Magazine*, and was as follows:—

Hydroquinone and Eikonogen Developer.

No. I.

Ice or distilled water (hot)	32 ounces.
Sulphite of soda	2 ,,

Dissolve, and make acid by sulphuric acid; then add—

Hydroquinone	160 grains.
Eikonogen (yellow-white crystals)	160 ,,

No. II.

Water	32 ounces.
Carbonate of potassium	4 ,,
Sulphite of soda	1 ounce.
Bromide of potassium	64 grains.

For use, take equal parts of Nos. 1 and 2; develop until image is seen on the glass side of the negative. Use developer over and over, refreshing with new as needed. The developer keeps well as a mixture of Nos. 1 and 2, but it is preferable to keep it in two solutions, as it allows more liberty at the time of developing by using more of the one or the other, as may be necessary. It does not stain the hands, gives excellent density, and works quicker at a temperature of 60° or 70°. At low temperatures its action is very slow. Colour of negative black, with a grey tint; printing quality very fine, especially after fixing in the following bath, which need not be acid, as in the case of pyro fixing bath, and therefore no free sulphur to trouble:—

Water	32 ounces.
Hyposulphite of soda	1 pound.
Sulphite of soda	2 ounces.

This fixing bath has kept for three months in use, fresh solution, as above, being added.

Mr. Carbutt thought that the method of instruction defined by Mr. Bell—viz., development until the image is seen on the back of the glass—was an erroneous one. If adopted by beginners or others developing their own negatives, they would get just such an over-dense result as shown by Mr. Bell. Density should be determined by examining by transmitted light, not by depending on what is shown on the back of the plate. All plates will not bear development so far; they would get very hard.

The Chairman called the attention of the members to the fact, noted in the medical journals, that uranium salts were of an extremely poisonous character. Heretofore it had not been known how poisonous they were, and it would be well to bear this in mind in using them.

Mr. Stirling: I would like to ask a question of the Society. I have here a Darlot lens, made specially for lantern projection, which has some peculiar features. It has a ten-inch focus. The ordinary lenses which are furnished for the same work are the Darlot 4 × 4 lenses, which are probably, I was going to say, twice the diameter. The question I want to ask is, Whether this lens ought not to transmit as much light as the larger lenses? If it does not, what proportion of the light does it cut off? Theoretically, the objective is placed in the focus of the condenser. To be perfect that ought to be a point—the point of a cone. Now, why a lens of that diameter should not transmit the whole of the light is an interesting question.

In the present number of The British Journal Photographic Almanac, the editor, under the head of *Lanterniana*, takes up that point, and says that the answer can be both yes and no; that if the radiant is, as it ought to be, in theory an absolute point—if the condensers transmit the rays as they ought—*i.e.*, converge them to a point, then a lens of small diameter should transmit as much light as the larger one, the additional glass and brass work being so much waste and expense. In the matter of expense I would say that a 4 × 4 Darlot lens is worth thirty-two or thirty-four dollars. I do not know what this may be worth, but it cost less than a third of that figure. The editor of The British Journal Almanac goes on to say that practically the radiant is not a point; it sometimes spreads until it is perhaps three-quarters of an inch in diameter. The slide also tends to diverge the rays, so that instead of being a cone at the focus of the condenser, there is a bundle of rays of varying thicknesses, dependent upon the degree to which the condenser and the slide destroy the perfect convergence of the rays; so that under certain circumstances this lens will transmit as much light as the other, but the chances are that the convergence will not be perfect, and therefore the larger lens is better. A writer in a book just published on *Optical Projection* says that opticians have gone to the extreme in either direction. For long-focus work they have provided lenses of three and four-inch diameters. He says it is utter waste of material. In some foreign lanterns the low-power objectives are made with the rear combination larger, because the lens, being brought closer to the condenser, the angle is a greater one, and there is more danger of rays being cut off there than with a longer focus lens, where the angle is a narrow one. I would like to ask whether any of the members have thought about this, and whether any light can be given on that point?

Mr. Cheyney: Some years ago Mr. D. S. Holman, then Actuary of the Franklin Institute, found that in order to get the best illumination for the lantern microscope, and also for the table microscope, the angle made by the rays from the condenser should coincide with the angle with which the

objective should receive them, in order that the rays should not be refracted any more than possible; or, in other words, there should be a certain relation between the focus of the condenser and that of the objective, and that wherever this relation was changed it was done at the expense of light.

Correspondence.

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

UTILITY OF HAND CAMERAS.

To the EDITOR.

SIR,—An article headed *Hints to Beginners* appears in your last issue, in which the word Oxford arrested my attention and caused me to read the whole article. I notice, sir, that nearly a page of your valuable space is taken up chiefly in disparagement of hand cameras and hand-camera work, and this by a writer who has never so much as seen a hand camera capable of attachment to a tripod, of accuracy of focussing, and of all lengths of exposure being given with it! There are several cameras, as you, sir, know full well, "combining these three important functions," consequently the last paragraph in Mr. Chesterman's letter is simply misleading. Through the courtesy of several manufacturers I had the pleasure of showing and explaining a collection of hand cameras before the Society with which I am connected. Some were little more than toys, others were wanting in many respects, while some were really good, and capable of producing good work as a rule.

I do not in the least know where Mr. Chesterman saw the slides exhibited of which he writes to you, but as I also reside in Oxford, I challenge your correspondent to attend one of the Oxford Photographic Society's lantern nights (if he will send me his address I will send tickets), and pick out such slides as they appear on the screen as have, or have not, been made from hand-camera negatives, and I should like him to send you another article after that occasion. I possess a hand camera which gives me almost complete satisfaction (when will the makers give us a swingback?), and it is to protest against such wholesale condemnation as that indulged in by your correspondent, who admits but small knowledge of the subject, that I ask you to kindly publish this in your next.—I am, yours, &c., PRESIDENT.

DURATION OF DROP-SHUTTER EXPOSURE.

To the EDITOR.

SIR,—Assuming the acceleration of gravity to be thirty-two feet per second, and neglecting friction, the time of exposure asked for by Mr. Edward J. Smith will be almost exactly six-one-hundredths of a second, or, roughly, one-sixteenth of a second.—I am, yours, &c.,

Glenfall Lawn, Cheltenham. CLIFFORD E. F. NASH.

SIR,—The time from the beginning of the opening of the aperture to the final closing of it is ·0592 sec.; but the time from the full opening of the aperture to the beginning of its close is ·0355 sec.—I am, yours, &c., EDWARD M. NELSON.

London, March 6, 1891.

P.S.—As similar questions are frequently arising, I will give the formula, which is quite simple.

The duration of exposure is the time the shutter takes to fall to end the exposure, less the time the shutter takes to fall to begin the exposure. The times may be found when *d*, the distance the shutter has to fall *in inches*, is known. Thus—

$$t \text{ (seconds)} = \sqrt{\frac{d}{193}}.$$

In Mr. Smith's example—

$$t = \sqrt{\frac{\cdot 75}{193}} = \cdot 0623 \text{ sec.}$$

$$t = \sqrt{\frac{2 \cdot 85}{193}} = \cdot 1215 \text{ sec.}$$

·1215
·0623

·0592 = the exposure. E. M. NELSON.

FLEXIBLE FILMS.

To the EDITOR.

SIR,—The letters of "Countryman" and "Lux" in the two recent issues of your JOURNAL, criticising the cupro-ammonium process of producing films for photographic purposes, demand a word or two of explanation from me, as they give a false idea of the process and its merits.

"Lux" starts with the fundamental error of supposing that the glaze is similar or identical with that produced by polishing or calendering a sheet of paper. In reality the two surfaces are as utterly unlike as the means employed to produce them. The cupro-ammonium glaze is far more brilliant than any that can possibly be produced by mere roller pressure, and is not attacked when immersed for a long time in water, weak acids, or alkalies and saline solutions, even when hot; whereas the glaze produced by calendering or pressure is easily removed by simple immersion in water. The reason is not far to seek. The cupro-ammonium glaze is of chemical origin, the calender glaze of mechanical origin; and the two are as widely remote in their physical properties as are the diamond and charcoal, or the gold precipitated in the toning bath and that obtained by hammering into leaves. "Lux," then, assumes that because paper is made of cellulose, the cellulose film must of necessity be paper—a conclusion not warranted when it is considered that paper is an assemblage of vegetable fibres matted or felted together and cemented by sizing materials, and is easily resolved into its component fibres by crushing up in hot water, while the cellulose film has no structure and cannot be disintegrated either by hot water or by chemical means, and may even be wrung out and twisted as an ordinary piece of rag without being injured.

Founded, then, upon these misconceptions of its nature and properties, your correspondents' reasons for doubting the ability of the cellulose paper to yield results approaching those of albumen may be dismissed in a few words. The cellulose film carries the picture in exactly the same manner as albumen, but that the picture remains in the film can easily be shown by boiling the print with water and rubbing away the supporting paper at the back with a soft brush when the picture is obtained as a transparency. The blackening of the paper does not occur, because the free nitrate of silver is prevented by the cellulose film from coming into contact with the paper. Although albuminate of silver cannot of course be formed in the film, a compound closely resembling it is present, since the untoned prints have a peculiar red colour resembling those in albumen. Indeed, the film resembles so closely in all its chemical and physical properties that of albumen, that with mounted prints it is only by chemical tests that the difference can be satisfactorily determined. While agreeing with "Lux" that there is a wide difference in their general properties between animal and vegetable substances, I contend that in the case under discussion the advantages lie on the side of the cellulose, which, composed only of carbon, hydrogen, and oxygen, is one of the most stable substances in the organic world, is not liable to decomposition by exposure to moist air, is quite unaffected by ordinary solvents, and contains no ingredient prone to cause blackening of the silver print. On the other hand, we have albumen, a highly nitrogenised and more complex animal body, very subject to spontaneous decomposition, more readily attacked by solvents, and containing about one and a half per cent. of sulphur. Comparing the properties of these, it seems to me that, granted an equally brilliant surface, and the possibility of producing the effects of albumen prints, the advantage is in favour of the employment of cellulose. Can a paper possessing these properties be regarded as no better than the plain paper of thirty years ago, to use your correspondent's expression? I trust when "Lux" next criticises a new invention he will distinguish between results chemical and results mechanical; that he will bear in mind the influence of allotropism on the properties of bodies, and that isomerism is common among organic compounds; and that he will pause before pronouncing upon the complexity of a process or the novelty of the results, and consider whether there may not be something in it hitherto undreamt of in his philosophy.

"Countryman" is correct in assuming that one object of the invention is the production of permanent silver prints, and rather pertinently asks how a sulphur free film would avail when hyposulphite is used in the fixing. With the cellulose film paper the operator has the choice of a variety of fixing agents, and it may interest him to know that the prints can be easily and cheaply fixed in a hot, nearly saturated solution of common salt, the prints being afterwards rinsed in warm water.—I am, yours, &c., J. WILLIAMS (The Patentee).

Willesden Junction, London, N.W., March 5, 1891.

DARK-ROOM ILLUMINATION.

To the EDITOR.

SIR,—Kindly allow me to point out an error in your report of proceedings of the Photographic Society of Great Britain. In your report I am made to describe a candle lamp for dark-room illumination. This is incorrect, as I have never used the lamp in question, and do not know its capabilities. I did, however, say that I considered a weak point of a candle lamp for the dark room is the fact that it might happen to give out in the middle of development, as there is no gauge to tell whether you have much or little candle left. My experience with candle lamps has not been satisfactory. About ten years ago I carried one on my bicycle, but I had to discard it on account of a most uncomfortable way it had of popping out at most inopportune times, through the candle being used up.—I am, yours, &c., J. DÉSIRÉ ENGLAND.

HAES' PERFECTION LAMP.

To the EDITOR.

SIR,—In the report of the meeting of the Photographic Society on February 24, I notice that my lamp, which had been given to the Society by the makers, Messrs. Benham & Froud, Limited, was exhibited and

explained; but the report, being most probably compressed, would lead a reader to suppose that the method described was the only way to use the lamp; and if this were so, many of the advantages it possesses would be lost. The method reported is only used when developing isochromatic or similar plates. The proper place for the lamp in use is on either side of the worker, close to the front edge of the bench. As a matter of convenience, I never allow the direct light to fall on the plate when commencing development; but when the image begins to appear, I examine the progress by partially rotating the candlestick. No ruby glass being used, and the worker being always in darkness, the light falling only on the plate, one is able to detect the slightest change in the image with a comfort hardly to be credited without experience; the beam of light will amply illuminate a plate twenty-four inches long; strong white light can be obtained by unfixing a bayonet catch, and all-round light by removing the hood. Yellow paper is not required on the wall to receive the coloured light; only one coloured glass is supplied, which is all that is necessary for practical work. I never attend the meetings of the Photographic Society, and was therefore unable to explain the best way of using the lamp myself, but trust to your kindness to allow me to do so in your columns.—I am, yours, &c., FRANK HAES.

28, *Basset-road, W., March* 5, 1891.

NATIONAL PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I have the pleasure to hand you herewith our list of judges for the ensuing exhibition, and I should be obliged if you will notify your readers that applications for space will be received up to Monday, the 30th inst., a week later than previously announced.—I am, yours, &c.,

S. G. BUCHANAN WOLLASTON.

Crystal Palace Company, Crystal Palace, S.E., March 8, 1891.

Judges.—Messrs. Frank Atkinson, Val. Blanchard, F. P. Cembrano, F. M. Good, Frank Howard, and Phillip R. Newman. *Lantern and Scientific.*—Messrs. G. Baker Cresswell, F. E. Freshwater, Com. C. E. Gladstone, R.N., and E. M. Nelson, F.R.M.S.

FILMS FROM WOOD PULP.

To the EDITOR.

SIR,—I don't know whether the following is new to you or not, but at all events I hazard the communication. You no doubt know that the manufacture of paper from the pulp of wood is carried on to a large extent both in America and the Continent. Lately this has been effected by the application of electricity, and the discovery that the product has proved *non*-electric, and thereby allowing the storage of the electric current, has led to the project's use for photographic purposes, viz., as a support for the sensitive film. It has been patented, and will no doubt be in the market shortly. I hope to get further information in the course of a month, which I will be happy to send you, if you deem it worthy of further investigation. I enclose you a sample given to me by a friend interested in its manufacture.—I am, yours, &c.,

JAS. ALEX. FORREST.

Waverly, Alexandra-road, Birkenhead, March 5, 1891.

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—I see that "A. J. E." continues to occupy a considerable amount of space and give himself much trouble in order to put himself out of temper with me and the above organization. I must repeat that I have no time myself to waste, nor do I take delight in the infinite pettinesses of newspaper debate. In the language of the "wild and woolly west," I 'see" your correspondent, and "go him one better."

My Society does for me all he describes for the sum of $9\frac{1}{4}d.$ per week. But he carefully conceals the fact that this has no possible connexion with the question of unemployed benefit. He knows very well that no benefit society dares to attempt the payment of a benefit to members out of employment; for the simple reason that incompetents are admitted as freely as competents into a benefit society, provided that their physical condition is satisfactory. Let "A. J. E." examine the rules of trade societies that give both sick and unemployed benefits, and he will see that the former benefit is always more liberal than the latter. Want of employment is a constantly increasing danger, sickness is becoming a rapidly decreasing danger. Is it any wonder that "A. J. E.'s" figures show a more liberal scale of payments than those of a society which accepts a constantly increasing liability? How little "A. J. E." is worthy of belief when he protests his fairness is evidenced by his first saying that he approaches the matter in a sympathetic spirit, and ending by a one-word sneer because our estimate of probable future strength is a modest one. (He will find the particulars he requires in my letter of the 13th February.)

Allow me to pass to an appeal to all those who have already promised to join to at once attend our branch meetings or send their moneys to our London Secretary, Mr. G. Nield, 44, Englefield-road, Southgate-road, N. There may be some who object to meeting at an inn, but this objection is overcome by the willingness of Mr. Nield to receive moneys by post. Other members are waiting for the production of specimens exacted by our rules before starting to make payments into the Society; but I would remind all promissory members that the filled-in form of application is all that is necessary, in the first instance, before starting to pay the necessary entrance fee and contribution, the specimens being sent in later, but as soon as possible. If the specimens finally sent are judged by the Judging Committee to be satisfactory, the question of admission is settled; but wherever they are not satisfactory the submitter's payments will be returned in full on returning the card of membership.

Wherever an applicant finds it impossible to satisfy the requirements of the rules relating to wages or periods of employment mentioned on our handbill, he or she should write and state the inability to comply in detail.

We have entered into correspondence with the "Amalgamated Society of Lithographic Artists" with a view to amalgamating with that organization when we shall have secured sufficient members to render it advisable on the part of that society. We shall then form a large and strong society; but our duty until then is to make our Union a *reality*, and not a mere *proposal*. I do not think it is too much to ask those who gave their promises to become paying members of this Society to redeem them by sending their entrance fees to Mr. G. Nield. In any case, let it be distinctly understood that we are going to fight this work out, if it takes us all the summer. Let those who believe in the proposals we have advanced for the last fifteen months in the press give us their support in solid cash. As an antidote to the misrepresentations of those who say our subscription is 8*d.* a-week, let me repeat the *scale* of subscriptions here:—

Class A.—Receiving a salary of 25*s.* or less, 2*s.* 6*d.* entrance, 4*d.* per week.

Class B.—Receiving a salary above 25*s.* not over 35*s.*, 3*s.* 6*d.* entrance, 5*d.* per week.

Class C.—Receiving a salary above 35*s.* not over 45*s.*, 5*s.* entrance, 6*d.* per week.

Class D.—Receiving a salary above 45*s.*, 7*s.* 6*d.* entrance, 8*d.* per week.

We are going to prove ourselves worthy of the support of the photographic operatives by sticking to this fight till we force success out of it. Let no one think himself too closely connected with this movement to start paying before the others start. Let us all put our pence together and try to cover the initial expenses, which are necessarily greater than those of any other period of the Society's existence.

We want to purchase a copying apparatus for printing a monthly report of all we do. Will sympathisers help with cash?

We want to see a good attendance at the next meeting. Meetings are held every Wednesday evening at eight p.m., at the "Red Bull," Gray's Inn-road, Holborn (near Holborn Town Hall).—I am, yours, &c.,

ARTHUR FIELD, *Gen. Hon. Sec.*

Exchange Column.

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

Wanted to exchange, Dallmeyer's patent 3B for a 5D, same maker.—Address, H. J. T., 11, Woodstock-road, Oxford.

Wanted, half-plate studio camera in exchange for ten-inch square folding camera.—Address, SCAMELL, 4, Albert-terrace, Church End, Finchley, N.

A large oil painting, framed, offered for an eight or nine-inch plano-convex condenser. Address, SQUIBBS, Photographer, Bridgwater.

Will exchange a seven-inch Ross' portable symmetrical (quite new) for a Dallmeyer's No. 1A wide-angle rectilinear.—Address, TOM COAN, 109, Caledonian-road, N.

I will exchange Lancaster's quarter-plate instantograph, with lens, stand, and two double slides, also chronograph watch, opera glasses, and Tylar's current prodncer, &c., for half-plate (modern) camera, slides, and stand.—Address, FRED. C. D. HUREL, Shepton Mallet.

I will exchange thirteen years of THE BRITISH JOURNAL OF PHOTOGRAPHY and ten years of the *Photographic News*, from the year 1878 (a few numbers missing), for studio accessories, head rest, backgrounds, table camera stand, &c.—Address, JOHN ROBINSON, 4, Zingari-terrace, Gipsy-lane, Upton-park, E.

Exchange *Year Books*, BRITISH JOURNALS, and *Photographys*, wheel print trimmer, half-plate cutting shape, vignette papers, and several direct printing papers, for *The Photographer's Indispensable Handbook* or 8×6 backgrounds.—Address, W. CHURCHILL, Photographer, East-street, Wareham, Dorset.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, March 18, *Testing Speed of Shutters.* March 25, Lantern night. Visitors invited.

AN alleged photographic novelty is now on view at the Literary and Philosophic Club, Berkeley-square, Bristol. It is a coloured photographic print, said to have been taken directly from negatives, the process adopted having been successfully carried out by Mr. F. Bligh Bond, architect, of that city, who is Hon. Secretary of the Bristol and West of England Amateur Photographic Association. The photograph is of cabinet size, and is a view of Land's End. It is a chromo-collotype, and is printed in blue, carmine, and yellow from a set of three negatives. As intimated, the print is produced directly from negatives, which it is claimed have undergone no retouching or manipulation beyond the chemical development. The principle involved is the selection of the colours of nature in the negative and their recombination in the print, which is said to be permanent.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

Henry W. Salmon, Winchester.—*Two views of Winchester Cathedral.*

A. J. SIMPSON (N. S. Wales).—We shall be glad to hear from you.

APLANATIC.—It was a mistake in the optician giving you a larger stop than the actual aperture of the lens. The firm named does not now do this.

R. B. Y.—It is impossible to say if your invention is original or not, or whether, from a commercial point of view, it is worth patenting, without knowing more fully what it is.

N. B.—As you have not been *legally* apprenticed, you are not an apprentice at all, but only a weekly servant. Of course, you are at liberty to give a week's notice and accept another engagement.

C. O.—The most complete public library of photographic works in London is that of the Photographic Club or that of the Camera Club. The Photographic Society of Great Britain has only a small library at present.

T. H. BILLINGHURST.—If you have bought a share in a patent that is worthless we fear you will have to put up with the loss, unless you can prove fraud in the transaction. In that case the law will give you redress.

LUMINILEX.—1. To get rid of the green colour in the crystals obtained by dissolving coins in nitric acid, fuse the crystals, which will oxidise the copper, and again dissolve in distilled water. 2. Apply to the Eastman Company.

E. H. A. (S. A.)—From the mere sight of the prints we can express no opinion as to the reason of their fading. As *cardboard* the mounts are of fair medium quality. A reliable chemical analysis would cost from five to ten guineas.

A. L. H.—As a matter of taste, in attempting to take the portrait of a clergyman with a detective camera while preaching in his church, there is no question. As to the success or the non-success of the experiment we have very little doubt.

REV. A. D. M.—Small orders often get "shunted" for those on a larger scale, particularly when alterations of premises are in progress. The only advice we can offer is to transfer the orders in future to another house that is more prompt in their execution.

L'POOL.—It is certainly a piracy—and any one renders himself liable to the penalties for the offence—to copy any copyright picture as a lantern slide. The mere fact that the "copy is neither on paper or canvas" is of no moment. The penalty is for copying.

LUX.—Either a thin solution of boiled starch or the application of a stratum of milk will give a delicate opalescent surface to glass. Still better, we think, would be exposure to the fumes of fluoric acid generated by dissolving fluor spar in sulphuric acid.

PITOR.—1. For collodion for enamelling, use equal parts of ether and alcohol. 2. As much cold water as the gelatine will absorb; afterwards to be liquefied by heat. The gelatine must be free from acid. 3. From ten to twenty per cent. 4. Keep glass flat until gelatine is set. 5. Write to Messrs. Trübner & Co.

W. B.—1. There are several processes for producing burnt-in enamels, such as by substitution, or the powder process, or that analogous to carbon printing, vitrifiable substances being used. All these processes are excellent. 2. See sub-leader on the subject of wastes, as given by Messrs. Valentine & Sons, a few weeks ago.

J. CONWAY.—With collotype, as with every other process, there is something to learn. You must not expect from simply reading an article, or seeing the process worked so far as the mere printing is concerned, that you will at once become an efficient collotypist. However, persevere and you will attain success in the end.

D. O. CONNOR.—You are under a misconception. There is no new Copyright Act. One is projected, and the Bill has been introduced in the House of Lords; but whether it will become law or not this session, or at all, is still a question. Anyhow, we think you are very unwise to continue exhibiting the portrait of any sitter in opposition to his wish for its withdrawal.

DOCTOR.—In carbon printing, if the tissue leave the support as soon as it is put into the warm water, supposing the usual practice has been followed, and the "safe edge" provided, it would appear that the tissue is insoluble. This can easily be tried by putting a piece of it, before printing, into warm water. If it does not then dissolve freely, all your difficulty is fully accounted for.

S. E. WARBURTON.—Success in the working of either the Woodburytype or the Stannotype process is much dependent upon the paper used for the printing. So far as we are aware, this paper is not supplied commercially in this country, as those who require it prepare it for themselves. The appliances necessary for the purpose are rather costly. Possibly some who work the Woodbury process will supply the paper to order.

BLACK LIST.—Mr. W. Illingworth writes that in December last he sent, in answer to an advertisement, to a house in Limerick some specimens, and although he has made repeated applications for their return, and enclosed stamps for the postage, he cannot get his pictures back.—This is the second complaint we have had against the same house within the last two or three weeks. Mr. Illingworth should communicate with the Superintendent of Police in Limerick, and then let us know the result for the benefit of others.

H. ROBINSON says: "Please say what is the difference between an enlarging camera and a magic lantern, and if the former can be used for the latter purpose, and *vice versâ*."—An enlarging camera is not necessarily a magic lantern, neither is a magic lantern an enlarging camera. Any apparatus manufacturer will, however, supply an apparatus to fulfil each requirement. Any good optical lantern, if fitted with an objective with its visual and actinic focus coincident, will answer as an enlarging lantern.

W. SLATER writes: "Can you kindly inform me how to make a wet collodion plate into a dry plate, no matter if slow in action, and need not keep good longer than twelve hours, but must be made by the wet collodion process for the special purpose wanted, and no gums, gelatines, albumens, or anything sticky must be used. I have tried a simply washed plate, but failed in certainty of result. Can the plates be washed with some chemical? Any information will oblige."—A wet plate prepared with a porous kind of collodion, when washed and dried, will answer, but it is better to give it a wash in a solution of tannin or decoction of coffee.

X. Y. Z. writes as follows: "I will be glad if you will let me know if there is any set wage for apprentices to the photographic profession? and, if not, I will esteem it a favour to know what you would consider a satisfactory wage each year for five years' apprenticeship, learning the business in a studio where really first-class work is done with high-class sitters, including operating and retouching, printing and toning, and general routine of the work, apprentice commencing at twelve years of age and finishing at seventeen."—There is no set wage for apprentices. It is all a matter of arrangement, and is governed chiefly by the status of the establishment to which the apprentice is bound and the premium paid. In these days of Board-schools, twelve years of age seems rather young for a child to be "apprenticed."

COLLODION puts the following queries *re* collodion emulsion: "1. What causes crapy markings in the film? I added no more water than half a minim to each grain of silver nitrate, and I shake emulsion half an hour before coating. 2. In answer to a former query, you said in order to intensify (for the same tones as acid pyro produces, I presume), take 'three grains pyro, two grains citric acid, to one ounce water, and add a few drops silver nitrate solution.' Is this silver solution the one given with the acid-pyro developer? 3. To obtain the faint image and then intensify for warm tones, as produced by acid pyro, is the following developer, which appears in your instructions, sufficient, viz., two grains pyro, five grains ammonia carbonate, one grain potassium bromide? or is it necessary to increase each of these after development begins? 4. Should intensification be done before or after fixing? and can it be done without harm in both cases in white light?"—1. Solvents too weak, or unsuitable pyroxyline. 2. Yes. 3. Not necessary to increase. 4. It may be done either way. It is best done in the dark room.

OBITUARY.—Died at Mount Eden, Auckland, New Zealand, on January 16 last, Andrew Bancroft Broomhall, youngest son of John and Adeliza Broomhall, of Surbiton, Surrey, aged 31.

ENFIELD CAMERA CLUB.—March 18, Demonstration on *Platinotype*, Mr. R. B. Lodge; April 1, Demonstration on *Bromide Enlarging*, Messrs. Fry & Co.; April 15, Lantern Night.

DISSOLUTION OF PARTNERSHIP.—We are informed that the partnership between Messrs. Fry and Hayman has been dissolved, as and from January 14 last. Mr. Fry will continue the business on his own account. No change will be made in the style of the firm.

CAMERA CLUB.—Conference Week.—Monday, April 6, half-past eight p.m. Opening of the members' annual exhibition of photographs. Open for about six weeks. Visitors admitted by ticket or card from the Hon. Secretary and from members. Smoking Concert, the first in the new rooms.—Tuesday, April 7, two p.m. Opening of Conference by the President at the Society of Arts. Papers from two to half-past five p.m. Meeting and discussion open to all. Eight p.m., Lantern Slide Exhibition in the Theatre, Society of Arts. Special tickets required for this meeting.—Wednesday, April 8, two p.m. Renewal of Conference at the Society of Arts. Papers from two to half-past five p.m. Half-past seven p.m. precisely, annual dinner for members and friends at the Criterion Restaurant.

MESSRS. ANNAN & SWAN, Photogravure Works, South Lambeth, have sent us a number of exceedingly beautiful specimens of the work executed by them. In dimensions, they range from small vignettes printed at the heading of notepaper, up to large works suitable for framing. In subject they embrace landscapes and portraits alike from photographs from nature, paintings, and drawings. As they employ orthochromatic photography in the intermediate processes, a natural and true interpretation of tone is obtained.

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LIVERPOOL INTERNATIONAL EXHIBITION. JUDGING THE PICTURES.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1611. Vol. XXXVIII.—MARCH 20, 1891.

WHAT HAS LIVERPOOL DONE FOR PHOTOGRAPHY?

The fact that the able editor of the *Liverpool Daily Post*, in a leader in his issue of the 12th inst., a quotation from which will be found on another page, admits the decadence of knowledge in his city as to the part Liverpool has played in aiding to bring the photographic art to its present high state, prompts us to say a few words on the subject.

It was in 1854 that the Liverpool Society (although founded in March, 1853, with the Mayor as President) came in a pronounced character before the world, and this they did through the mediumship of the journal they were compelled to issue in their own behalf. The journal of the Photographic Society (London) had been started in March, 1853, and the Liverpool brethren had sent their transactions to be recorded in its pages, but, from what cause we cannot tell, this was not done except at very sparing intervals. It was therefore determined that a journal of their own should be established, and this was accordingly done ten months after the starting of the *London Photographic Journal*.

The *raison d'être* of the *Liverpool Photographic Journal*, now The British Journal of Photography, will be more specifically ascertained from the opening editorial address, the first paragraph of which we here reprint:—

"The Liverpool Photographic Society, in putting forth a journal of their own, rest their claims to public support upon the widely extending interest in the several branches of photographic art—the daily progress that is being made by the practical members of their own Society, and other photographers elsewhere. The admirers of the art naturally desire to have more particulars, and the practical operators more full and precise records of the suggestions, experiments, and successes in various parts of the world than can possibly be afforded by a newspaper devoted to general information. The *London Photographic Journal*, though furnished with the proceedings of the Liverpool Society from the commencement, has not been able to find room for them, a part only of the May Meeting being given in the September number. The Glasgow photographers obtain their information of our proceedings through the medium of American newspapers."

This young journal, with which the names of Messrs. J. A. Forrest, Corey, Frank Howard, and possibly some others, were associated in the editorial management, Mr. Henry Greenwood being the publisher, speedily caused the world to recognise the great practical ability of the members of the Liverpool Society. At its various meetings the chemistry, optics, art, manipulation, mechanics, and indeed every phase of photography were discussed in the most masterly manner, and while some of the papers read were masterpieces, many of the pieces of apparatus devised and described by the members showed such a wide grasp of the subject as to have rendered invalid patents for "improved" apparatus obtained at the present time. Even microscopic and astronomical photography were, in those days, brought by its members to as high a degree of perfection as the optical appliances of the period permitted. The transactions of the British Association of 1854 record that Professor Phillips, speaking of the labours of Lord Rosse and Dr. Robinson, both of whom possessed exquisite telescopes, in photographing the moon, said, "But nothing which they had to show in the shape of photographs of the moon was at all to be compared with the results that had been obtained by the voluntary exertions of the photographers of Liverpool." We may add to this that these Liverpool photographs of the moon were shown to the Association enlarged to twenty feet on the lantern screen.

In course of time the *Liverpool Journal* became the property of its publisher, Mr. Henry Greenwood; and Mr. William Crookes, F.C.S. (now Professor Crookes, F.R.S.), became its editor. When he left the editorial chair to become Secretary of the London Photographic Society and editor of its journal, his place was for a brief period filled by Professor Malone, whose duties in one of our London institutions compelled him to relinquish it in favour of Mr. George Shadbolt, at or about that time President of the Royal Microscopical Society. It was under Mr. Shadbolt's reign that the local title of the journal was changed to the more comprehensive one of The British Journal of Photography, and with its change from a fortnightly to a weekly journal in 1864 the present editor took the chair, which the greatly increased business of his predecessor had compelled him to relinquish.

Allusion has been made in the *Daily Post* to Sayce and Bolton. It was in 1864 that these gentlemen, both of Liverpool, sent to The British Journal of Photography their first communication relative to collodio-bromide emulsion, and from this time the art of photography entered upon an entirely new phase, culminating in the now universally employed dry plates. We could cite many other improvements which have emanated from the men of Liverpool, but time and space will not at present suffice.

POSTING PHOTOGRAPHS.

A recent offer by the Postmaster-General of three premiums (250*l*., 100*l*., and 50*l*.) for the best proposals that may be sent to him, not later than noon, May 1st next, for an improvement in the apparatus now used for transferring mail-bags to and from trains in motion, will, to many of our readers, offer no point of interest. Yet others of them, especially those resident in towns where important postal service lies along lines where the apparatus referred to is in use, are very considerably affected by the matter. It may be necessary to explain that the various towns along the route of a mail train receive and deliver their bags of letters from and to the train without its stopping for a moment. A special contrivance of wire netting

is employed for catching the bags of letters as they are dropped out of the train, and a similar network projects from the train to catch the bags which it automatically unhooks, so to speak, from the posts they are suspended from. The immense impetus possessed by the weighty bag as it leaves the train, or that suddenly given to it when received into the netting upon the van, produces a violent concussion. If written letters, &c., compose the main part of the contents of the bag, their elasticity saves them from injury; but if a packet of photographs, say cabinet size, happens to receive the first shock of impact, they are bent, broken, or doubled up like a matchbox, and often entirely ruined. We have seen a tightly packed parcel of a score of thick cabinets so bent and broken across the middle as to be useless. It is, therefore, obvious that the Postmaster-General's offer of a prize is by no means uncalled for; indeed, we have a shrewd suspicion that the complaints of photographers have had much to do with this attempt to ameliorate the system. However, the evil is not remedied yet, and the plan that our readers who have many such packets to send should adopt is to ascertain from their local postmasters the particular towns in the district where the automatic bag delivery is employed, and also the times of day for posting letters to those places without the intervention of the apparatus; for, it must be noted, it is only by the mail trains that it is adopted, and there are always other trains by which letters are sent.

We thus point out an evil and a method of avoiding it; but if we are asked how to protect the photographs so as to avoid any possibility of damage, we can only say that such a thickness of packing would be needed as would greatly add to the cost. We do not think that anything short of two pieces of half-inch board would be safe, and there would be occasions when even that amount of strengthening might be insufficient. When the size of the parcel is much above that of the cabinet picture, book-post should not be employed; the photographs, properly protected, should be despatched by parcel-post. They are safer in every way, and the charge being lower, except for single pictures, there is, perhaps, little need to impress the advisability of adopting this mode to any photographer of business experience; but as our words are read by amateur and professional alike, we think it well to draw attention to this aspect of the matter.

Here, however, another and very important question arises. "When a professional photographer sends out by post to his client a properly packed parcel of pictures which, notwithstanding all the care employed in packing, arrive at their destination broken, bent, and worthless, *who is to pay?*" Probably an occasional photograph or two would be replaced without discussion; but when it came to matters of dozens, and that several times in a year, it is very natural to suppose that the photographer would be disinclined to replace them at his own expense. Equally certain (as we know by experience) is it that when pictures so damaged have been received the receiver has looked upon it as a matter of course that he has "a right to have a dozen good photographs when he has paid for them." How different a matter looks according to the standpoint it is viewed from! Evidently here is a knotty point of law, and we are not aware of its ever having been brought into court. We do not profess to give any opinion whatever as to the possible result, for so many points complicate the question when looked into. Possibly the consideration of who paid the postage might influence the legal aspect of the case. That we are speaking of no light evil the experience of photographers throughout the length and breadth of the land will prove, and one gentleman has told us that the evil with him has occurred so many times that he contemplates putting up a notice to the effect that he is not responsible for damage to photographs sent by post. We think that the real justice of the case might be met by the artist supplying another set at half price. It would be interesting if some of our readers who have had painful experience in this direction would give us their views — an account of their practice in this direction.

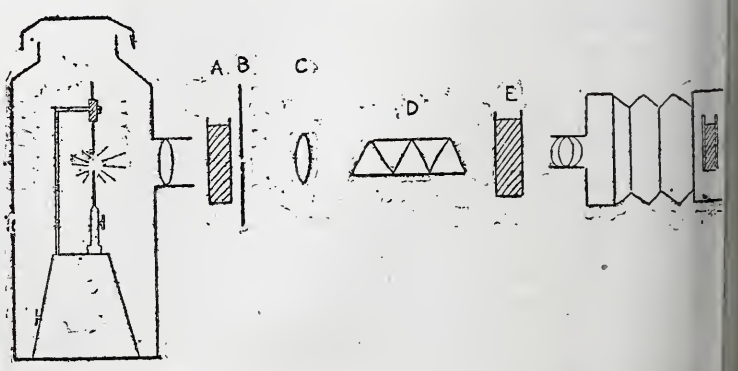
In conclusion, we may say, in anticipation, to objectors, that it is no use applying to the Post-office officials; they will not pay a penny, whatever the amount of damage done, for uninsured or unregistered packages sent by book-post. This subject is, however, too important to treat in a few lines, and we purpose shortly to return to a consideration of its bearings.

PROFESSOR LIPPMANN'S EXPERIMENTS ON THE PRODUCTION OF COLOURED FILMS.

A FEW weeks ago the unscientific newspaper writer was exulting over what he was pleased to regard as a solution of the problem of photography in colours; and, indeed, there were instances where the technical press went almost as far as the newspaper reporters in alluding to Lippmann's "great discovery." We, however, in our leading article of four weeks ago (p. 113) not only took care to point out (even assuming the *facts* to be as stated by the newspapers) that at the very best there is only a reproduction of a spectrum, and this but good enough to be regarded as excellent by "some" observers. We also concluded by opining that the work of Professor Lippmann brings us no nearer to a solution of the problem of photography in colours, than we were forty years ago.

Later particulars from Paris and some experiments of our own go far to convince us that there is even less of photographic or physical interest centring round Lippmann's experiments than might reasonably have been supposed from the earlier accounts. Indeed, it may not be too much to assert that the recent experiments have absolutely no bearing upon the problem of photography in colours; not even that indirect bearing on the question which orthochromatic photography certainly has, to say nothing of what can be done by plotting out of the subject on several plates by the use of coloured screens.

Perhaps our best way will be to describe the sort of experiments upon which the recent statements about "Photography in Colours" have been founded.



An intense beam of light is produced by means of an arc electric lamp contained in the lantern shown at the left-hand side of the sketch, this beam passing through the cooling trough A (water or weak alum solution), then reaching the

lit, and after passing through the collimator lens C, being lecomposed by the direct vision prism-system D. Between he prism-system and the camera we have another glass-sided rough E, the purpose of which we shall indicate shortly; but efore doing so, let us point out the nature of the surface hich receives the spectral image in the camera. Virtually e have, in the camera, a glass-fronted trough containing ercury, the inside of the glass front being coated with an xtremely thin sensitive film; the most important points as o this sensitive film being that it must be transparent and tructureless—a thin collodio-albumen film, for example.

If under these circumstances a long exposure (an hour or ore) be given to the intense spectrum obtained from the eam of electric light, and the plate be developed, it will in lmost every case show colours—those colours known as inter- erence colours. The portions of the plate corresponding to he various parts of the spectrum may not only show different ints, but on holding the plate up to the light so as to view it y transmission, the complementary tint will be seen in each ase, so that it may be said that the transmission aspect is a ort of "negative" of that obtained when the plate is seen by eflected light. Interference colours can be obtained on the late whether the reflecting surface of mercury is used or ot, but more readily and quickly when the mercury is used. Occasionally the colours obtained on the film will to some xtent recall or resemble those spectral tints which acted on he same parts of the film; but more often this will not be the ase. In other words, colours may be obtained, but generally hey will be *the wrong colours*. An experience similar to this s by no means uncommon in the case of collodion positives.

Unless we had seen every result obtained by Mr. Lippmann, ; would be obviously unfair to positively assert that there is n no instance a close correspondence between the spectral olours projected on the sensitive surface and those visible on he developed plate; but at present we have no reason to uppose that he has gone further along the road towards hotographing the spectrum than to produce coloured plates aving such superficial resemblance to the spectrum as served impress the newspaper correspondent, and to mislead some her writers having very superficial scientific knowledge. oreover, we look upon it as highly probable that such tints s he has obtained are merely the results of different degrees of posure, and not of any specific action caused by the colours the spectrum. Indeed, to obtain the maximum play of olours which can be obtained by the action of the spectrum n a thin sensitive film, it is necessary to bring into action the ass-sided trough marked E, and to fill it in succession with arious coloured solutions, the exposure being made through ch of these solutions for a determinate time. It is obvious at by such a method each colour of the spectrum (we use the rm "each colour" in rather a popular than in a strict sense) n be made to impress itself individually and alone on the nsitive surface, and by timing the exposure of each colour ight, it becomes easy to obtain, for any selected part of the ectrum, any one of the interference tints which the thin nsitive film is capable of giving under a variable exposure.

In other words, if we take a very thin and transparent nsitive film, and expose it to varying degrees of light (all e exposures being very much greater than for ordinary otographic purposes), the plate may become iridescent, and ow some faint approximation to several of the tints of the ectrum. At any rate, the green and yellow may be noticed being vigorous and metallic, while a deep blue is often obtained, and occasionally a rusty red. If now we replace the prism, slit, and collimator in the arrangement indicated above, by a coloured window with three panes, we have Lippmann's arrangement, as depicted in a quasi-scientific Continental paper, and copied into some of the English publications as an illustration to bear out the fervent enthusiasm of the impressed newspaper reporter. With this arrangement, then, it becomes quite easy to depict on the sensitive plate these interference colours, provided that the panes of glass are selected so as to correspond to the interference tints obtainable, the coloured liquids used in the trough E are such as to expose each colour singly by cutting off the other two, and the several exposures are so timed as to give rise to the wished-for interference colours on the plate. Still, this sort of operation is not very much more than an optical equivalent of a very round-about and "scientific" way of putting the colours on by hand; is, in fact, merely a method of giving a longer exposure to some parts than to others, and seems to have no real bearing on the problem of photography in colours.

Doubtful as we are as to whether Dr. Lippmann has actually photographed even the spectral colours, a consideration of his theory is hardly incumbent on us at present; but incidentally we may refer to some strange explanations recently given, which take for granted, among other things, that a ray of monochromatic light reflected from the back of the film will always return along the path of the incident ray, that in so doing it will interfere with the incident ray in such a way as to add energy to it, and to cause silver deposits to arise in the film at distances apart equal to half a wave length (about one hundred thousandth of an inch for a mean ray). We now come to the remarkable assumption that the light waves are not impulses travelling in straight lines, but that they work in and out, snake fashion, between those portions of the film which are acted upon; and finally it is supposed that a film built up of numerous layers of silver deposit will possess in each part that colour which corresponds in its wave length to double the distance between the silver deposits. If all the above assumptions were correct, we might see the possibility of photographing the spectrum, or any homogeneous light, by Lippmann's mode of procedure, but not of photographing natural objects, which seldom reflect homogeneous light. As, however, every one of the above assumptions is in direct opposition to our present optical knowledge, we look upon such an "explanation" rather as amusing than instructive.

PREPARATIONS FOR THE COMING SEASON—DARK-ROOM ARRANGEMENTS.

THE developing requirements for negative work only will differ very considerably from those necessary when any regular enlarging is undertaken, especially if large sizes are in question; but, of course, the amateur will keep this fact in view in laying the plans. For instance, in a dark room in which the developing space available is restricted to perhaps no more than a square yard of bench room, including the sink, it will be practically impossible to work comfortably with any but the smallest sizes of paper, though a careful manipulator might manage to handle glass up to whole-plate size without much difficulty. Special provision will therefore have to be made for the development of enlargements, either by planning the permanent developing room on a sufficient scale, or arranging for the temporary conversion of the rest of the apartment to that purpose when required.

The general comfort and convenience may, however, be greatly promoted by a due attention to the minor details of the fittings, especially in the disposition, fixing, "aluming," and washing baths. These necessarily require a considerable amount of space, even when no larger sizes than 12 × 10 or 15 × 12 are attempted; but with still larger dimensions it becomes absolutely requisite to have all the arrangements planned on the most liberal scale. Comparatively few amateurs, however, will systematically practice enlarging beyond the proportions first mentioned, and under such circumstances space may be economised by arranging the various dishes to slide into or on to shelves placed one above the other in tiers, providing, of course, clear bench space enough on which to place the dishes when transferring the picture from one to the other. When, however, the larger sizes are in question, the weight of the dishes or trays themselves, as well as their contents, preclude the possibility of any such course of procedure; indeed, the mere handling of the large sheets of paper in the moist condition, when the "trick" has been learned, requires plenty of room and perfect freedom of action.

With regard to the dishes or trays employed for enlarging purposes, the most suitable and convenient material is, unquestionably, wood, saturated with paraffin wax, or thoroughly coated with shellac, Brunswick black, or Aspinall's enamel, after putting together. Such trays are light, cheap, and durable, and can be constructed by the amateur himself. The material need not be of greater thickness than half an inch for sizes up to 20 × 18 if the bottoms are properly "tongued and grooved" and further strengthened by means of a couple of light fillets screwed on the cross way of the grain. For the developing dish, a depth of an inch and a half will be found ample, but for the fixing and alum baths, which do not require constant rocking, and especially for the washing trays, a considerably greater depth is desirable.

Of the waterproofing materials named each possesses its advantages. Paraffin wax is perhaps the cleanest when properly applied, but it necessitates some little skill and care, as well as time, in its application. The woodwork should be thoroughly impregnated, the wax being driven into the pores by means of heat. There are various ways of effecting this. A paste may be made by treating the shredded wax with warm turpentine, or a mixture of turpentine and benzole, and after smearing this well over the wood holding it before a clear, hot fire until it is absorbed. This course, however, has the disadvantage of a tendency to cause the tray to warp. A better plan consists in scraping or shredding the wax pretty finely, sprinkling it freely over the surface of the woodwork, and then rubbing it in with a moderately warm laundry iron, or a chemist's plaister spreader. The melting point of good samples of paraffin is about 135° Fahrenheit, and if the iron is heated to 150° or 160° it will cause the wax to penetrate without much danger of warping. A dish once properly prepared in this manner may be kept in good condition for a very long time by going over it occasionally with the paste of half dissolved wax, or even with ordinary furniture polish.

Brunswick black is a cheap and convenient, as well as efficient, coating, if allowed to dry thoroughly with free exposure to the light and air. If this is attended to, the coating becomes insoluble and very tough, but otherwise it is liable to crack and peel off in course of use. Aspinall's enamel is more expensive, takes longer to dry, but gives a hard, tough surface that is little liable to injury. Shellac forms a very good coating if applied in the form of two or three coats of ordinary shellac varnish, each being allowed to harden before applying the next. Or it may be reduced to coarse powder or small fragments and rubbed into the wood, especially at the joints, with a heated iron, as recommended for paraffin. The coating of shellac is liable, especially when thick, to break or chip if knocked about much, but otherwise is extremely durable and easily kept clean.

Large trays of great lightness are easily made by building up from successive layers of paper laid over a block of wood, and cemented with paste or glue, and, when thoroughly dry, coated with one or other of the waterproofing materials already mentioned. Some care, however, should be exercised to prevent such dishes warping or twisting in drying. A couple or more light battens or fillets of wood, nailed across the bottom by means of "gimp pins," applied from the inside, before waterproofing, will not only prevent warping, but greatly strengthen the tray. This style of tray is better adapted for developing purposes than for washing.

An inestimable convenience in working even moderately large-sized papers in a confined space will be found in the "well-bath," a shallow tray somewhat longer than the sheet of paper to be manipulated, and having the extra length at one end covered over like the "hurricane deck" of a steamer, so that when tilted up on one end the contents are retained. With such an arrangement, the enlargement may be soaked previous to development until it lies perfectly flat, and, the water being poured off, the developing solution is introduced into the well; while the tray is held in a perpendicular position, and this being then steadily inclined horizontally, the solution sweeps steadily over the paper as it lies attached to the bottom of the tray. In a similar manner, by reversing the operation the developer is instantly transferred to the well for the purpose of making any fresh additions of the various ingredients, and a great deal of trouble in pouring the solution in and out of the dish is avoided.

In a previous chapter we have assumed that though a separate developing room is partitioned off from the general apartment, the rest of the room may be converted into a dark room when required for enlarging purposes. We may briefly consider how this last may be effected. Unless required to be permanently darkened, it will be preferable to have a movable screen or screens made to fit into the window-frame, so as to be perfectly light-tight. For this purpose we prefer a double frame, the upper portion being entirely opaque, or containing a small coloured window fitted with an opaque blind to illuminate the room, while the lower half serves for the admission of the light for the actual enlarging.

The upper half may consist of a light wooden framework covered with canvas and paper, as already described in conjunction with the erection of the dark room, and as it will be subject to no special strain it may be of the lightest construction. The lower frame, however, which has to carry the negative holder, and which may also be usefully made to supply the means of reflecting the light on to the lens, should be of more substantial build, and the two sections should be so arranged that the lower sash of the window may be thrown up to its full extent while they are in position. The frames are made to attach closely to the woodwork of the window-frame by suitably placed buttons.

Next, as to the arrangement of negative holder and reflector. The former consists of a rebated frame fitted with "carriers" for the different sizes of negatives to be used, and may be simply an aperture the size of the largest negative in the shutter or screen itself. It is far more convenient, however, to

provide means for the lateral and vertical adjustment of the negative for the purpose of centring, and this is easily arranged in the same manner as the adjustable front of an ordinary camera. From the lower edge of this opening, and projecting into the room, is solidly attached a horizontal shelf upon which is to be fixed the lens. A simple shelf may be provided, and on this, when required, may be placed an ordinary portrait or landscape camera with the lens pointing into the room, and the focussing glass removed or turned back so as to allow a clear view of the negative when fixed in its carrier. Or a rough sliding body or bellows camera may form part of the window attachment, the only conditions requisite being a sufficient range of motion to give the necessary degree of enlargement.

The reflector may be hinged on the opposite or out side of the frame, and made to fold when out of use into a recess in the frame itself, and to let down when required by means of cords at each side to an angle of 45°, so as to reflect the light from the sky directly though the negative. The reflecting surface may consist of cheap silvered glass, or opal, or painted wood, though the first is preferable; it must be of sufficient dimensions to properly illuminate the largest negatives to be used, but there is no advantage in having it unnecessarily large.

With such an arrangement it is only necessary when about to enlarge to place the two frames in position, having first thrown up the lower window sash, to let down the reflector, and proceed to work, the whole operation requiring but two or three minutes, and the machinery folding into an extremely small space when out of use, the reflector, if of glass, being protected from injury at the same time.

The only additional apparatus now required is the easel upon which to affix the sensitive paper. This consists of a flat board carried in a perfectly perpendicular position on a stout frame travelling steadily upon runners or castors. It is convenient to have a sort of tramway upon which this frame travels freely while the easel retains its parallelism with the negative in all positions; but one is apt to stumble over the lines in the dark, and where it is considered objectionable the parallelism may be secured by having a series of guide lines chalked or painted on the floor.

The surface of the easel should be painted white or pasted over with white paper, and should have a couple of diagonal lines crossing at its exact centre, which point, it is needless to say, should coincide with a line passing through the axis of the lens. These points—the centres of the lens and of the easel or focussing screen—should remain constant, and any centring of the picture done by adjustment of the negative in its sliding frame.

The same arrangements, with but little modification, will answer equally well for the production of lantern slides; indeed, the amateur who will undertake the trouble of following the instructions given in this and previous articles will find himself equipped for almost any kind of work that may arise.

A Bill to amend the Merchandise Marks Act of 1887 was introduced into the House of Commons last week and read a first time. From a perusal it appears that its object is to give effect to the recommendations of the Select Committee of last year, which will make the law far more stringent—or cause it to be more stringently carried out—than at present. If the Bill passes it will materially affect some photographic dealers' system of conducting their businesses—that is, those who sell foreign manufactured goods without distinctly indicating their place of origin. Lenses, paper, chemicals, &c., made abroad are almost universally sold without any sign that they are other than of home production, particularly when they bear the names of the English sellers. Brown's lenses, Jones' albumenised papers, and Robinson's chemicals may be all of foreign make, yet they are now sold without any reference to the fact.

The present law is stringent enough if put into force, as it may be by any one who chooses. But *private* individuals do not care to undertake the trouble and expense of prosecutions. In some trades—watch-making and cutlery, for example—prosecutions have been instituted by corporate bodies representing those trades, and, as a result, very little foreign cutlery or foreign-made watches are now sold for English. According to the projected Act, the Board of Trade are to take up the prosecutions for any breach of the law affecting the general interest, and defray the expenses from moneys provided by Parliament. Also, it is intended that the Customs "entry" of the goods imported shall be a proper "trade description," within the meaning of the Act, so that the Customs authorities will have the power of detaining all goods falsely described.

Apropos of the second of the series of Cantor lectures on the *Chemistry of Photography*, by Professor Meldola, which was given at the Society of Arts on Monday, we have been asked if it is *en règle* that the talented lecturer should not only have specifically referred to a photographic process, the nature of which he could not disclose, as a patent was about to be applied for it, but have invited the inventor, Mr. Varley, to give a demonstration of the process, which was done without a single word of information as to its nature having been given. And we are further asked if this is not using the Society of Arts as a means of advertising a secret process. The process referred to is one in which no salts of silver are said to be employed in the preparation of the printing paper.

The question has frequently been put to us as to whether the oxygen supplied compressed in cylinders is equal in illuminating power and in actinic quality to that made at home from chlorate of potash and manganese. We have heard different opinions expressed on the subject, particularly with reference to the actinic value of the two kinds. Two or three who use the limelight for enlarging and copying by have told us that they always have to give a longer exposure with the commercial gas than with the home-made. Why this should be the case it is difficult to conceive, inasmuch as the commercial article ought to be, and no doubt is, purer than that which is made in the old-fashioned way. It is quite possible, however, that the purest gas does not give the most chemically active light. It may be that the slight impurity generally present in most home-made oxygen may add to the actinic quality of the light.

It may be well to remind readers that the present is an unusually excellent time for obtaining a stock of cloud negatives for future use. During the latter part of March and the early weeks of April better cloud effects are to be seen than perhaps at any other period of the year, also the light is generally excellent for securing them. It is tolerably well known to practical men that the light just after an April shower has passed is about the most chemically active of any during the year. Some professionals go so far as to affirm that in the studio an April light is preferable to any other. Therefore it is the best time for taking specimens.

Anent our observation a week or two back, that some modern writers seem to have very hazy notions as regards some of the old processes, a correspondent sends us a cutting from a contemporary which is very amusing. The writer of the article forwarded, in giving his ideas about photographing in colours, makes allusion to the tints often seen on Daguerreotypes, and says:—"In ordinary Daguerreotypes taken under normal conditions, I think this suspicion of colour is partly due to the silvered metal plate, and also to the bichloride of mercury used in the intensification of the image." Great Scott! *the intensification of a Daguerreotype image with bichloride of mercury!*

What will our many old Daguerreotype friends say to this? The above emphasises what we have frequently referred to before, namely, that many modern photographers, also some who write so freely about the art, have but very vague ideas about the older processes, their principles and practice.

The recent gales we have experienced, and more may be expected, must have been trying to many studios on the tops of houses and other exposed situations. There are many studios in London and large towns that were erected a quarter of a century ago or more, when it was considered essential to have as much light as possible. Hence, as the building Act was not so stringent then as now, the buildings were often constructed regardless of stability and durability. The sash bars were made as thin as possible, and usually of wood; therefore many of these studios must be in a very unsafe condition by this time. As the wreckage of photographic studios by the force of the wind is not a thing unknown, owners of ancient "glass houses" will do well to keep this fact in mind, as the falling *débris* may entail loss of life or limb, for which the owner might be made liable.

A Queen's Drawing-room means a considerable influx of business to a few leading West-End photographers, and the last two have been no exception to the rule. It is now quite the correct thing for the fair *débutantes* to drive direct from the palace to the studio to be photographed in their Court dresses. The *Daily Graphic*, a few days since, had a very fair illustration of a fashionable studio on a Court day, accompanied by a graphic description of the sittings.

Once more photographers have had the opportunity of securing snow effects, and under conditions different from those prevailing earlier in the year when the fall of snow was unaccompanied by wind. In the recent fall a strong gale prevailed which had the effect of driving the snow into reefs and banks of the most fantastic shapes, such as are rarely seen in England though common enough in America, where blizzards are more prevalent than here. Snowdrifts from twelve to twenty feet thick are rarely seen in this country, but they were last week on the Devon coast. Some photographs now before us give unmistakable evidence of this. It will possibly be many years before such a scene will be witnessed on one of the warmest and most genial coasts of England. These photographs are incontestable evidence of the phenomenon of a blizzard in one of our warmest counties in the second week of March.

In the *Comptes Rendus* MM. Fremy and Verneuil, who for some years past have been experimenting on the production of artificial rubies, state they have now successfully overcome the difficulties they have hitherto met with, and are obtaining much larger crystals. What have been produced up till recently have been but small, and only of use for jewels for the holes of watches, and for which purpose that are said to answer quite as well as the real stones. The improved process is said to consist in subjecting to a high temperature for several days a mixture of alumina, bichromate of potash, fluoride of barium, or other fluorides, together with a small proportion of carbonate of potash. The recent improvement consists in the addition of the latter material. With larger appliances the inventors expect to make gems weighing as much as three kilos—nearly seven pounds. Like Professor Lippman's process of photography in colours, the manufacture of artificial gems is exciting some little attention in France just now.

THE LIVERPOOL EXHIBITION.

In reviewing the contents of the eight rooms in which the exhibits are on view, a word should be said in praise both of the manner in which they are hung and the energetic management which has brought together so large a number of good photographs. Every one had words of praise for the Secretary's labour; in fact, an expression we overheard places the matter in a nutshell—"The Exhibition is all Mayne, tempered by Lange, and hung by Tompkinson." We would draw attention to two important principles governing the admission of the pictures. In the majority of instances medals were only offered for collections of four pictures; and again, none was eligible which had been exhibited before, except at Pall Mall. It is easy to see that under two such stringent rules exhibitors of mediocre ability had little, if any, chance of receiving a medal, for, as was pointed out, while almost any wielder of the camera can point to one good piece of work, it requires the possession of great skill to produce four photographs worthy of being hung together.

The large number of pictures—far larger than ever has been, or could be, shown at Pall Mall—distributed over so many rooms will, perhaps, be best described by taking them in the order of the catalogue, class after class, room by room.

The medal awarded in Class I., four or more portraits, 10 × 8 and over, unfortunately had to be withdrawn, and no other appears to have been considered of sufficient merit. Mr. W. Crooke's *Man in Armour* was perhaps the best portrait or study of a head in the room, but unfortunately it had been before exhibited, and was ineligible for reward. As it has been before described by us, we need not again allude to it, except to emphasise its striking merit, which was a great contrast to the *Portrait of a Lady* by the same exhibitor, the hair of which was the most prominent feature of the portrait. Four studies of heads, life-size (Nos. 1, 2, 3, 4), were chiefly noticeable from their being labelled untouched. Probably some esoteric meaning is attached to the word by Messrs. Mavins & Vivash, for two of the pictures at one stage or another had received a considerable amount of hand work. Mr. Ralph W. Robinson's four brown frames (25 *et seq.*) contained four brown pictures—pretty portraits of children, one a double portrait, very attractive. Mr. Barry's four frames (49, &c.) were noticeable for clean work, if tame; while, if Miss Burraud had sent three more pictures equal in conception and posing to an exceedingly effective picture of a lady in white dress resting against a column, they would have been a long way ahead of the rest. We made favourable notes of a frame of four portraits by Vandyke, of Liverpool (69, 70, 71, 72), which for technical execution could hardly be surpassed. The retoucher had, some might think, laboured hard at them, but his work did not show, and neither modelling nor drawing was lost. Especial interest attached to this set of portraits owing to their representing the leading officials connected with the Exhibition.

Class II. (Portraits—set of four) calls for no comment beyond the bronze medal set (Harold Baker)—four cabinet portraits, three of them very good, of ladies gracefully posed, lighted in a peculiar way from both sides of the subjects, and successfully photographed.

In Class III. Messrs. Window & Grove were rewarded by the judges a bronze medal for four portraits in platinotype. The portrait of Ellen Terry, whether for the graceful posing of the figure, balance, and arrangement of the leading lines (the hand against the mandoline being the least satisfactory spot), the clear way in which the head received the dominant light, which was gradually weakened as it fell on the parts more remote, was worthy of great commendation. The other three were chiefly remarkable for not being remarkable. All four were of a very agreeable and even tone, and had received the attention of the brush-worker to some extent.

Class IV. was mainly noticeable from Mr. Byrne's frame of four life-size heads not retouched. These we have before mentioned when shown at Pall Mall. They exhibit both the weakness and the value of photography for such work; vigour, effect, flatness, want of repose, are all shown.

Class V. is a very large one, and must have been a source of difficulty to the judges in their awards. There are very few frames with no one picture of merit, but we do not find fault with the judges' award to Messrs. E. Lloyd Edwards and F. L'Arces of a bronze medal for their evening effects in 178 *et seq.* Running through the numbers *seriatim*, we note Mr. F. Sutcliffe's set. In 112, *The Haywain*—the figures at the gate relieved by a background of quiet sky, the whole being, however, a little heavy—is a charming picture, while the rustic habitation in 111 represents a structure to delight the eye of an artist. No. 125, J. Bankhurst—hill-side to our left relieving a distant prospect of meadows, with bridge in the middle-distance spanning a wide stream, mountains showing beyond—is a well selected picture, showing very good atmospheric effect.

Ernest Spencer's *On the Exe*—study of a tree-covered bank with a

boat in the foreground—would have been a far prettier picture if a standpoint had been chosen that gave less water to the front of the picture. Mr. D. Cunningham's set (136, &c.) included a pretty village street, with a cart and horse placed too conspicuously to the spectator's left. Mr. E. Lloyd Edwards takes a bronze medal for the four pictures, 142, &c. Those who were at the Convention last year may be able to pick out the spot on the River Dee shown in 142: trees overhanging the water, their reflections giving depth and reality to the stream, while a tiny peep on to the sunlit hills beyond acts as a foil to the dark foliage. "*Que diable allait elle en cette galère*," someone uttered as we examined 146, *Westward as far as the eye can reach*, a most effective study of sea and sky and foreground; the clouds were beautiful, the sea looked like real water, and standing on the highest point of a rock, to which the very dark foreground receded, is seen a female figure so prominently as to demand a story which the picture does not tell.

The rock and water in 149 (John G. Bullock) were excellently photographed, but if a horizontal instead of an upright, oblong form had been chosen the picture would have been still better. Mr Ralph W. Robinson's winter scenes, 154 *et seq.*, are excellent. Carefully selected points of view, deftly introduced figures, have helped to make telling pictures of very unpromising subjects. They are perhaps a little flat for bright crisp snow. The introduction of the, figure in 155 is exceedingly clean in the middle of a white landscape, with few conspicuous objects. It is the largest space of dark in the picture. It is near the spectator, and yet the eye is not attracted to it to the detriment of the whole. Mr. Milman Brown's summer evening, in which a picturesque tree gives effective relief to the figures on our right, is noticeable. Mr. F. D'Arces gives us a set of four good pictures—reposeful, slow-moving rivers, river banks, trees. The title, *Sunset in Essex*, we suppose, would do as well as any other or any other as well as it. There is no luminosity in the sky. Mr. Fenwick W. Shaw's set of four pictures of the seasons are excellent photographs, and under a less close competition for honours, might have received a medal. Mr. W. Bedford's studies of trees are excellent as such—very interesting, and technically good photographs, but we have seen far more worthy pictures with his name attached.

There are several hoar-frost pictures (our readers should note the President's hoar-frost study in the catalogue, it is very beautiful), many of them are well executed, but uninteresting and black, not suggesting the fairy handiwork of King Frost. No. 231, by Mr. S. G. Buchanan Wollaston, is very attractive. Four pictures (No. 247) in Class IV. (Mrs. Janie N. Hignetts) will be admired for their crisp, bright, and technically excellent workmanship, the trees being a little woolley, however; and we are sure every one would be pleased at the award of a medal to Mr. Tomkinson for the two pictures of his set of four (269–270)—Peel Castle in the dim moonlight rising out of the water, silent and dark, its reflection giving the needed effect of solidity, while the moon itself, unseen, is evidently shining behind a bank of clouds ready to cast his silver rays over the whole scene. His *Sheep Washing* is a capitally executed photograph of a most difficult subject, as anyone would say who has seen the frightened animals soused in the water of the deep running stream. A very different operation from that where the friendly help of a big trough on dry ground is provided.

(To be continued.)

DIFFICULTIES IN OPTICAL DEMONSTRATIONS.

THE members of Photographic and Lantern Societies must at times feel that however excellent the papers are that touch on technical optical matters, the difficulty of proving certain assertions, and probably facts, is considerable, owing to the ordinary apparatus not being suitable for such demonstrations. The reason is not far to seek. In the first place, when once the source of light is disturbed, it is difficult to re-establish the same conditions, and this particularly applies to removing condensers and placing others in the lantern for trial. I remember when, some time ago, a gentleman and myself were trying different kinds of jets under various pressures, so as to secure the best possible light for dissolving-view purposes, how the jet which was thought to be the best a few minutes before was not so good after, because the portion of the lime the gas was playing on was not so effective. Where degrees of illumination are closely approximate, it is only by preserving the original standard of the luminant that comparisons can be made, and if so small a matter as that just alluded to can influence the illumination, it follows that facilities must be available for *alternating* the portion of apparatus under comparison several times in order to come to a decision. I have in mind the demonstration by Mr. E. M. Nelson at the Lantern Society recently of the illuminating power of lantern condensers, and previously of Mr. Freshwater at the London and Provincial Photographic Society of the effective power of small *versus* large objectives, and in both instances the absence of a specially constructed experimental lantern was, I am sure, felt by others besides myself.

This subject has been prominently present in my mind for some long time past, and at the preliminary meeting of the founders of the New Lantern Society I suggested as one of the useful subjects that might be practically taken up was this very one of arriving at the best form (for certain requirements) of the optical arrangements of the lantern, and the construction or purchase of a testing apparatus that should ensure exactly similar conditions for comparison.

It is probable that something of the following would answer:—A rectangular box to contain the jet and wide enough to place two fronts on, the jet being so mounted that it can slide on runners laterally, so as to be quickly changed from one optical system to the other, with an adjusting stop at each end. The condenser mount should be open and each of the lenses mounted separately, so that they can be used separately or in combination with the usual lens that forms the pair, or with others to make double or triple condensers of various patterns, and the objective mounted in a flange pivoted to a support that can be turned into the optical axis of either lantern at will. By this means not only could the effect of different forms of condensers with the same objective be compared, but also their effect on other objectives. When two similar optical systems had been chosen and proved, the question of jets could be gone into, and a frame put into each stage so as to obliterate the right and left half of the respective fronts, which would at once show to the experimenters or audience which was the brighter or whiter disc, and when test photographs were projected which the sharper of the two pictures.

It has been considered by some of those who have given a great amount of attention to lantern matters that as long as the slide to be projected was not more than three inches diameter, and *was circular*, a three and a half inch condenser gave the best result, providing always that the source of light had only a moderate area of illumination, but when the three-wick and other multiplex lamps were introduced, having large areas of illumination, the four-inch condensers with two plano-convex lenses (having their convex sides together) gave the most satisfactory results generally, for it would show the square cushioned-shaped photographs and slides as well as circular, and it was therefore adopted as satisfactory for commercial lanterns. For special purposes, both condensers and objectives can be specially arranged to suit the *particular requirements*, and these combinations can best be determined by experiments made by members of the Lantern Society, and of lantern sections of photographic societies; but until it is proved to demonstrations that a triple condenser is better for projecting the regular commercial photographs, it is only fair to lantern makers that it should not go forth to the scientific and photographic world that the double condenser, as supplied and used with satisfactory results, has been found wanting and superseded. No one desires more than myself to see the optical lantern improved, and I shall be interested in any development of the practical application of new ideas, and watch the results of modified forms of optical systems or new illuminants with more than ordinary attention; but until a real gain is obtained for the usual requirements of the lanternist, it will be as well to ponder before "changing horses."

G. R. BAKER.

MERCURIAL VAPOUR DEVELOPMENT.

I HAVE to thank Mr. Francis T. Beeston, who, in the JOURNAL of January 16th last, was kind enough to supply me with an item of information in regard to the whereabouts of Obernetter's "reversing" formula, upon which I had myself been unable to drop, despite the fact that I have hitherto been, or rather have regarded myself as, a diligent student of THE BRITISH. I trust on a future occasion to be able to detail the results of a few trials with this extremely interesting process, which, to my thinking, well deserves rescue from oblivion.

Apropos of the subject of negative reversals and camera positives, I once heard it stated that, as a matter of fact, a direct positive had never been taken in the camera. Exactly the opposite is, of course, the case, since a little reflection will show that Daguerreotypes were nothing more and nothing less than direct positives obtained by the operations of exposure and development—a description which appl es

precisely to Colonel Waterhouse's recently published method. It was while reflecting upon the essential resemblance between the two processes mentioned that I was led into a series of speculations, of which the following notes and experiments are the outcome.

At the outset I asked myself, Is it practicable to obtain a camera positive on a gelatine plate by means analagous to those employed with Daguerreotypes? To some slight extent they are parallel methods of working. Modern gelatine films very frequently hold a mixture of iodide and bromide of silver, and such a mixture was the sensitive medium of the older process. Even under the most favourable conditions the latter was probably many hundreds of times less sensitive than the dry plate of to-day, but that, *per se*, does not seem a fatal obstacle to the amenability of the latter to the same scheme of development. Such a proposition, however, opens up other questions of a somewhat more formidable kind than that already propounded, which require to be answered before this last can be disposed of.

Now although, theoretically, the unaltered layer of sensitive material in both the Daguerreotype and the modern glass plate may be expressed by the formula $AgBr \times AgI$, it has never been proved by experiment that the two substances are chemically indistinguishable. "The composition of this bromo-iodide of silver," wrote Hardwich in 1854, "is uncertain, and has not been proved to bear any analogy to that of the mixed salt obtained by decomposing a solution of iodide and bromide of potassium with nitrate of silver." I scarcely imagine the late Mr. Hardwich writing like this unless he had met with certain attempts to establish the analogy. "Observe also," he writes, "that the bromo-iodide of silver is more sensitive than the simple iodide only when the vapour of mercury is employed as a developer." I should say that the treatment of an exposed Daguerreotype plate with a modern alkaline developer would throw a little light on the question. If a negative impression resulted, then the analogy would be practically perfect.

Not merely did much doubt and uncertainty exist as to the exact composition of the sensitive layer—with, it is to be presumed, equal obscurity in regard to the undeveloped impression—but the same trustworthy author tells us that few questions gave rise to greater discussion among chemists than the nature of the (developed) Daguerreotype image. It was supposed by some to consist of mercury alone; others considered it a compound of the latter with metallic silver; the point seems never to have been agreed on. "Claudet proved the presence of mercury by volatilising it from the image in sufficient quantity to develop a second impression immediately superimposed." One would imagine that the presence of silver might have been demonstrated just as easily so that it could have been agreed that the image was a compound of silver and mercury, which I suppose there was very little doubt it was, since after Claudet's experiment it is to be presumed that an image of some kind still remained in the plate, which, not being vaporisable by heat, as silver is not, must undoubtedly have been of that metal.

I have said above that I assumed that the composition of the latent Daguerreotype image was an obscurity at the time the process was actually employed, and so I believe it was left when wet collodion superseded it. The literature of the subject, however, is of the scantiest, but in the first of the Cantor lectures for 1882 Captain Abney attacked it. His conclusion was that light set up exactly the same change in a brome-iodide Daguerreotype plate as in a gelatine film holding a similar compound in suspension, reducing the sensitive layer, in fact, to the condition of sub-salt. If such was the case, then the old doubt of the identity of the sensitive Daguerreotype film with a mixture of bromide and iodide of silver produced by triple decomposition receives a by no means ineffective reply. On the occasion referred to, although Captain Abney had the practical assistance of a most experienced Daguerreotype worker, Mr. William England, who, doubtless, remembered the discussions that took place anent the composition of the developed Daguerreotype, the lecturer skimmed over the point with the scarcely satisfactory explanation that in development "mercury vapour is caused to condense in the sub-iodide and leave the iodide intact."

It was the recollection of these passages in Captain Abney's lecture which mainly instigated me to ponder over the practicability of developing the sub-salt in an exposed gelatine film with mercurial vapour. Doubtless, if the matter were put in the form of a question, most people would declare it *im*practible, since it would be argued that the gelatine would not be penetrable by the "developer." Still, while owning the force of such an objection, it would be rash to regard it as deciding the point in a satisfactory or rather a conclusive manner. It is well known that gelatine films are acted upon in a marked degree by other volatile substances. For example, ammonia vapour will, I believe, darken an unexposed gelatino-bromide film if the latter be held above it for a considerable time; while if a film be exposed and immersed in a solution of a reducing agent, and then placed above an open bottle of ammonia, development will proceed as usual. Again, by fuming a gelatino-bromide plate with ammonia and exposing it behind a negative in a printing-frame, an image of greater vigour is obtained, and in considerably less time than if an unfumed plate had been exposed.

Thus the implied "developing" effect of mercurial paper on gelatine could not, it seemed to me, be condemned offhand, and was only to be clearly confirmed or dissipated by actual experiment. I do not remember that this system of development had ever been attempted and reported upon, and I own that when I determined to try it I was more curious to ascertain if it was feasible than sanguine that it would prove to be so.

I exposed both slow and rapid bromo-iodide plates in the camera, and then subjected them to the action of mercury vapour, which I obtained in the following manner:—Having thoroughly warmed two small porcelain dishes, I filled one with boiling water, and immediately above it placed the other dish holding about an ounce of mercury. The latter refused to volatilise at the temperature of its receptacle, which could hardly have been less than 140°, although, theoretically, I believe a much lower temperature is supposed to affect it. I then transferred the mercury to a small evaporating basin, which I placed upon a retort stand and immediately above a spirit lamp. Next, having covered in the whole arrangement so as to shut off the light of the spirit lamp, I held the exposed plates above the evaporating basin.

By the light of my dark-room lamp I could see that after a minute or two the surfaces of the films were darkened, and at first I supposed that a real "development" had taken place; but upon closer inspection I was undeceived. The mercury had simply condensed upon them without striking up any action with the "sub-salt," and as I applied a finger to the films the deposit became converted into minute globules of mercury, leaving the plates perfectly clear and unaltered on their surfaces. Then I tried some plates which I had exposed in the printing-frame for fifteen, thirty, and sixty seconds, and the result was the same. The vapour of mercury would *not* develop an impression upon a gelatine bromo-iodide film, or, for that matter, upon a film of pure bromide, so that the assumed objection as to the "stopping" action of the gelatine holds good in fact.

These abortive attempts, however, by no means exhausted the series of experiments I had decided upon making, and I will therefore resume the subject on another occasion. THOMAS BEDDING.

PICTORIAL COMPOSITION.

[A Communication to the London and Provincial Photographic Association.]

SOME one has said, somewhere, some time ago, that "there is nothing new under the sun." Some one was undoubtedly right, in the main, but he was not a photographer, or he would have had misgivings; misgivings, perhaps, not as to the newness of the art of photography, although the last Assyrian clay tablet has not been deciphered yet, nor the last of the Egyptian Papyri unrolled, and although the old world goes on making revelations nowadays in such a quite sensational and *fin de siècle* manner. No, his misgivings, had he been a photographer, I say—especially an amateur—would have been pretty general; he would have believed in most new things for a time, and certainly at least in the last, the very last, new thing, and as the advertisements advise, he would "see that he got it."

Yes, gentlemen, that insatiate and still unsatisfied craver for a new thing; that restless cavy, who epitomises in one type the last quarter of the nineteenth century; that person possessed above all people by the demon of unrest, even in our time—the average amateur photographer—wants not only a brand new camera and lenses which will do everything but think, with plates and developers to match, but he has wanted to make (and believed, at any rate for a time, that he could make) for himself new pictures by brand new rules, and in default of finding these ready to his hand has, now and then, had the temerity to formulate some for himself.

I open my address on pictorial composition this evening to you members of the London and Provincial Photographic Society with this preface because I wish it to be quite understood that I have nothing new to tell you; and if in your midst there should unhappily be one unfortunate possessed in any degree by this demon I have alluded to, as time does not serve for duly exorcising the unrestful spirit, I take the liberty, in your interest and his own behoof, of warning the unhappy being from the room. I have no message for him, and his presence will, while doing no good to himself, only disturb the placidity of those who believe with myself that photography, however new as an art it be, does not give its votaries new eyes, new

brains, or new sentiments, but is ruled, like its elder brother and sister arts, by the same laws of pictorial composition we are content to think eternal, and more than suspect are divine.

Pray do not think me harsh in this serious admonition, nor personal in any quarter; bear with me rather, and support me in my firmness, inasmuch as I know this disorder of unrestfulness is catching, and there is no knowing who amongst us may next take the insidious disease, nor to what lengths it may carry us; our ideas of pictorial composition might get inextricably mixed up with lengths of foci, a complication of the malady I have witnessed which is simply disastrous. I am not going to discuss foci at all, it is not my *métier;* there are gentlemen of eminence amongst you whose high qualifications are admitted and well known; who will tell you much better than I can what lenses will, and will not do, and you may rely on their opinions. I will only caution you, however, in one particular, and that is, that some of them having, I suppose, a mild attack, an incipient unrestfulness, are not always quite decided what it is they want their lenses to do. Neither do I want to talk much about paper to-night, although as I see a tendency lately to traverse and upset my dicta on printing surface, I must not let it pass altogether; my excuse must be, alas! that your art gentlemen can scarcely be accurately described as one of the arts of peace; for one of the features of photography is, as you know, that there is pretty generally a paper war going on. I will only say about paper, beware of the unrestful again. The desire to take the shine out of everything—that is no doubt part of our nature—is under some circumstances praiseworthy, and I do not at all mind the shine being taken out of paper, provided always you give me an adequate range of values in my shadows; but what I do object to is, that having succeeded in accomplishing a fairly pleasant pictorial composition, you should want me to mar the charm of that composition by making me look at it, so to speak, through a ridiculous reticulation. Nothing will make me believe that roughness of surface is not a matter of absolute scale in works of pictorial art with the area of that surface; it were as reasonable to maintain that for a miniature painting, glass paper is preferable to ivory. Tastes undoubtedly differ. I can only regard those as curious which are satisfied only in a cabinet picture when it has the texture and grain of a fresco.

There are those who admire Constable. I am one of them, but I well know that his chief attraction does not lie in the roughness of his technique—a roughness which does not appear necessary when we look, as we do with pleasure, on the not despicable work of John Linnell or Turner. For my own part, while I have no sympathy, as I have shown, with this latest affectation, I look for no improvement in photography from the multiplication of landscapes where the sky appears equally ploughed with the fields; neither would a Venus born from the waves suggest a regeneration of art to my mind, or my sense of beauty and fitness be in any degree edified, however lovely she were in other respects, if that Venus were corrugated and pock-marked, and appeared rising from a pebbly sea. Craving your forgiveness, I say not another word on lenses or paper. Let us get to composition.

Now, I am quite prepared to be met at the outset by the outcry, "What stale nonsense! Whatever worn-out rubbish you may quote from Burnet or Harding, or derive from the old and dilapidated masters, you can't take liberties with nature and shift a group of poplars, a steeple, or a mountain, to suit your pedantic persuasions in photography, as you permit yourself to do in a sketch or water-colour drawing. Best let nature shift for itself," &c. &c. That we cannot do these things in photography, which are the licenses of the other pictorial arts, let us admit at once; so much the worse for photography perhaps. But we have to make the best of photography if possible to-night, and the best of photography is this, that if you are really in earnest in search of the picturesque, the best photographer, *i.e.*, the man who is the best artist, will, other things being equal, give you the best picture. There is no doubt about it, it is being proved every day: the worst and the best of photography, after all, lies in the man and not in the tools. Then what shall the photographer do? Is he to worship stocks and stones, taking the dross of nature for art, disbelieving that there is a subtle spirit anywhere, that she keeps back, except to the favoured few who know her face to face and look her through and through, or to those seemingly almost as few who, with no divine afflatus, yet with simple faith and the intellect such as they have, rubbed bright as God gave it them, will wrestle on any terms with nature for this treasure, and not too proud to profit by some of the counsel and experience of their race, wrest this spirit of art from the bosom of nature, delighting themselves and benefiting mankind?

P. H. Newman.

(*To be continued.*)

NEGATIVE MAKING.

[A Communication to the Epping Forest Photographic Society.]

A perfect negative is one that will yield a good print in any process that the artist may desire should be the medium of presenting his creations in a finished form, and a thorough acquaintance with the technical conditions and details of working will enable him to produce with a fair degree of certainty, a negative that will give the exact result he may require, provided of course that the conditions under which the exposure was made allow of such a result being obtained.

I do not propose to treat the artistic aspect of negative making, but rather the technical, and its application to the carrying out of an artistic idea, and to consider—(1) choice of plate; (2) exposure; (3) development; (4) any treatment that may be necessary either before exposure or after development. Each of these, while it may be considered to a certain extent independently, very largely influences or controls the others, and consequently, in order to produce the finest result, the same mind must direct the whole work, so that each part is suited to the other, and all that done has one object—the accomplishment of one definite idea.

Choice of Plate and its Rapidity.—In selecting a plate for general work the individual characteristics of different brands should be ascertained by careful experiment, though it may be accepted without question that the plates sent out by any leading firm are good and capable of producing the finest results. If such are not forthcoming, the fault must be looked for in the user, not in the plates; but since no two makers work from the same formula, but in some instances differ very materially in the manner in which they prepare their emulsion, it follows that the resulting images will differ in their character and scale of tones, in some instances very strongly.

A good test subject is a vase containing flowers, some white and well lighted, others darker, and some should be very dark; or, failing such variety, some white flowers arranged in a dark vase having a pattern or darker markings on it, it being necessary to have details in high lights and deep shadows, both of which are essential to a successful rendering of the picture, in addition to a fair range of half tones. The negatives taken should be very carefully compared for density, detail or gradation in the lighter tones and high lights, and detail or gradation in the darker tones and deep shadows. Any plate that with correct exposure and normal development will not give vigorous negatives should be rejected. While one or two brands of plates give sparkling gradation in the lightest work, it is unfortunately obtained at the expense of the shadow detail, for those that render the darkest parts best fail to reproduce the lightest tones so well as others.

For general work I much prefer to use a plate that gives the strongest shadow detail without veiling the deepest shadows. No one can have failed to notice how imperfectly, even at its best, photography reproduces details in dark masses of badly lighted foliage in comparison with the effect of the scene itself, and in landscape work generally a full amount of detail merging into a deep black gives extreme depth to the shadows. The high lights, generally sky and parts that reflect a large amount of light in proportion to the rest of the picture, can better afford to lose a little in gradation if the darker work can gain in consequence. If the shadow detail is well marked and strong, most of the half tones will be slightly lighter than otherwise. The actual plate used is, to a large extent, a matter of individual taste and opinion; personally, I have a great liking for a clean-working plate, in which the shadows do not veil nor the plate fog or stain by prolonged or forced development. The fairest negative does not of necessity give the finest print, but I have never been able to produce satisfactory prints from negatives badly stained or fogged in development.

In this paper I am considering an amateur's or wandering photographer's requirements, rather than any special class of work. He must be prepared for landscapes, interior and exterior views of buildings, marine, instantaneous, and figure studies, and occasionally portraits.

Though a small reserve stock of plates suitable for special subjects might be kept, I am strongly of opinion that, as far as possible, one brand and one rapidity only should be used for all work; the photographer is then thoroughly acquainted with all its characteristic peculiarities, he is fairly safe in his exposures, and being well accustomed to the appearance of the plate in development, will know whether it is giving him the result he requires, or how best to modify his treatment should the exposure have been at fault, or the nature or lighting of the subject require special development. Frequently, too, a photographer will obtain better results in special subjects on a comparatively unsuitable plate to which he is well accustomed, than on a more suitable one with which he is thoroughly unacquainted, the mastery of the methods of treating the plate giving him such control over his result. An incidental advantage, though not a

small one, is that the slides can be filled without any consideration of what may be met in a tramp with the camera, and whatever fortune may throw in his way he is prepared for it.

It is frequently stated as an accepted fact that a *slow* or *very slow* plate will give the finest results in landscape work, and consequently no other should be used. The writer's experience does not support this view, but rather otherwise. Some of the moderately rapid, which are quite quick enough for ordinary instantaneous work under fair conditions, will give as fine a result as the slowest. Those of excessive rapidity, however, do not produce such good negatives, and frequently fog badly in development, but still there is no reason for using, as many advise, a plate only a few degrees faster than wet collodion, necessitating exposures so prolonged as to be in many instances fatal to success.

While speed is not so important a consideration as quality, yet if with a moderate degree of rapidity all other good qualities can be combined, then the gain is a great advantage. In landscapes, even if not instantaneous studies, figures or animals may be desirable, or the movement of trees or water may necessitate a short exposure, which with a fairly rapid plate would be ample, but with a slow, of no use whatever. I have not found either the greater latitude in exposure claimed for slow plates; true, a second too much with a rapid plate may do more harm than four or five too much with a slow, but it is the proportion to the correct exposure in either case. Expose a slow plate five or six times too long, and it is as difficult to treat successfully as a moderately rapid.

H. W. Bennett.

(To be continued.)

NOTES FROM SCOTLAND.

There seems to be a moving of the dry bones, among the amateurs especially. A new Society is being started in the now near village of Liberton, they who reside about that district feeling the Edinburgh Society rather too high and mighty, and perhaps too distant for them, it being above three miles to the latter's rooms. Amateurs only wishing to join are to communicate with Mr. John Stuart, Tower-villa, Liberton. Rumours have also been heard of another similar body, and they have now assumed a concrete shape. The new Society is, I understand, to be confined to the *alumni* of the Edinburgh University. They have already secured photographic premises quite close to the University Union, a set of buildings attached to the new University for the social and other purposes of the students, and from which body the new amateur Society is mainly recruited.

The Edinburgh Society is also wakening up, and there are to be medals provided and awarded for the best inter-society workers of that body at the usual opening exhibition of the next session. The conditions under which they will be given have not yet transpired, save in so far as the outdoor meetings being now re-established one at least of the medals will go to the best work done at them and exhibited at the Society.

The London and English societies are much taken up with increased facilities for such society meetings; here the rule with all railways is for parties of ten and upwards for any purpose to get a separate carriage or compartment to and from a destination for fare and a half in any class.

In the galleries lately occupied by the exhibition of the Edinburgh Photographic Society the artists of the Royal Scottish Academy are now holding their annual exhibition. Were it not for the fact that artists are a very *touchy* lot, many lessons might be drawn from it of mutual benefit to both bodies of depicters of nature—the photographer and the pictorial and plastic.

It is, however, to be observed how constantly they have to seek the aid of the youngest sister of the representative artists. Again, at the Philosophical Institution lectures, one of them, a sculptor, Mr. Charles M'Bride, has been lecturing on *Sculpture, its Methods and Aims*. He, in an admirable discourse, gave advice and opinions to the public and his *confrères* which applied in many ways directly to photographers, their aims and work. Many of his illustrations were shown by the optical lantern and limelight; of course they were photographic transparencies from modern and ancient sculpture. In concluding, he said, what is worthy of our attention: "If modern sculpture" (call it photography) "was to be worthy of the name, its products must bear the marks of the times in which they lived, of the extraordinary evolution of thought which later days had witnessed. Their literature, their poetry, their novels, their music were redolent with this. Their *art* could not afford to lag behind."

Nor should we with ours. W. H. Davies.

Foreign Notes and News.

The editor of *Helios* recently tells a rather amusing story of how a Yankee photographer attempted, without success, to obtain a negative of His Majesty the King of the Belgians. The enterprising individual lay in wait for his victim in a corner of the Kursaal, at Ostende, which the King very frequently visits; but as soon as he had got his objective fixed, His Majesty happened to perceive it, and, making a sudden turn, presented his coat tails to our enterprising friend, which the latter, however, did not think it worth while to waste a plate on. He then shouldered his apparatus, and followed the King step by step, who, aware of what was taking place, turned suddenly completely round and confronted his enemy. The unfortunate operator was so overcome and confused at finding himself unexpectedly face to face with Royalty that he dropped his precious apparatus, which duly smashed upon the floor. The King appeared to the bystanders to be secretly delighted at the occurrence.

The same authority relates how, on the visit of the Emperor of Germany to Belgium, a photographer approached uncomfortably near to the Royal party. He calmly proceeded to focus and adjust his instrument in the very faces of their Majesties, when the Count of Flanders approached him, turned round his camera, and told him to be off—"*Allons, Monsieur, s'il vous plait.*"

R. S. Botonne, in the *Photographisches Archiv*, recommends the following as a "bromide of copper intensifier:"—

A.

Bromide of potassium	1 pint.
Water	25 pints.

B.

Sulphate of copper	1 pint.
Water	25 pints.

The two solutions are mixed, and the resulting precipitate of sulphate of potash allowed to settle, and the clear solution filtered off. This solution imparts to the negative in a few seconds a very beautiful enamel colour, the shadows remaining clear, so that it appears as a brilliant positive when seen from above. It is then thoroughly washed until every trace of copper is removed, and then treated with a solution of one in twelve of ammonia, which gives a very fine copying chocolate tone, with powerful contrasts. Such is M. Botonne's receipt, but we must confess to not quite understanding how the sulphate of potash is precipitated, as it is under ordinary circumstances a soluble salt.

A lecture was given on the 9th inst. in the scientific lecture theatre of the Urania Society in Berlin by Mr. Muybridge, of San Francisco. It will be remembered that Mr. Muybridge was the first photographer who obtained impressions of animals and human beings in rapid motion—a department of the art which Anschütz has since so astonishingly enriched. It is satisfactory to know that Mr. Muybridge received an excellent reception in Berlin, and that he has arranged to give a series of lectures there in the English language illustrated by experiments.

We extract the following receipt for matt varnish from the *Photographische Nachrichten*:—"To three parts of ordinary negative varnish add one part of finely powdered tartaric acid, shake thoroughly, and allow the mixture to stand for twenty-four hours, then pour off the clear portion, and slightly warm the plate before applying it. The grain is said to be very fine." This, in a modified form, is known to our older readers.

The *Revue de Photographie* introduced a pleasing novelty last month by way of an illustration. It consisted of a collotype printed on matt semi-transparent gelatine, mounted on a sheet of rose paper. The execution of the work is by Messrs. Thevoz, of Geneva, from a negative by Lacroix.

According to Herr A. Lainer, the gold salts occurring in commerce, owing to their varying content of gold and free acid, give rise to considerable uncertainty of effect in the treatment of positives. Herr Lainer has consequently been induced to interest himself in the preparation of gold salts, and has succeeded in obtaining a new preparation, which may be described as anhydrous chloride of potassium and gold, and contains 52·03 per cent. of the latter metal.

Our contemporary, the *Fotografisk Tidskrift*, appears to grow larger and more interesting every month—an excellent proof of the constantly increasing interest taken in photography in Scandinavia. The last issue contains an excellent article on *Micro-photography*, and its value as an assistant to the scientific investigator, by Professor J. Lundgren.

The following combined toning and fixing bath is recommended by M. Lamy, in *Helios*.

A.

Distilled water	500 c.c.
Acetate or phosphate of soda	30 grammes.
Gold potassium chloride	2 ,,

B.

Distilled water	500 c.c.
Ferrocyanide of ammonium or potash	40 grammes.
Chloride of gold	2 ,,

C.

Distilled water	1000 c.c.
Fixing soda	375 ,,
Caustic soda	5 ,,
Saturated solution of potash alum	500 ,,

A and B are poured into C, which is agitated meanwhile, and after standing twenty-four hours the clear portion of the solution is poured off for use.

As long ago as last June, Herr Gaedicke made a communication to the society of "Friends of Photography," to the effect that he had succeeded in manufacturing a collodion-emulsion plate of medium sensibility, equal in fact to that of a medium gelatine plate, while giving more delicate shading and finer precipitation, with great latitude of exposure, short development, &c. They have not yet, we learn from the *Photographische Correspondenz*, appeared on the Continent, and Herr Gaedicke means to produce them first in England. Has any one seen or heard anything of them here?

Herr A. Lainer has recently been recommending a new matt varnish, in which toluol is substituted for the benzol in the ordinary varnish. This is his receipt:—

Ether	100 c.c.
Sandarac	10 grammes.
Toluol	34–50 c.c.

The ether is poured into a flask and the 10 grammes of powdered sandarac then added, which dissolves on shaking. The solution is then filtered, 35–40 c.c. of toluol added, and though a good varnish may be produced with less toluol, it is advisable to use at least this amount, as the resulting coat is more equable.

Ogonowski recommends the following method of colouring silver prints. The first proof is made rather thin on ordinary salted paper, toned with gold, and fixed. The print while still moist is laid upon a sheet of blotting paper, and a glass plate placed upon it. The print while still moist is coloured in the ordinary way to give the local tones, re-albuminated, re-silvered, and then put into the copying frame under the negative and reprinted. The resulting effect is said to be extremely beautiful.

Our Editorial Table.

An Easy Walk Through the British Museum.

By Louis Fagan. London: Duncan C. Dallas, 5, Furnival-street, E.C.

The treasures of the British Museum are to a vast number a sealed book for want of the services of the trusty guide who also enacts the part of the philosopher and friend. In this booklet of ninety-eight pages Mr. Fagan, who is one of the Museum officials, presents a clear and short description of the most notable works of art contained in this great National Institution. The information concerning these is couched in concise language, and the value of the work is greatly enhanced by some seventy or eighty illustrations made from nature by Mr. Dallas, and executed by his Dallastype process. It is a most invaluable shilling's worth.

Jahrbuch für Photographie und Reproductions-Technik. 1891.

Von Dr. Josef Maria Eder. Halle: Wilhelm Knapp.

An excellent feature of Dr. Eder's Annual is a series of no less than twenty-three inset plates which serve, not only to illustrate progress in reproductive methods, but also to show advance in other branches of the art-science. Among the most notable reproductions we may mention a ball-room scene, photographed by Mr. R. Slingsby, and also a drawing-room group by the same gentleman, both these being taken by the flashlight. Another flashlight group taken with Hesekiel's lamp (an arrangement by which the magnesium dust is projected into the chimney of an ordinary paraffin lamp) shows the whole lighting as coming from the paraffin lamp seen hanging over the table. Very remarkable and interesting are some examples of instantaneous work by Professor L. Mach and Herr E. Mach. As will be remembered, these experimenters photograph a bullet in flight by the light of the electric discharge; this discharge being brought about by the bullet itself striking the wires connected with the Leyden battery. In this series we not only see the bullets in flight and the areas of compression and rarefaction, but also what appear to be actual breaks in the air immediately behind the ball. There is also shown a sound wave as produced by the crack of the Leyden battery discharge; a similar sound wave distorted by a jet of air issuing under a tension of 45 atmospheres, and a remarkable photograph of air issuing from a rift at high pressure (38 atmospheres). Other subjects of scientific interest are a portion of the moon's surface, taken with the Barlow lens at Vienna, and a photograph of the retina of a beetle, showing the visual impression thereon; while from the point of view of reproduction, the gem of the series is a small photo-intaglio engraving (Heidelberg Castle) by Obernetter. The general contents of the book are excellently arranged, and not only include an abstract of the year's work, but also numerous original papers of interest.

Geschichte der Photographie.

Von C. Schiendl, A Hartleben's Verlag, Vienna, Pest, and Leipzig.

This comprehensive work, consisting of 480 closely printed large octavo pages, is something more than a mere history of photography in the sense ordinarily understood. The gradual growth of photography is first carefully traced out from the time when Schulze (1727) obtained an image on a sensitive mixture of silver nitrate and chalk, to the period when the labours of J. N. Niepce gave us the means of recording in permanent ink the pictures of the camera; and on p. 31 of Herr Schiendl's book we find a reproduction of a print published by Niepce in 1824, the original plate of which is now in the museum of Chalon, s. S. In grain it is not unlike the ink photographs of Messrs. Sprague, but it does not show quite so much gradation of tone.

We now come to the more systematised portion of the work, in which the subject is classified under such headings as Daguerreotype, photography on paper, the collodion process, photo-mechanical methods, emulsion processes, platinotype, photo-grammetry, heliochromy, photography in its artistic aspect, and tar-colour processes. The author's aim has evidently been to give under each heading a chronological abstract of all the most important investigations and processes, with copious references to original sources of information; and as the work now stands, it is a reference book which includes the most important researches all through the range of photographic work; and to illustrate how well the matter is brought up to date we may refer to the chapter on tar-colour processes in which the primuline processes are described. At the same time the literary style is excellent and the book pleasant to read, the author avoiding such long and involved periods as so often make German books oppressive in the reading.

Herr Schiendl has avoided the very common fault of devoting a disproportionately large amount of space to such subjects as are particularly his own, or, in other words, he has not lost sight of the whole in his devotion to parts. His chapter on the history of scientific aspects is specially interesting. Here he gives the various chemical and physical theories, which are presented in historical order, from the views of Schnauss, published 1853, to the recently published theories of Carey Lea. Indeed, this section, which runs through no less than a hundred and thirty-seven pages, appears to us to be one of the most valuable compendiums of photographic theory which has been published. The art aspect is dealt with in a short chapter, where are recorded in brief abstract the teachings of the chief writers on photographic esthetics, and in which their works are briefly described.

In the group of portraits which is to be found as a frontispiece, the selection has been made so as to include men eminent as ground-breakers in all the chief departments of work. Thus, as early discoverers we find the two Niepces, Daguerre, and Talbot. As later workers who have inaugurated methods are Poitevin, Albert, and Gaudin; as an optician we have Petzval; as scientific workers, Abney, Carey Lea, Davanne; and as a representative of pictorial photography, Robinson. Herr Schiendl does not give a portrait of Schulze, as the two to which he had access differed widely.

Although it is not usual in a review to make reference to such literal errors as fall within the province of the printer's reader, the fact that a very vigorous attack upon Herr Schiendl's book has been founded mainly upon such circumstances as the spelling of Petzval's name—"Petzwal" in one place—justifies a departure from this usage, and we may say that we regard the book as more free from "literal" errors than is the case with most scientific literature.

Geschichte der Photochemie und Photographie vom Alterthume bis in die Gegenwart, von Dr. Josef Maria Eder.

Halle: Wilhelm Knapp.

We have here the first part of the second edition of Dr. Eder's well-known handbook of photography, and not only does he give a detailed and comprehensive history of the advance of photography up to the period of Daguerre, but also several very fine heliographic portraits of the early workers.

Specimens of Chlorotypes.

The above name has been given to a new Obernetter gelatino-chloride emulsion paper. It dries with a smooth, fine matt surface, which retains great transparence in the shadows. The specimens which we have received from the agent, Mr. J. R. Gotz, 19 Buckingham-street, Strand, W.C., warrant us in saying that this paper will undoubtedly take a place amongst the most successful papers. The tones that may be obtained vary from a warm brown, through purple, to a cold black. Although the toning bath most suitable is supplied by Mr. Gotz ready for use, he makes no secret of its preparation. It consists of chloride of gold, chloride of ammonium, and sulphocyanide of potassium.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4163.—"A Photographic Flashlight Apparatus." J. H. Ainley.—*Dated March* 9, 1891.

No. 4228.—"Rotating Photographic Lens Diaphragms." J. Johnston.—*Dated March* 10, 1891.

No. 4272.—"Improvements in Candle Lamps for use in Photographic Dark Rooms, and for other Uses." H. A. Benham and W. H. Tomson.—*Dated March* 10, 1891.

No. 4387.—"Improvements in Oxyhydrogen Limelight Apparatus." Complete specification. W. C. Hughes.—*Dated March* 11, 1891.

No. 4459.—"Improvements in Photographic Cameras known as 'Detective' or Hand Cameras." J. W. Morgan.—*Dated March* 12, 1891.

No. 4483.—"Improvements in Photographic Cameras." Communicated by G. H. H. Couchman. A. J. Boult.—*Dated March* 12, 1891.

No. 4615.—"A Squeegee for Photographic and other Purposes." C. C. Piper.—*Dated March* 14, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 5158.—"Holding, &c., Photographic Plates." Stanbury.—Price 8*d*.

PATENT COMPLETED.

Improvements in or Connected with Apparatus for Holding and Changing Photographic Plates.

No. 5158.—Charles Henry Stanbury, 91, Fleet-street, London.—*February* 21, 1891.

This invention relates to a holder or box for containing sensitive plates both before and after they have been exposed, and to means for transferring the plates to and from the camera.

The box is provided with a number of slides with spaces between for receiving the plates, and the back of the camera (or dark slide as it is often called) is provided with two slides having a space between to receive a plate.

The outer ends of the slides carry flanges, which come against the ends of the partitions between the slides so as to make as light-tight a joint as possible.

In order to transfer a sensitive plate from the box to the camera, the back is put on to the bottom of the box and the lower slide of the box and the upper slide of the camera back are pulled out, whereupon the plate drops from the box into the back—the slides are then pushed in again. After the plate has been exposed in the camera, it is put back into the box, but this time at the top. In order to make room for it the slides in the box are pulled out one by one in succession, allowing each plate to drop down into the next space below that which it previously occupied, so that now the top space is empty whilst the bottom space contains a plate. The back of the camera is then placed upon the top of the box, and its slide and the top slide of the box are pulled out, the plate drops into the box, and the slides are pushed in again. The next or second plate, which is now at the bottom of the box, is transferred to the camera in a similar manner, and so on.

In some cases I replace the intermediate slides of the box by holders for the plates, but I retain the two outside slides.

The claims are:—1. Boxes for photographic plates so constructed that the plates can be taken out at one side and put in at the opposite side substantially as described. 2. Boxes for photographic plates being at two opposite sides, so formed as to fit on to the back or dark slide of a camera, such sides being closed by slides, which can be withdrawn to put in or take out the plates substantially as described. 3. Backs or dark slides of cameras formed to fit on to a box containing plates, and provided with a slide which can be withdrawn to put in or take out the plates substantially as described. 4. Apparatus for holding photographic plates substantially as described and shown in the drawings.

An international photographic exhibition will be held in the galleries of the Fine Art Institute, Glasgow, in September next, under the auspices of the Glasgow and West of Scotland Amateur Photographic Association. Full particulars will be announced very shortly. Besides the classes usual at such exhibitions there will be a section for photo-mechanical work.

Photographic Society of Great Britain.—March 24, technical meeting; subject for discussion, *Hand Cameras*. Members are requested to bring their cameras with them. March 31, lantern evening and discussion on lantern matters. April 14, Mr. W. Willis will read a paper on *Platinotype*. April 28, subject for discussion, *Animal Photography*. The exhibition of collotypes will remain open till April 14.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 23	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 24	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 25	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 25	Burnley	Bank Chambers, Hargreaves-street.
,, 26	Burton-on-Trent	The Institute, Union-street.
,, 26	Halifax Photographic Club	Mechanics' Hall.
,, 26	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 26	Oldham	The Lyceum, Union-st., Oldham.
,, 26	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 12,—Mr. W. H. Prestwich in the chair.

A copy of *The Studios of Europe*, by Badin Pritchard, now out of print, was presented to the library by the Hon. Secretary (Mr. R. P. Drage).

Being lantern night, a large collection of slides was exhibited on the screen. Mr. S. T. Chang showed, amongst others, some reminiscences of the Conference at Chester and groups of the lady cricketers. These were followed by slides furnished by Messrs. W. A. Casson, J. S. Teape, J. B. B. Wellington, and C. H. Cooke.

There was no other business before the meeting.

THE LANTERN SOCIETY.

March 9.—Mr. E. W. Maunder on *Photography as applied to Astronomy*.

Mr. Maunder commenced by dealing with solar photography, the sun having, he said, been the first celestial object which was photographed for scientific purposes. Soon after the discovery of the Daguerreotype process photographs were taken of the moon, and also of some stellar groups, but these views did not serve any scientific purpose, and it is from the systematic use of the photo-heliograph for obtaining a photographic record of the state of the solar surface that the application of photography to astronomical purposes may be said to date. Mr. Maunder next spoke of the first photo-heliograph erected at Kew, and described in detail the later instrument now used at Greenwich, the work done by the instrument being illustrated by a series of slides showing portions of the solar surface. Other views were also exhibited prepared from the beautiful photographs taken by M. Janssen at Meudon, these being, as Mr. Maunder remarked, the finest solar photographs yet produced, showing as they do most admirably the details of the structure of the surface of the sun, the faculæ, &c. While dealing with solar photography, Mr. Maunder also pointed out the strong grounds for connecting the periods of maximum solar disturbance, as marked by the frequency and extent of sun-spots with terrestrial magnetic disturbances; and he further alluded to the manner in which the periods of maxima and minima were marked by variations in the latitude of the spots occurring. The next portion of the subject treated was the application of photography to the observation of total solar eclipses, the instruments used being described and a number of photographs shown illustrating the structure of the corona as seen at recent eclipses. Leaving the sun, Mr. Maunder next proceeded to treat of the photography of the planets, illustrating his remarks by slides of Jupiter and Saturn taken at the Lick Observatory and by Professor Pickering, of Harvard. The task of photographing a planet was, he remarked, one of great difficulty, inasmuch as the very moderate light available did not admit of instantaneous exposures, such as sufficed in the case of the sun, while the rapid rotations of Jupiter and Saturn on their axes prevented recourse being had to the long exposures which could be employed when photographing fixed stars. Altogether, up to the present time, although remarkable progress had been made, photographs of the planets left much to be desired, and could not compare favourably with the records obtained by skilful draughtsmen. In illustration of this there were thrown upon the screen reproductions of a number of the best drawings of the planets of which direct photographs had been shown. Dealing next with stellar photography and photographs of nebulæ, Mr. Maunder remarked that in these departments photography left all records founded on visual observations far behind. In fact, the details of structure of nebulæ, as shown by the magnificent photographs of Common and Roberts, had been a complete revelation, and had resulted in an extension of our knowledge of such bodies, the value of which it was difficult to over-estimate. For comparison there were shown on the screen photographs of the Orion nebula and the great nebula of Andromeda, and reproductions of the best drawings available prior to the production of these photographs. In dealing with stellar photography, Mr. Maunder paid a well-merited tribute to Dr. Gill, of the Royal Observatory at Capetown, whose photographic survey of the southern hemisphere, carried out largely at his own cost, and now practically completed, may be fairly said to have originated the scheme for the general photographic survey of the heavens determined upon by the International Congress, and the arrangements for which are now in an advanced stage. In treating of these matters Mr. Maunder spoke at length on the admirable work done by Messrs. Paul and Prosper Henry, of the Paris Observatory, his remarks being illustrated by a large number of lantern slides showing the instruments used, photographs of the Pleiades, a portion of the constellation Cygnus, &c. In conclusion, Mr. Maunder dealt with the application of photography to solar and stellar spectroscopic research, there being exhibited on the screen the wonderful photographs obtained by Mr. Higgs from the red end of the solar spectrum, and examples of the spectra obtained by Professor Pickering from stars, the duplicity of which had been revealed by the spectroscope, the spectra obtained on some days showing the duplication of the lines due to movements of the stars in the direction of the line of sight. This duplication of the lines showed that the spectrum in

which it occurred was compounded of the light from two stars moving at different velocities with regard to the line of sight, and by collating the observations at different dates it was possible to calculate the periods of revolution and the masses of two stars which had never been separated visually by any telescope yet made, and probably never would be.

At the next meeting of the Lantern Society, on March 23, the slides sent to England by the American Lantern Slide Interchange will be exhibited.

HACKNEY PHOTOGRAPHIC SOCIETY.

MARCH 12,—Dr. Roland Smith in the chair.

A demonstration on *Bromide Enlarging* was read by Mr. S. H. Fry.

The Secretary issued circulars inviting members to send pictures for the forthcoming Palace Exhibition.

Mr. FRY then gave his paper and demonstration. He prefaced his demonstration by explaining the best kind of lens to use and the diaphragm, advising the use of as large an aperture as would be consistent with sharpness and atmospheric effect. For vignetting he made a hole in a card and obtained the vignetting effect by a rotary motion. If one part was not properly exposed, it could be treated locally, or re-exposed by washing off the developer, and bearing in mind that the paper was only about one-third as sensitive as it was before. A very good way to gauge exposure when in doubt, say, for a matter up to three minutes, he advocated the placing of a strip of paper across the exposure board, and giving a number of exposures right across, taking a record. Then, by after-development, the correct exposure could be decided on. The lecturer advised the use of plenty of safe, orange light, and when judging the density it could best be done by looking through the paper. With respect to developers, he preferred the ferrous oxalate at present, though eikonogen may eventually usurp the place. The lecturer said he had found the acid bath unnecessary, provided the developer was perfectly washed out of the paper, and, moreover, if acid was conveyed to the fixing bath there was danger of a formation of deposit of sulphur. He advised the soaking of the paper prior to development in distilled water.

Mr. GOALING asked whether ordinary water would not do; but was informed that there would be oxalate of lime formed.

Dr. GERARD SMITH asked if the paper would not become slower if wetted.

Mr. FRY said not if plain water was used.

Mr. HARVERSON asked what would the exposure be for artificial light; and was informed that it depended on the quality of light; if oxyhydrogen, just about the same as daylight.

Mr. LANE wanted to know whether an ordinary lens would do for enlargement.

Mr. FRY thought it perfectly suitable.

The demonstration then took place; no acid bath being used, the paper and opals being washed with a large plug of cottonwool. A stain was perceptible as of fog, but on being treated by the lecturer with tincture of iodine it disappeared.

In answer to a question by the Secretary as to the extra cost of opals over bromide paper, Mr. FRY informed the members that there had to be such great care exercised in the cleaning that extra cost was incurred thereby, the slightest finger-marks affecting result.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MARCH 8,—Mr. Goodhew in the chair.

Mr. GOODHEW reported proceedings taken at the meeting called by the President of the Toynbee Club *re* Federation of Societies.

Messrs. Goodhew and Cherry were elected to represent the Society at future meetings.

A field-day at Rickmansworth was arranged for Easter Monday.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MARCH 13,—Mr. W. A. Brown (President) in the chair.

The PRESIDENT announced the result of the meeting called by Mr. Biden on the subject of federation, and said he thought the smaller societies would be greatly influenced by the action of the Photographic Society of Great Britain towards the scheme. The Council had, however, resolved to send two delegates to attend the next meeting, on the 23rd inst.

Mr. HODGES was inclined to doubt the advisability of doing anything definite until more was known about the scheme.

Mr. ROLAND WHITING then read a paper on *The Laws of Art as applied to Photography*, which he illustrated by sketches on the blackboard. A long discussion ensued, principally on the question of improving the composition of photographic pictures by combination printing.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 13,—Mr. F. P. Cembrano presided.

Photometers and actinometers were discussed. Decoudun's actinometer, and Watkins's exposure meter for camera work, and Sawyer's, Burton's, and other makes for printing purposes, were shown and described.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 11.—Mr. G. DAVISON gave his promised lecture on *The Art Side of Photography*.

After a few brief remarks on the relation of art to photography, he divided his lecture into the following sections,—tone, balance of lines, focus, &c., illustrating his remarks under each heading by handing round for inspection numerous prints, all of which were thoroughly appreciated. The printing in of clouds, the trimming of prints, and the mounting and framing in the most effective manner received his attention, as did the effect of an addition of mercuric chloride to the platinotype bath, the use of lenses and stops, and, finally, pinhole photography.

At the close of his lecture, a discussion on the subject took place.

Fixtures:—March 25, lantern evening; April 8, "American" slides April 25, Alpha demonstration.

CROYDON CAMERA CLUB.

MARCH 16,—Messrs. W. G. Fenn, Henry Larkin, H. B. Larkin, H. Coombes, and J. Daniell were elected members.

Mr. A. E. Isaac lectured on *Lenses*, and a discussion ensued.

A large number of slides contributed by Messrs. Oakley, Hirst, Overton, Carden, White, Reeves, and others, were thrown on the screen.

Arrangements for holding the exhibition of members' work are being pushed on. In connexion with the above a fine collection of the works of the late Mr. Donkin will be shown.

THE STEREOSCOPIC CLUB.

THE first meeting of a new society, to be called the Stereoscopic Club, was held at the Brooklands Hotel, Brooklands, near Sale, on Monday, Mr. W. J. Cunliffe (the President) in the chair.

The CHAIRMAN said the new Club was intended to supply an organization and a place of meeting for the discussion of stereoscopic photography. The motives which had prompted them to study and practise this particular branch were not far to seek. As business men they had not time to give to paper printing, which requires daylight. To be able to make transparencies by contact in the evening is one advantage; another is the portability of the apparatus, together with other conveniences, such as render the work highly suitable for amateurs. These, however, are by no means the greatest claims for stereoscopic photography. It is the beauty of the resulting picture which has the highest claim. A stereoscopic transparency is the most perfect transcript of nature which photography is capable of rendering. This branch of photography has been much neglected of late, and is worth reviving and rendering more popular. Hundreds of amateur photographers not only know nothing about it, but have never seen a good transparency by a good stereoscope. It is intended to establish a uniform system in the work done by members, for without certain technical observances stereoscopic pictures are made which, when viewed by ordinary stereoscopes, cause much difficulty, and are often impossible to combine and make one picture. It will be the first duty to consider the various methods of producing stereoscopic pictures, then consider and decide upon some form of stereoscope as the most generally useful. Manchester has been recognised as a centre in lantern work; it was the first place out of London to establish a photographic society, which was the first in the world to establish a lantern section, and there is no reason why Manchester should not take a prominent position in the revival of the stereoscope.

Mr. W. I. CHADWICK, the Hon. Secretary, explained some technical points, and it was ultimately resolved that the Stereoscopic Club adopt $6\frac{1}{2} \times 3\frac{1}{4}$ as the standard size for transparencies; also that the dual pictures should be printed at $2\frac{3}{4}$ centres measuring the foreground—the "distance" not always being the same—and that when matts are used the openings are to be $2\frac{1}{2}$ inches wide and $2\frac{5}{8}$ centres.

The meeting closed with an exhibition of some beautiful transparencies contributed by the members, and also a highly interesting loan collection from Mr. Megson.

MANCHESTER PHOTOGRAPHIC SOCIETY.

MARCH 12.—Mr. Whitefield (Vice-President), at the request of the President, occupied the chair.

This meeting was made special to consider a proposed addition to the rules, with the view of an entrance fee being paid by new members. After considerable discussion, the proposal was rejected.

A miniature camera was passed round by Mr. WHITEFIELD, who explained that it was the work of a boy from his father's instructions. It was interesting as showing that with simple materials fair results could be obtained, the whole of the well-made little camera and dark slide, to take a quarter of a quarter-plate, being constructed of hard cardboard. The lens was a simple one, from a set of three bought for a cheap microscope for 5*d.* the set. The total cost of the apparatus would be about 6*d.*, and a sample print showed that, as a beginning, it was not to be despised.

A contribution to the question-box, as to the best method of copying photographic prints and glass positives, was satisfactorily answered by Messrs. Brothers, Edwards, Blakeley, and Schofield—the principal object being to get the light full on the front of the picture to be copied, a large gas jet placed just above the camera being as good a means of illuminating as any. The grain in unmounted prints could be avoided by wetting and squeegeeing on to glass, and copying whilst in contact therewith.

Mr. BROTHERS contributed a paper on the subject of *Photography and Colour*, which, though not giving any new method to obtain the much-sought-for object of photography in colour, was a very exhaustive essay on the attempts to obtain such. Mr. Brothers had prepared his paper some time previous to the reported discovery by M. Lippmann, but he concluded his lecture by a full description of the experiments of that professor, which gave a very different construction to the subject than those given in the newspapers.

In the remarks following the reading of the paper, Mr. HEYWOOD expressed his opinion that in the chromo-collotype process we should look for the most practical results in colour photography.

The thanks of the meeting were accorded to Mr. Brothers, and the proceedings then became informal and conversational.

The next meeting will be held on April 9, when makers will be asked to contribute to a show of hand cameras and novelties.

LEEDS PHOTOGRAPHIC SOCIETY.

ON Monday evening last Mr. Godfrey Bingley (the President) gave the third of the series of elementary lectures, his subject being *Albumen and Aristotype Printing*. Mr. T. W. Thornton (Vice-President) occupied the chair.

Mr. BINGLEY stated that printing and toning, although simple photographic operations, often prove difficult to beginners. A good print could, of course, only be obtained from a good negative; weak and thin negatives were often the cause of bad prints. The best light in which to print was bright, diffused light. Speaking of albumen printing, Mr. Bingley said if purple tones were required, the washing previous to toning should not be as thorough as for sepia tones. With respect to the toning bath, perhaps that known as the "borax" bath was best for a beginner; it should be used soon after being made, and it was best to prepare a fresh bath for each batch of prints. The slower prints toned, the better the tone, and the more gold taken up by the print the greater the chance of permanency. Over-toned prints were flat and slaty in colour. Blistering, which sometimes took place, could be prevented by adding one drachm of ammonia or one ounce of methylated alcohol to each pint of fixing bath. In speaking of aristotype or gelatino-chloride paper for printing, Mr. Bingley observed that this paper keeps better than albumenised paper. It is somewhat higher in price, but the results are finer. Printing is done in the ordinary way, the action of the light being carried on until the shadows assume a bronzed appearance. The toning bath giving the best results is composed as followed:—

Sulphocyanide of ammonium	3 drachms.
Hyposulphite of soda	7 grains.
Water	20 ounces.

To three ounces of the above solution add three ounces of water containing two grains of chloride of gold, and when clear make up to eight ounces with water; this will tone one sheet of paper. The prints tone quickly, and when a rich purple has been reached they should be removed at once to the fixing bath, consisting of hyposulphite of soda, two ounces to the pint, and allowed to remain ten minutes, or until the print is an even colour.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

MARCH 11,—Mr. J. Porritt in the chair.

One member was elected.

A communication was read by the Hon. Secretary from the Midland Railway Company in response to an application from this Society for reduced fares for members when travelling as photographers, to the effect that, having considered the question, the management do not see their way to grant the request. It was resolved that this Society place itself in communication with the secretaries of various neighbouring societies with a view of forming an association for obtaining facilities in this direction.

Mr. GEORGE BANKART then gave a demonstration on *Autotype or Carbon Printing*, having prefaced the demonstration with a short but precise description of the principles of the process and the various results from different conditions of exposure and heat in development. He developed two 11 × 9 pictures printed on the Autotype Company's tissue; and the various stages of development, from squeegeeing on to opal to the finishing of the process by development of the picture by hot water, was watched by a throng of interested listeners, to most of whom the process was entirely novel. The demonstration was a perfect success, both prints yielding fully developed pictures, proving the value of this branch of the art. It was announced that at the April meeting Mr. Porritt would read a paper on *Photography, Past and Present*, with notes on the quality of dry plates and lantern slides, and a few remarks on the object of our excursions.

DERBY PHOTOGRAPHIC SOCIETY.

MARCH 10,—Mr. Richard Keen presided.

Mr. J. A. COPE read a paper entitled *The Chemistry of Photography*.

Six new members were elected.

A number of the members of this Society journeyed to Leicester on Thursday evening to a *conversazione*, under the auspices of the Leicester Photographic Society.

Mr. PIERPOINT gave a lantern exhibition of two hours' duration, and a number of choice slides were thrown on the screen.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 16.—Five new members were elected.

Mr. J. W. MCKENZIE gave a description and demonstration of the parchment collographic process recently brought before the London societies by Mr. Warnerke. Mr. McKenzie produced a number of excellent prints, and the process was watched with keen interest by the members.

Mr. HUGH REID exhibited a camera fitted with a telescope as a focussing finder, and showed negatives of vessels in motion taken with the apparatus.

The meeting closed with the usual show of lantern slides, amongst which were ninety-five views in the Yellowstone Park, U.S.A., and a number of miscellaneous slides by members.

Correspondence.

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

A NEW USE FOR PROFESSOR WHEATSTONE'S STEREOSCOPE.

To the EDITOR.

SIR,—I find in one of the trade stalls a Wheatstone stereoscope which has revived my thoughts as to its present utility. The great difficulty in its use when first brought out was the fact that it was a reflecting stereoscope only. Professor Brewster superseded it by the stereoscope which we are endeavouring as photographers now to resuscitate. The size of the Brewster stereoscope is limited to $6\frac{3}{4} \times 3\frac{1}{4}$. It struck me in looking at the Wheatstone stereoscope that the difficulties which at the time it originally was brought out and proved insurmountable arose from the fact that at the period it appeared we had no other reflecting power than silver-plate glass, which, in consequence of its thickness, gave two images from the back part, or silvered side, and the front or polished surface as well, that made the picture useless as an optical instrument. Since that period great progress has been made in the manufacture of plate glass, and it can now be obtained the one-sixteenth part of an inch in substance, and when silvered has only one reflecting surface instead of two, or it may be silvered on the surface, as in the case of nautical instruments. Hence its utility opens up a new field, inasmuch that plates usually called "half-plates," $6\frac{3}{4} \times 4\frac{3}{4}$, or whole-plate, $8\frac{1}{2} \times 6\frac{1}{2}$, with this proposed alteration can be used. This, if carried out, would add a charm to large pictures which they have not hitherto had above the $6\frac{3}{4} \times 3\frac{1}{4}$, giving the stereoscopic effect to an unlimited size. The means of bringing out such a state of things would add nothing to the *impedimenta* of the present working of the amateur. Any amateur could make the triangular piece of wood on the top of a tripod an exact triangle, and the usual aperture through which the screw is carried through could be changed into a slit three inches in length across the triangle. The picture taken first on the left-hand corner, afterwards another plate taken at the extreme end of the slit on the right hand. Prints from these plates when placed in the right and left-hand side of the Wheatstone reflecting stereoscope would become one in the two reflectors, and add a natural beauty not hitherto enjoyed in large sizes. I may mention that Wheatstone's instrument was amongst a variety of photographic material exhibited in the Exhibition, Liverpool, and manufactured by Mr. Wood (late Abraham), Lord-street, Liverpool.

JAS. ALEX. FORREST.

Waverley, Alexandra-road, Birkenhead, March 17, 1891.

UTILITY OF HAND CAMERAS.

To the EDITOR.

SIR,—It is only upon the desperate assumption that "President" finds the cap a perfect fit and that he *was* the gentleman whom the plaudits of a roomful of excessively good-natured friends induced to avow, to a total stranger, the paternity of the lantern slides casually alluded to at p. 150, that I can possibly account for his singular outburst in your last number. Whenever I meet a writer arrogating to himself the office of indirectly instructing an editor how to fill his "valuable space," I know, by long experience, where to find abundant evidence of an utter incapacity of understanding, let alone criticising, the offending article; and "President's" letter is no disappointment to me.

I will trouble "President" to refer me to the passage in which I admit, specifically or even by inference, that I have "never seen a hand camera capable of," &c. I said nothing of the sort, and I am sorry that the courtesies of journalism oblige me to convey my denial in these mild terms. From the accusations that I indulged in "wholesale condemnation" and "disparagement" of the hand camera and hand-camera work, I am confident that every impartial and intelligent reader will absolve me; and it is therefore unnecessary for me to join issue with "President" here. But I demand to be told where I am guilty of the amazing folly and falsehood of "admitting but small knowledge of the subject." If your correspondent's familiarity with the subject is to be reckoned, for example, by the extent of his honesty in controversy, I fear he has dropped into the dangerous error of measuring me by his own standard.

I observe "President's" challenge, and I thank him for his invitation, but I do not perceive the point of the one, while my intermittent presence in Oxford debars me from unreservedly availing myself of the other. Besides, he omits his own address, and were it otherwise, I doubt if my self-respect would allow me to accept a favour at the hands of such an unfair opponent as your correspondent appears to me to be.

There is nothing whatever of an argumentative character in "President's" "protest," so that I see no reason to recede from the position I took up in my article. This was, that except with men of skill, judgment, and experience, the hand camera does not, as a rule yield high-class pictures, and it is therefore a dangerous instrument to place in the hands of a beginner. I counsel "President" to carefully read Mr. W. B. Bolton's admirable article on p. 163, as well as the first column of your second leader in the same issue, where he will find ample authoritative confirmation of several points which I urged last week. Your "space is too valuable" for imparting the mere alphabet of the subject to this self-conscious, thinly disguised official.

Apropos de rien, "President" asks, "When will the makers give us a swingback" (to a hand camera)? and on my own account, I beg to add, a reversible holder, a rising and sliding front, and a reliable exposure meter? Pending the introduction of such boons, however, suppose this mechanical genius tells us how *he* would make a hand camera with a swingback! Come!—I am, yours, &c., R. E. CHESTERMAN, D.Sc.

Banbury-road, Oxford, March 14, 1891.

DURATION OF DROP-SHUTTER EXPOSURE.

To the EDITOR.

SIR,—Allow me through your columns to thank your correspondents who so courteously replied to my inquiries of the 3rd inst. Especially I would thank Mr. Edward M. Nelson for giving the formula, which will enable me and others to make similar calculations.

As there are many photographers who still use the simple drop-shutter in preference to the high-priced and complicated shutters advertised, it may increase the general usefulness of the reply if I state that the exposure, one-sixteenth of a second, is the speed of a simple drop on a Ross' rapid symmetrical lens 8 × 5 with stop *f*·22·6.—I am, yours, &c.,

Halifax, March 17, 1891. EDWARD J. SMITH.

FLEXIBLE FILMS.

To the EDITOR.

SIR,—I have read with great interest the letters of "Lux" and Mr. James Williams which have appeared in your recent issues, in consequence of my communication to you, published last month. There is much in Mr. Williams's letter especially worthy of note, but the first question that naturally suggests itself is, Why, if his paper possesses all these numerous merits, has it not been in general use before this? Even now I observe that Mr. Williams, whilst dealing ably with theoretical objections raised, altogether passes by the practical question I asked, and which I beg to repeat, viz., Where can this remarkable invention of his be seen and procured? I do not suppose that I misrepresent the feeling of photographers in general, whether amateur or professional, when I say that a paper capable of receiving a silver print which is to be permanent, and which contains no albumen, and yet possesses a gloss equal to the best albumenised paper, and with which no hyposulphite need be used, but a solution of common salt instead, is an invention that will be regarded with keen interest, and accorded a cordial welcome. Why, then, does Mr. Williams hide his light under a bushel? Why require the stimulus of direct questioning to reveal his whereabouts? Is he so enamoured of this product of his brain that he cannot bear to part with even a bit? I pause for a reply.—I am, yours, &c., COUNTRYMAN.

DARK-ROOM ILLUMINATION.

To the EDITOR.

SIR,—I trust you will excuse my again asking you for space in your paper this week, but I should like to be allowed to remark in reply to Mr. J. Désiré England's observations about what he considers a weak point in a candle lamp, that substituting the word oil for candle. I do not know what means he has of knowing how long such a lamp will burn unless previously tested. I have never seen a dark-room oil lamp fitted with a gauge, but a good candle can be measured and the length of time it will burn calculated to a few minutes; a fresh candle can be put in use much quicker than oil, and without soiling the hands.

May I add a word to those who still think that ruby glass is necessary in the lamp when developing? I have just developed some 12 × 10 Edwards's isochromatic plates used with the screen without ruby glass, and the rabbet edges of the plates are perfectly clear; the plates are free from fog of any kind, and if I say the colours were cardinal red, yellow-brown, black and white, I think it will be enough to prove that ruby glass is not required.—I am, yours, &c., FRANK HAES.

28, *Bassett-road, W., March* 16, 1891.

THE LIVERPOOL EXHIBITION—A PROTEST.

To the EDITOR.

SIR,—Allow me a small space to state that I consider a grave injustice has been done to the exhibitors in Classes 7 and 9 in the withholding of the medals. Of course it is understood that the jurors have power to act thus under two conditions, as stated in Clause 8 of the prospectus, viz., either too small a number of contributors, or insufficient merit in the pictures. Let us see how these points apply to Classes 7 and 9.

First, as to numbers. An examination of the catalogue will show that, taking the average of eleven classes—Nos. 3, 4, 12, 18, 20, 21, 23, 24, 25, 26, and 27, with a total of ninety-nine contributors, they average only nine competitors all round (and in four of them *only three to six competitors*). In Class 7 they number thirteen (with fifty-two pictures), and in Class 9 they number twenty-one. We must, therefore, dismiss the idea that *numbers* show a deficiency, although in Class 9—as *only one picture is permitted*—the total of contributions will naturally appear small, but in all fairness ought not to be taken into account. It will thus be seen that in eleven classes, *averaging only nine* competitors, all the awards have been disposed of; but in the two, Nos. 7 and 9, averaging almost exactly double the number of competitors, the medals are withheld. The objection as to numbers cannot possibly stand.

Second, on the score of merit. Of course the opinion of the jurors must be final. Not having seen the exhibition, I have no opinion to offer, and being a contributor to Class 9 only (of these two), the only remark I have to make is that my one picture having already taken a silver medal (at a Society local competition) on which occasion it elicited very high praise from the judge (a gentleman of well-known photographic standing) would appear to belie the opinion that *no picture of sufficient merit* existed in this class. I do not mean to assert that no better pictures are in the class, but I think it is a fair deduction from this fact, that the judges have from some cause or other given undue preference to other classes, and too little consideration to Class 9, and that it is treating the twenty-one contributors to Class 9 with scant courtesy to pass the class over without making any award at all. No doubt the duties of the jurors were very onerous in dealing with such a mass of contributions, but on behalf of myself and the remaining thirty-three competitors in Classes 7 and 9, I trust they will not object to reconsider their determination and to re-examine these classes with a view to awards being made.

For obvious reasons I desire to preserve an incognito, and sign myself

AN EXHIBITOR.

P.S.—I note also that in Class IX., although "only one" picture is allowed, two competitors appear (by the catalogue) to have *two each* hung. *Vide* Nos. 381 and 383, and 382 and 387.

Exchange Column.

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

I will exchange mahogany camera, 16×16, background, and seven-feet balustrade, for an 18×18 camera.—Address, WILLIAM CHILD, 14, Wellington-street, Leeds.

Will exchange a lady's violin, bow, and case, handsomely inlaid back, and splendid tone, for posing chair or any accessories.—Address, W. G., Excelsior Galleries, 193, Belgrave-gate, Leicester.

Wanted to exchange, whole-plate burnisher and hand writing desk, quite new, with cash, for half-plate camera with slides, in good condition.—Address, W. C. B., 66, John-street, Troy Town, Rochester.

Required, a whole-plate or 12×10 wide-angle rectilinear lens; will give in exchange good landscape negatives, quarter-plate stereoscope, and 12×10 size to value.—Address, EDWARD J. HUGHES, 3, Colville-gardens, Bayswater, London.

Sevey's rustic bridge, Ross' whole-plate doublet, 10×8 ditto, backgrounds, ten years of THE BRITISH JOURNAL OF PHOTOGRAPHY; wanted in exchange, 12×10 modern landscape camera with double slides.—Address, W. BASSETT, 78, Stoke-road, Guildford, Surrey.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

John Stuart, Glasgow.—*Portrait of Sir Archibald Orr Ewing, Bart., M.P. Portrait of Alexander Wylie, Esq., Renton.*

G. WILSON.—We can give no information relative to the lens unless you send it for examination.

B. J.—1. The system suggested will answer quite well for producing the enlargement. 2. Use the 10 × 8 lens.

C. D. J.—Do not send any specimens to the firm named; they are on the black list. More than one complain against them.

C. ROSS.—Ample information may be obtained by consulting the published specifications of patents referring to the subject.

H. H.—1. The lead will do no harm. 2. With equal angular apertures the exposure is the same whatever the size of the picture. 3. No.

M. GUTTENBERG (Manchester) desires us to mention that the process for producing the pictures on mirrors we described last week is patented.

W. BECKWELL.—Castor oil is not necessary in collodion for enamelling prints if a suitable kind of pyroxyline be used; then it is better omitted.

S. J.—If you only use a few sheets of paper occasionally you will find it more economical to purchase ready sensitised than sensitise for yourself.

W. S. B.—1. Mrs. Cameron's portraits were made for the most part by a single achromatic landscape lens without any stops, but she subsequently employed a rapid rectilinear. 2. Similar lenses can be used for obtaining like effects.

J. LOWNDES writes: "Could you kindly favour me by recommending some good works (books) which would be of real use to a photographer for carbon printing?"—The *Autotype Manual*, published by the Autotype Company.

A. JOSLIN.—However simple a process may appear when seeing it worked by a skilled hand, you will find you have much to learn before you will become proficient. Photo-lithography and zinc etching are no exception to the rule.

ROB ROY.—Thanks for the cutting; we have commented upon it elsewhere. As you say, it is often very misleading for people to write as authorities on processes about which they know nothing whatever. This is frequently the case with modern writers on the old processes.

X. writes: "Would you kindly tell me the best way to recover the metal from the waste of the platinotype process, *i.e.*, trimmings, fixing solutions, &c.?"—Messrs. Valentine & Sons have been good enough to promise us an article on their methods of recovering photographic wastes. Last year they received nearly 30*l.* for platinotype residues alone. Better wait for the promised article.

MRS. EMERSON writes: "Mr. Francis Bates' letter in a recent issue of your JOURNAL has been pointed out to me. I should like it known that Dr. Emerson is, and has been for some time, away from postal districts, but that he will receive a copy of the letter referred to when he reaches his next halting place, in about ten days."

A. CLARK.—We have no recollection of such an article. Possibly your correspondent was alluding to collotype, by which process prints can be produced in any colour, and on almost any material. Plain salted, rough-surface paper, deeply toned with gold or platinum, will yield prints of a blue tone, but the toning must be carried to a very deep stage.

PACO.—1. Protectoline will answer for varnishing lantern slides. 2. Heat will not damage crystal varnish nor render it tacky. 3. Roll the print, which has previously been kept in a damp place, in contact with a rough surface of the grain required, with an elastic surface, such as printers' blanketing or soft rubber, intervening between the roller and the print.

COBALT writes: "Is there anything published giving instructions about colouring photographs, and if so, how could I procure it?"—The best work written on the subject was that by the late Mr. Wake, though it is now out of print. You might, perhaps, obtain a copy by means of an advertisement. Messrs. Newman & Co., Soho-square, have a work on colouring photographs.

E. R. C. asks which process is most used commercially for enamels (burnt in), the "powder" or the "substitution," and which we can recommend to give the best result.—Either process will yield equally good results in experienced hands. On the whole, perhaps the dusting-on or powder process is the one most generally followed by those who work on a large scale.

R. C.—If the plates commence to frill directly the developer begins to act, the fault is with the emulsion. Surely this does not happen with any of the recognised brands of modern plates? If so, they should be returned to the makers. If, as we suppose, they are of home make, try treating them with a weak solution of chrome alum before commencing the development.

COMUS puts the following queries:—"1. Will you please say which is the best celluloid film-carrier to use with detective camera, having bag attachment to take the front plate after exposure to the back?—2. Do you consider these films to be equal to glass plates for touring?"—In reply: 1. Try Bolton's film carriers.—2. Yes, provided the emulsion with which they are coated is the same as that used for the glass plates.

PLATINO says: "I am about to try platinum printing, and will feel greatly favoured by your recommendation of the process most suitable for a photographic printer to take up—1. Willis's hot bath; 2. Willis's cold bath; 3. The German printing-out, or any other there may be."—We advise our correspondent to make himself familiar with all the processes. Then he will be competent to execute orders by any that may be required. The hot bath process is most used commercially.

G. W. CROOKE writes: "I send herewith a piece of grey sheeting which I shall be glad to have your opinion on as to suitability for painted background; also whether in any number of your JOURNAL you have given full instructions how to make? If this is not suitable, please say what is."—Unbleached calico would be better than the material sent. So many different methods of colouring backgrounds, all equally good, have been given in back volumes and Almanacs that we have not space to repeat them here. Good backgrounds may be made either by "flatting" in oil colour or with distemper colour.

J. H. WALKER writes: "I am desirous of taking micro-photographs (the minute photographs), and cannot succeed in obtaining a fine enough deposit, although the wet collodion process is used, the ones I have taken, when examined by a one-inch micro-objective, having such a coarse grain that all fine detail is lost. Will you kindly inform me what kind of collodion will give a grainless film, formula for developer for same, also name of any book on the subject?"—Let the nitrate bath be neutral, and employ a three-grain pyrogallic acid developer. The granulation will thus be so slight as to approximate to a stain. Use an iodised collodion by preference.

ROBERT JOHNSON.—There are several methods of producing photographs on wood blocks, such as the powder process, the carbon process, the collodion transfer process, &c., but with all these processes there is a film which causes trouble to the engraver. Mr. Rienlander has a process which he works for the trade that we believe is free from this trouble, but he preserves the details as a trade secret. A transfer in fatty ink by one or other of the photo-mechanical processes would answer, but you would have to learn an entirely, to you, new process before you could avail yourself of these methods, and we imagine this would scarcely answer your purpose.

A. MACLUCAS writes: "Will you be so kind as to advise me in the following case?—I sent last November to a London firm a negative to be enlarged and painted in oil. The price agreed upon was 5*l.* 8*s.*, for which I sent a cheque. Now, although I have written three times, I can neither get an answer nor anything else. I should not mind the delay so much were it not that my client has threatened to stop the order, as I thought, and partly promised, she should have it by the New Year. Now, what had I better do?"—Our proceeding would be this: Put the work in the hands of another house, cancel the order with the first, and proceed against them in the County Court for a return of the money paid, and for damages for any loss you may have incurred through their delay. We should like to have the name of the firm who has treated you so badly.

MANCHESTER says: "Yesterday I was called upon to take two views in 'a greenhouse,' in which were some very rare plants. On focussing I could scarcely see the image. This I found was caused by mist on the lens. I wiped it off; but on once more focussing the dimness again appeared. On examining the lens I found the mist was between the glasses, and on clearing this away the lenses became wet, and in the end I did not get a sharp and crisp negative. Can you explain the cause?"—The cause was that the lenses being colder than the atmosphere of the conservatory, the moisture, always present in such buildings, condensed on the glass. The way of avoiding the trouble is to allow the lenses to acquire the temperature of the room before attempting to use them; or, better still, leave them for some time in a place warmer than the conservatory in which they are to be used. When the glasses are warmer than the atmosphere, no moisture will condense upon them.

MOUNTANT says: "We have been very much troubled of late with our prints rising at the edges after they are mounted. Sometimes we have to go over the most of them again and paste down the corners and edges, giving us double work, and not always satisfactory. We have used different kinds of starch, viz., 'Colman's,' 'Glenfield,' &c., with like result. Would you kindly inform us which is the starch most used by the trade, and suggest what fault there might be in the making or mounting?"—Either of the starches named are good for mounting purposes. We fancy there must be something wrong in our correspondent's method of making the paste or in the using of it. Make the starch into a stiff paste with a little cold water. Then add boiling water, with constant stirring, until the paste, after thinning, becomes thick again, and transparent. Let cool; then beat it up with a spoon, or pass through a coarse sieve. If a sponge be used for applying the paste, the latter operation can be dispensed with.

L. P. TAYLOR writes: "Kindly give some information on the following subjects, as I find the instructions given in books, &c., differ considerably. 1. How long do albumenised prints, quarter-plate, want washing in a circular washer, the water spraying in at the top, and also half-inch pipe going full force, which drives the print round and round; would two hours be sufficient if they are left in water all night, and all the loose fixing solution blotted off with blotting paper after they come out of the fixing bath?—2. How long do lantern plate negatives (quarter-plate) require in a washer like the one sketched, which is the ordinary draining rack with tank and syphon, with one and a half inch pipe of water going in at the top; is twenty minutes sufficient to wash the hypo away?—3. How long do bromide prints want washing in the same washer as I have described for the albumenised prints?"—1. If the prints are blotted off after removal from the fixing bath, and rinsed in two or three waters, the time mentioned ought to be sufficient.—2. Two hours would be better.—3. About the same time as given to albumenised prints.

PHOTOGRAPHIC CLUB.—Wednesday, March 25, Lantern night. April 1, Adjourned discussion on *Shutters*. Bank Holiday, Outing at Leigh, near Southend.

MR. THOMAS S. MAYNE writes: "In your list of awards Mr. A. Vandyke is credited with two medals. This should only read one. The medal in Class 1 was withdrawn, but not from Mr. Vandyke."

M. LIESEGANG, son of Dr. Liesegang, has just published a book dealing with the problem of seeing distant objects by means of electricity—a subject which has been a special study with M. Liesegang. We propose shortly to deal with the work at some length.

THE LIVERPOOL EXHIBITION.—The opening of the Liverpool International Photographic Exhibition is interesting on many accounts, and certainly all the more interesting because it has a special local significance. When such an authority as Mr. Taylor, of THE BRITISH JOURNAL OF PHOTOGRAPHY, acknowledges that the art owes a great deal to Liverpool, the flattering statement will come as a surprise to many who thought themselves tolerably familiar with local affairs, but who had probably never heard the names of Sayce or Bolton. That Mr. Taylor should also confess to something like a feeling of chagrin that Liverpool had managed to have an exhibition such as they never saw in London is also flattering to local *amour propre*, as showing that there are some things in which the much disparaged provinces can more than hold their own against the often over-rated metropolis. A great deal of the success achieved is undoubtedly due to the activity and energy of Mr. T. Mayne, the Hon. Secretary, who was fortunate enough to find coadjutors of his own stamp in the Executive Committee, and particularly in Mr. W. Tompkinson, Vice-President of the Liverpool Photographic Society, under whose direction the exhibits were hung. In the case of local exhibitions of any sort it is not very often that opportunity is afforded for unqualified and unmodified congratulation. There is generally a fly of some sort in the ointment, either for the exhibitors or the public, and in the case of exhibitions of pictures the fly sometimes obtains unpleasantly abnormal proportions. The present is a happy exception to this disagreeable rule, and an enterprise inaugurated under such pleasant auspices may be regarded as assured of success, especially when its own merits are a more than sufficient guarantee for its attractiveness with the general public. For the majority of people, indeed, it is obvious that photography must possess a charm superior to that of any other art, because its practice does not demand the possession of natural gifts which are the endowment only of a favoured few. The power of appreciation is almost universal, but the power of expression is limited, though its limits are being daily expanded by education. The charms of nature, however, appeal even to the uneducated intelligence, Peter Bell to the contrary notwithstanding, and so, in an equal degree, do the charms of music, poetry, painting, and the plastic arts. The Autumn Exhibition would not be the annual success it is if the frequenters of it were confined to the cultured and æsthetic.—*Liverpool Daily Post.*

*** GOOD FRIDAY.—*In consequence of Good Friday falling next week, we go to press one day earlier than usual. Our contributors and correspondents will please note this.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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CHAMPION CLASSES AT PHOTOGRAPHIC EXHIBITIONS.

THE exhibition season may now be said to be in full swing, but it is not, we hope, too late to draw attention to a matter connected with the regulation of some of these popular institutions, in order that a much-needed reform may be introduced wherever the opportunity for so doing occurs. The reform is one which should be acceptable to judges and exhibitors alike, since it would make the duties of the first-named infinitely pleasanter to themselves, and their results more satisfactory to large numbers of the second body upon a point which at present, we believe, is the cause of a totally opposite sensation. We allude to the institution of a champion class at all exhibitions at which none have previously existed.

To those who make photographic exhibitions a study, the need of such a class will be apparent. There are many exhibitors who constantly practise sending their pictures "on tour," so to speak, of all the exhibitions where medals or other prizes are offered. Those pictures, as a rule, are started on the journey with a tolerably certain chance of securing a good crop of medals before it terminates. If any of our readers care to turn back to the reports of the last and previous exhibitions of the Photographic Society of Great Britain, they will find several pictures which were selected for awards there that subsequently went the round of a number of exhibitions, at each of which other awards were obtained.

So far, nothing whatever can be said against this variety of what is termed "pot-hunting." It is legitimate, and even commendable enough—up to a certain point. At that point, however, we come in sight of an evil which demands removal. Let us quote a common example to illustrate it. A provincial society holds an exhibition, at which there are several open classes. There are numerous entries, and among them figures a frame of pictures that has already received a medal in London and Liverpool. The award was deserved, the pictures have been written and talked about, and when they come before the new judges the latter are perfectly acquainted with them. Their merits are obvious, they are skilful productions by a master hand—they, in fact, are the best pictures in their class, so that the judges' duty is plain: they must be treated on their merits, and hence they receive another award. The pictures are then probably sent on to a succeeding exhibition, from place to another, and so on, and the same thing as we have just described goes on happening, sometimes for months.

There may be those who see nothing in this which calls for criticism or even notice at our hands; but let us look at the matter a little closer. The other exhibitors in a class at a comparatively small exhibition are probably not prepared to enter the contest against a man who has been already adjudged victor elsewhere, and thus, when the results are made known, there is often much muttering against the successful man. In reality, ordinary competitors have no chance against these peripatetic exhibitors, and thus to open the door to the occurrence of this kind of thing is unwise, and almost unjust, treatment of the rank and file of photographic exhibitors. But it does something more, it embarrasses the judges, even while it simplifies their labours. These officials cannot disregard a work of exceptional merit, though they are cognisant of the facts we have stated, and thus are often assailed for conniving at playing the "pot-hunter's" game, when in reality, as we have shown, they are powerless to alter matters.

The remedy is obvious. Let each photographic exhibition have a champion class for pictures that have received awards elsewhere. In some exhibitions this is already done as a matter of course — as, for instance, at Glasgow — but at very many of them it is not, probably through ignorance or insufficient study of the conditions necessary to assure equitable treatment of those who support these undertakings. Champion classes are interesting from all sides. They bring together a collection of admittedly good works, and the extra labour given the judges in distinguishing the best among them is not thrown away, or unappreciated by outsiders. Practically speaking, exhibitors in champion classes are on even, and therefore fair, terms with one another; but a champion-class picture among a number of others that have not received the stamp of judicial favour, and are probably of inferior merit, is at an unreasonable advantage, and is a source of disturbance to all but its producer, who, we are sure, would really feel more pride at carrying the award away from men of as much skill as himself, instead of, perhaps, a number of competitors to whom exhibition work is only of occasional, and not, as in the other case, of constant study and effort. There is little or no dignity attached to the position of Triton among minnows.

The fault—if fault it can be called—is clearly with those responsible for drawing up the classification of exhibits, and we hope that our remarks will be understood as conveying a hint that it is one which should not recur. To those exhibition committees who have not yet decided upon what classes to have, we strongly recommend the institution of one for champion pictures as not only desirable from the points of view we have treated it, but also as well calculated to promote the greater popularity and success of their exhibitions.

LIGHT AS A MANIFESTATION OF ELECTRICITY.

Two years ago a notable book was published by Professor Oliver Lodge,* and in this work are clearly enunciated ideas as to the relation of electricity and light, which have been slowly growing

* *Modern Views of Electricity.* By Oliver Lodge. London: Macmillan & Co., 1889.

since Clerk-Maxwell, in 1865, stated his now generally accepted theory of light.

It has long been recognised that an electrical disturbance is by no means confined to the conductor itself, but pervades the surrounding non-conductor or dielectric; and in illustration we may refer, on the one hand, to those attractions and repulsions which are exercised by conductors in which steady currents flow, and on the other hand we may refer to such disturbances in the dielectric surrounding a conductor as give rise to short electric impulses in neighbouring conductors every time the current in the primary circuit is started, stopped, increased, or diminished. This latter case presents the ordinary phenomenon of induction, and in such instances the whole of the force transmitted from conductor to conductor passes across the dielectric or non-conducting medium. Indeed, so complete is this lateral transmission of electric energy from conductor to conductor, that in modern transformers (the "transformer" being practically what, in the older days, was spoken of as "induction coil") the loss of energy in transformation is quite trifling, and may lead us to assume that electric energy can be as completely and wastelessly transmitted across a dielectric or non-conductor as along a conductor, provided that the initial current is broken up into suitable periodic impulses, or is reversed at suitable intervals.

During the past decade it has been recognised, especially by Hertz and Lodge, that the condition of the dielectric and conductor, when a discharge is about to take place in a circuit gap, is analogous to that of a strained spring, and, when the discharge takes place, something occurs which may be compared with release of the spring. Indeed, the analogy seems to go so far as this: both spring and electric state return to the normal, with alternations or oscillations of condition; the viscosity of the medium damping the oscillations of the spring, and the resistance of the circuit damping the oscillations in the electric circuit, resistance in this case being the equivalent of viscosity. This view is rather experimental than theoretical, or, at any rate, it is supported experimentally; for, if the discharge of a Leyden jar is examined by a rapidly rotating mirror, it is in most cases found to consist not of a single instantaneous discharge, as was supposed till recently, but of a number of alternating flashes which pass in rapid succession, and the whole is over in about a hundred-thousandth of a second, the duration of a single oscillation being sometimes only one-hundred-millionth of a second, although in other cases it may reach a ten-thousandth of a second.

The most distinct evidence of the oscillatory action in the non-conductor has been obtained by Professor Hertz, of Carlsruhe, during the past three or four years, and he has come to the conclusion that the electrical oscillations are actually light, although the wave length of the oscillations may be different from light as it affects our organs of vision, and one of the most interesting series at the Frankfort Electrical Exhibition consists of the apparatus by which Hertz demonstrated the refraction, reflection, polarisation, and interference of the electrical oscillations in a non-conductor or dielectric.

Perhaps our best course will be to briefly describe one of the fundamental experiments of Professor Hertz. Two brass rods or cylinders, say rather over an inch in diameter, and about six inches long, are set up in line a little way apart, so as to form one rod with a small gap in it. The two rods are now connected with the terminals of an induction coil, and what appears to be a continuous spark is seen at the gap between the two brass rods; what really happens, however, is this: at each sparking of the coil—and this sparking may occur one, two, or three hundred times a second—electric oscillations are set up in the cylinder, the impulses waving to and fro therein at the rate of something like five hundred million times a second, and corresponding oscillations are produced in the surrounding dielectric; but it must be distinctly understood these are not disturbances in the air like those causing sound, neither are they progressive stages of compression and rarefaction like those of sound, but transverse oscillations (in the ether, to use the common term) such as are now commonly held to produce light. In this particular instance the wave length will be about three times the length of the double cylinder or rod.

The effect of the electrical radiations may be recognised by placing a similar pair of rods, placed parallel with those connected with the induction coil, the gap between the two rods of this receiver being quite microscopic. The appearance of corresponding induced sparks at the gap of the receiver would range fairly well with what has long been known of induction, but Hertz shows us conclusively that some oscillatory agency like light is the medium of communication between what we may call the primary conductor and the secondary conductor (or receiver).

Plane conducting surfaces reflect the oscillations; so, if a sheet of zinc is bent to a parabolic section, and the sheet is so placed that the pair of brass rods connected with the induction coil (electric oscillator) corresponds to its focal line, the electric oscillations are projected in a parallel direction, by reflection; or, to speak crudely, the inductive influence is collected and reflected as a bundle by the parabolic sheet of zinc. If now a second sheet of zinc, bent to parabolic section, is used to receive the bundle of rays, and the second pair of brass rods is placed in the focal line of this distant reflector, the induced spark will appear, though a distance of sixty feet separate the two pairs of brass rods. Here there is a form of force, unrecognisable to our senses, but capable of being reflected like light, and producing electrical effects at a distance. Hertz found that the oscillations set up in such an instance as that now supposed are plane polarised, and the receiver itself may be looked on as an analyser for on rotating it, the effect diminishes until the receiver is in a plane at right angles to the oscillator, when the effect becomes *nil*.

A gridiron of metal wires may be used as an analyser, the gridiron being transparent to the electrical radiations when the length of the wires is in a plane perpendicular to that of the electric oscillations, but if the gridiron is rotated a fourth of a circle it becomes opaque to the radiators, and, moreover, acts like a metallic reflector. Very thin conducting sheets are substantially opaque to the electrical radiations, but non-conductors or bad conductors, are transparent, so much so that the closing of the door which separated the room containing the oscillator from that containing the receiver, in no way interfered with the phenomenon. In such experiments the receiver, instead of consisting of two isolated conductors, may be a looped conductor with a minute gap.

Perhaps the most striking test of the essential identity of the electric radiations and light is the refraction test. A large prism of pitch was prepared, the faces being several feet square and the refracting angle was about thirty degrees. When this was placed in the beam of parallel rays, the sparking of the receiver ceased and the position of the refracted beam was found by trial. The index of refraction of the pitch for the waves in question was found to be 1·7.

The above short account of some of the fundamental experiments of Hertz is sufficient to show that electrical waves are probably identical with light waves, except as to wave length, the analogy standing on a very different basis from the somewhat

emote resemblance between sound and light. Moreover, the ıore recent experiments of Hertz show that electric oscillations ffect the gelatino-bromide plate.

Professor Oliver Lodge discusses the question of the econo- ıical manufacture of light by electric agency, and intimates hat the hope of the future rests in the complete conversion of he electric energy into oscillations of the required wave ength. In discussing present means of obtaining artificial ght, he emphasises the wastefulness of our existing system of roducing light artificially. We want to produce a certain ange of oscillation, but at present we do not know how to roduce oscillations of the required rate. The present methods re based upon the heating of matter, or making atoms vibrate, -a wasteful process, which "is as though, in order to sound ome little shrill octave of pipes in an organ, we were obliged o depress every key and every pedal, and to blow a hurricane.' f oscillations of the required wave length could be produced irectly in the ether, it is probable that, as Professor Lodge ays, a boy turning a handle might generate as much light as great steam-engine driving a group of dynamos.

Light is electrical vibration according to Lodge and his chool, and in the introduction to the work we have mentioned he Professor classes electricity under four heads, one of which "Electricity in Vibration or Radiation—that is, Light." "As oon as," says he, "we clearly recognise that light is an elec- rical vibration, so soon shall we begin to beat about for some ieans of exciting and maintaining an electrical vibration of ny required degree of rapidity. When this has been accom- lished, the problem of artificial lighting will have been solved."

It is notable that, since this modern view of light has been romulgated, but little has been said on the other side; indeed he most prominent physicists seem to tacitly assent to the iew, and in connexion with this subject we may mention that rofessor Lodge has a new work in hand, which is, we under- and, to be published by Messrs. Whittaker.

INTENSIFICATION AND PERMANENCE.

ROM a lengthy communication received a week or two back om a very old correspondent, we are forced to the conclusion iat a good deal of misunderstanding still exists as to the lative permanence of intensified negatives as compared with ose that are not so treated, and also as to the real cause of e deterioration when it occurs. We gather from our cor- spondent's letter that he suspects the stability of the com- ound forming the image itself; but, if a careful examination e made of a number of negatives that have gone wrong after tensification, it will be found that it is the clear portions hich become discoloured and "filled up," not the image iat has faded.

We have written over and over again on the subject, ointing out that it is upon the careful treatment of the gative previous to intensification, rather than to the actual mposition of the final image, that its permanency depends, d for the benefit of the newer accessions to the ranks of otography we can but review what has been previously said, king as our text the letter to which reference has been made.

The first question propounded is, "What is the chemistry mercury bichloride, and strong ammonia? Is the resultant oduct simply oxide of mercury with excess of alkali, or what the proper chemical title of the resulting product?" The estion as it stands is scarcely one *directly* affecting inten- ication, though indirectly the reaction alluded to has very much to do with the permanence of the negative. Bichloride of mercury and strong ammonia *ought not to* meet one another in the process of intensification, but it is because through care- lessness they unfortunately do that mercurially reinforced images have obtained so doubtful a character.

In order to arrive at the result of mixing solutions of bi- chloride of mercury and ammonia, it is necessary to glance at the constitution of the former substance. As our chemical readers are aware, it consists of one atom of mercury in combination with two atoms of chlorine, and forms a soluble crystalline salt, to which the names of mercuric chloride, per or bichloride of mercury are given, to show that it contains the largest possible amount of chlorine. Mercurous chloride, subchloride or protochloride of mercury, known also in medi- cine as "calomel," is another salt containing only half the quantity of chlorine, forms a greyish-white powder, which is readily blackened by a great variety of substances, including the free alkalies. It is produced in a variety of ways, but for our present purpose we need only mention the particular re- action that causes the formation of calomel in conjunction with intensification. If certain metals, amongst which is included silver, be immersed in solution of mercuric chloride, a portion of the chlorine is abstracted from the mercurial salt, and calomel, or mercurous chloride, together with chloride of the new metal, are formed. In like manner, if a solution of an alkali, or an alkaline carbonate, be added to solution of mer- curic chloride, a precipitate is at once formed which, at first, is white, but gradually changes through various shades of brown to black. This is the result of two separate reactions, first the reduction of the mercuric salt with formation of calomel, and, secondly, the further reduction of the latter. The alkali in the first place abstracts a portion of the chlorine, forming alkaline chloride, and subsequently attacks the mer- curous chloride first formed, reducing it to the state of oxide; and, as both these reactions may proceed simultaneously, it is questionable whether any definite product is obtainable.

This is the general reaction that occurs when a solution of a fixed alkali, such as soda or potash, is poured upon calomel— the white powder is blackened and converted into mercurous oxide, the chlorine going over to the alkali to form chloride of sodium or potassium. But, if aqueous ammonia be substituted for the fixed alkali, a different change occurs, for the blackened product then consists of a double chloride of mercury and ammonia or chloride of mercurous ammonium (NH_2 Hg Cl), while a small proportion of mercury remains in solution in the excess of alkali. Both these products are readily acted upon by chemical means, but are not subject to change from atmospheric causes; and, so far as the constitution of the negative image is concerned, they may be looked upon as perfectly permanent. If it were the practice to raise gela- tine negatives to a red heat, or to submit them for lengthened periods to the action of boiling water, the matter would be different; but, as such treatment, or anything approaching it, is clearly out of the question, the mercurially intensified image, when properly treated, may be accepted as reasonably permanent.

When a solution of mercuric chloride is applied to the surface of a gelatine or other negative, the change occurs first alluded to as one of the means of producing calomel. The metallic silver forming the image abstracts a portion of the chlorine from the bichloride, and is converted into chloride of silver, while the mercuric salt is reduced to the mercurous state. The reaction is made clear in the following equation:—

$$Hg Cl_2 + Ag = Hg Cl + Ag Cl.$$

In the case of a collodion negative, the image is thus converted into one of pearly whiteness, which, although it contains chloride of silver, appears to be totally unaffected by the action of light. With a gelatine negative the same purity of whiteness is never obtainable, a result that may be possibly due partly to the formation of compounds with the constituents of the gelatine itself, and partly, also, to the imperfect removal of soluble matters from the film. The presence of a very slight trace of "developing stain," invisible before the application, becomes painfully apparent when the negative has passed through the mercury bath.

The bleached image thus produced consists of a mixture of mercurous with silver chloride, and is next treated, after careful washing, with some solution capable of again decomposing the white compound. A dilute solution of ammonia is that usually employed, and this, as has been shown, converts the mercurial portion of the image into chloride of mercurous ammonium, but its action on the silver portion is not so clear. By some it is held that the silver is reduced to the state of subchloride, while others again deny the existence of such a compound. It appears pretty certain, however, that the chloride of silver does undergo reduction in some form, since the application of a solution of sodium hyposulphite, after intensification, fails to materially reduce the density of the image, as would be the case if the silver chloride remained unchanged. Again, the substitution of an ordinary developing solution of pyro and ammonia for the plain ammonia produces little or no increase of density, which must be the case if it were a question of the reduction of the silver salt.

So much for the mere reaction of intensification. Let us now look at the question of permanency. It has been already stated that the products forming the final image are, so far as the treatment they are likely to have to undergo, perfectly permanent, and yet not only has considerable doubt been cast upon the stability of negatives intensified in this manner, but some have gone so far as to utterly condemn mercurial methods as useless and untrustworthy. Facts are stubborn things, and it is therefore very difficult to explain away the very numerous instances of collodion negatives that have stood for years, and yet stand, after having been treated with mercury. The fact is, the question really resolves itself into one of sufficient or insufficient washing, before and after the use of the bichloride solution. It is not of the least use to say, as our correspondent of the other day says, and as many others have said before him, "I always wash my negatives very carefully;" the washing and the care may have been there, but they have not entered into partnership. It is an easy matter to devote a vast amount of care to giving a great deal of washing in the wrong way, and it is well to bear in mind that the quantity of water that passes over a plate, and the length of time it takes in doing it, are very far from forming the measurement of the thoroughness of the actual washing the plate has received.

Comparing a collodion with a gelatine plate, it is scarcely necessary to remind our readers that "thorough" washing can be performed with the former in a tenth, nay, in a hundredth, of the time required for the latter; and, when mercurial salts—or especially the bichloride—happen to be in question, the proportion may be still further increased, owing to the hardening action of the bichloride and the persistence with which it remains in the "leathery" film.

Now, the result of placing an imperfectly washed plate in the bichloride solution is just this: the pores of the film, if not full of, at least contain some traces of hypo, and its necessary attendant, the double silver salt. By the reaction of these different substances we have possibly formed sulphide of mercury, sulphide and chloride of silver, as well as calomel, while any pyro stain that may remain in the gelatine becomes now permanently fixed there by the peculiar hardening action of the mercury. Is it any wonder, then, that such a plate, if it be spoilt at once, should afterwards show signs of deterioration?

If the insufficiency of washing occur after the use of the bichloride, and before the application of the reducing solution, as is most likely to be the case, the result will be that the unremoved bichloride will, in the first place, be reduced to calomel and subsequently by prolonged contact with the weak alkali to the state of mercurous oxide. Thus the immediate condition of the negative will be dependent upon the strength of the alkaline solution and the period of its application; but, the seeds of injury having been once sown, the doom of that particular plate is sealed. In fact, when any of the alkalies or their carbonates are employed as the reducing agent, an insoluble compound is formed in the film—in the case of insufficient washing—which it is perfectly impossible to remove afterwards; and, though it may be scarcely visible at first it is bound sooner or later to pass through further stages of change, and greatly intensify the harm it does, if it do not altogether ruin the negative.

Our correspondent makes some remarks which we cannot exactly follow, regarding the specially bad results that follow the use of sulphite of soda as the reducing agent. Now singularly enough, sulphite of soda was introduced as a substitute for the alkalies chiefly because it causes the formation of no insoluble salts. Added directly to a solution of bichloride of mercury, it causes no precipitate, and, while it blackens mercurous chloride, the products of decomposition are perfectly soluble, and so are capable of removal by washing. Thus the great advantage of using sulphite of soda is that, in case of accidental carelessness in the matter of washing in the earlier stages, a final wash of a really genuine character may remove the injurious matter remaining in the film.

From a long and close experience with mercury intensification we are led to believe that, given a thorough washing at every stage of the production of the negative, the image intensified with mercury will prove as permanent as any. Indeed, we have seen negatives in the intensification of which so powerful an agent as sulphide of ammonium following mercury had been used, which were as good five years after treatment as original. Sulphide of mercury is undoubtedly permanent, too much so indeed, since it generally forms in those portions of the negatives where it should not be, and is absolutely unremovable by any treatment short of destruction of the negative.

Our correspondent further expresses astonishment at the statement in a leading article on August 14 that silver-intensified negatives were the most permanent of those we had under review, "more especially as mercury figures in most of the formulæ." It may relieve his mind to know that the negatives referred to were intensified with acid pyro and silver alone.

In a recent number of the *Journal of the American Chemical Society* is an article by Mr. James H. Stebbins, jun., printed in our last issue, upon some investigations he had made upon the developing power of hydroquinone subjected to the action of 66° sulphuric acid. Finding one of the drawbacks of the unaltered substance to be its limited solubility, he led his first experiments in the direction of altering its quality. If he converted it into a mono-sulpho acid, he anticip

increased solubility, with, possibly, no alteration in its developing power. Passing by the details of his experiments in the production of a new compound, which are more fitted for students of pure chemistry, we may state that he obtained the desired product—hydroquinone monosulpho acid. He tested its reducing action upon gelatine dry plates. For this purpose he made a preliminary test, using an Eastman lantern slide plate and a solution of the barium salt of the hydroquinone sulpho acid, made slightly alkaline with carbonate of soda. "A positive of very fair quality was thus obtained, the tone of colour being reddish-brown. It developed up very slowly, however, but it is expected that better results will be obtained when using a developer of definite composition." He states that he hopes soon to complete experiments upon this subject, and will then submit such further results as he may have obtained. It is evident that already Mr. Stebbins has added another to the list of developing agents, and it remains to be seen what its value may be. The comparatively recent additions have given great power to the skilful photographer, but any other which possesses distinctive characteristics will be of value, be it by altering the rapidity of development, reduction of time of exposure, or power over the colour of the developed image.

The subject of methylated spirit is always a complicated one to those who have not taken the trouble to learn its vagaries, as they are called. Primarily, it is fairly well understood that this compound is simply ordinary alcohol, to which wood naphtha has been added under excise supervision for the purpose of allowing it to be sold without paying any duty; but difficulty number one comes in. It may not be sold retail by any dealer unless he possesses a licence. If, however, it be made into a very weak varnish, or finish, as it is termed, by adding a small quantity of one or other of certain resins, it may be sold by any one. Consequently, it frequently happens that, when methylated spirit is applied for, the purchaser gets supplied with "finish," a matter of little or no import if he require it for varnish, but of considerable injury if it be required for collodion-making or chemical purposes. Again, if needed in large quantities, the excise authorities step in, and say that one gallon is the maximum bulk they permit to be sold in retail. All these restrictions are devised to prevent its surreptitious use as a beverage, the original purpose of the addition of the naphtha being the rendering the alcohol too nauseous. It is, however, found that this end is not entirely subserved by this addition, and, in consequence, the authorities have issued a new decree, of which our readers should take notice. For the future, after the original nauseant, in the required proportion of ten per cent., a further addition is to be made of twelve gills of mineral naphtha of the specific gravity of not less than ·8 to every 100 gallons of methylated spirit.

Speaking of varnish, it may be observed that the use of japanner's gold size has been very little experimented with, though it possesses very valuable characteristics, and such as should render it useful for photographic purposes. Of itself it takes too long in drying to be capable of practical application, but it may easily be conceived that by suitable additions this might be obviated. It is made chiefly from linseed oil, boiled with litharge and other 'dryers,' with the addition at intervals of gum anime and turpentine. Recently M. A. Livache has been experimenting upon the results of the oxidation of drying oils (such as linseed), the product of such oxidisation being the production of a solid elastic mass, perfectly dry, and of a colour more or less brown, according to the method of preparation. He finds a close physical analogy between the oxidation of drying oils and caoutchouc. It is evident that the more a varnish can be assimilated to indiarubber the more oxidable it must become, except as regards its comparatively soft texture. Indeed, a solution of caoutchouc in benzol forms a valuable coating for negatives, its drawback being the unpleasant nature of the solvent, which is, moreover, dangerously explosive, and further, difficult to purchase, owing to the regulations as to its sale, intended to safeguard the public against its employment.

Dr. R. E. Chesterman, whose recent contributions to our columns provoked some highly controversial correspondence, which will, doubtless, be fresh in the recollections of our readers, has recently departed for a tour in Egypt that will occupy him during the whole of the coming winter months. Notwithstanding his published antipathy to hand cameras, we have reason to believe that the Doctor has provided himself with one of these now indispensable items of the traveller's kit, and that his conversion is in no small degree due to the excellence of the slides which his antagonist "President" enabled us to examine as a result of the correspondence on the utility of the hand camera that took place last spring. We may possibly receive an account of the photographic incidents of the Doctor's tour, which, if his powers of description approach his richness of vocabulary, will assuredly entertain our readers.

Several circulars headed "From the *ateliers* of Austin & Eddy, 22 and 24, Lombard-street, Margate" have been sent us during the last few days by the original recipients of them. Messrs. Austin & Eddy offer to give something for nothing, or next to it. If you will send a good photograph of yourself or any member of your family, they will make you from it an exquisite life-size *portrait free of charge*. This is a handsome offer, and we hope that all those who take advantage of it will be pleased with the pictures they receive, and will duly have them suitably framed, and exhibit them to their friends, which are the only considerations asked for in return. Would Messrs. Austin & Eddy carry their kindness yet a step further, and furnish those whom they circularise with the address of a firm who will do the framing at a reasonable rate? They do not undertake this class of work themselves, of course, otherwise we suppose they would say so in their circulars!

In commenting upon the fact that on August 1, in the columns of a Jamaica paper, a writer—with the reproductions of the Royal Academy pictures issued by the illustrated journals, as well as Messrs. Cassell's, Blackburn's, and the *Pall Mall Gazette* books on the same subject before him—was able to give his readers an account of the most important pictures of the year, the *Publishers' Circular* deduces "convincing evidence of the advantages to be derived from the modern process of engraving." We take it that it is by an oversight on the part of our contemporary that photography is not more directly given the large share of credit that is its due. To most readers the phrase "modern process of engraving" conveys no information as to what the process really is, and certainly no suggestion that photography has anything to do with it. We regret to have occasion to complain so often of the misconceptions which exist in the minds of non-photographic newspaper writers as regards photographic technique; but photography only "wants its rights."

The work done by Professor Oliver Lodge, of Liverpool, towards establishing the existence in nature of electrical radiations in a non-conductor, is referred to in a leading article which will be found on p. 577 of our present issue, and his speech at the recent meeting of the British Association is notable in several respects. In the first place, he insisted on the need of public research laboratories at the present time, and he then hinted at the growing hope that some experimental inroad may be made into the domain of psychology, or, at any rate, into a physical field bordering closely upon the psychological. At any rate, the electrical oscillations may open up new means of communication by a form of energy in no way affecting our senses, not requiring any special conducting path, and practically unobstructed by many objects which are opaque to light. A telegraphic code on the Morse system between the oscillator and the receiver would obviously be a very simple matter to arrange, and although in the experiment mentioned the distance between these was only sixty feet, there seems no physical reason why the oscillations should not be directed to a very distant point by a suitable reflector; and, moreover, it is quite conceivable that mechanical telegraphic instruments may in time be operated by the agency in question, perhaps even writing telegraphs. In such a case, the projection of any person's handwriting into a closed room having nothing but air-connexion with the external world would be an easy matter.

CONTINENTAL NOTES AND NEWS.

Our brief notice of the Brussels Congress which appeared last week was compiled from the daily reports given in the columns of the *Indépendance Belge*, the papers being kindly placed at our disposal shortly before we went to press by a friend who attended the meetings. It will be noticed that the non-technical reporter speaks of the "diameters of *lenses*" adopted by the Congress, whereas, of course, he should have said "diameters of lens mounts." The mistake is another illustration of the pitfalls that abound for reporters who have only a limited knowledge of scientific matters, and are suddenly called upon to "take down" words and terms the precise meaning of which they do not understand.

While on the subject of the Congress, we notice that the *Moniteur*, in analysing the nationalities of the members present, took occasion to lament that on neutral ground, such as Belgium, countries like Germany, Austria, England, and Russia were not more numerously represented. It appeared that at the opening of the Congress there were present eleven French representatives, two English (the *Moniteur* says four, but this, we know, is an error), twelve Belgian, and one each from Germany, Denmark, Switzerland, Russia, and even poor little Servia. Eleven Frenchmen to one German! It is very much to be hoped that temporary racial differences have not interposed an obstacle to the progress of photography, and that the abstention of Teutonic *savants* is due to other causes. Science is above mere politics. As for the "international" character of the Congress, we humbly beg to call it into question; while, looking at its numerical distribution, as well as the fact that something like two-thirds of those present were strongly prejudiced in favour of things *à la Française*, it would be foolish to expect any decisions to be arrived at that did not run parallel to Gallic susceptibilities, however illogical or unreasonable they might happen to be. An ideal international congress assumes two things which the Brussels affair did not have, viz., the participation of Austria, Italy, Spain, and other countries, and equal distribution of representation—two, or may be four, but no more, being allowed to each country.

At the meeting of the London and Provincial Photographic Association last night, the subject for discussion was to have been *The keeping qualities of plates*. This is a matter that is peculiarly distinguished for the curious, contradictory, and remarkable experiences which it never fails to elicit whenever it is talked or written about. Gelatine plates have been proved to retain all their original good qualities unimpaired for periods varying up to seven or eight years, and that under the most trying climatic and other circumstances, but it is too early to ascertain whether they are capable of lasting so long as dry collodion plates are said to do. M. Pricam, writing on the subject in the *Revue de Photographie*, tells us that in 1872 to 1874 he used collodio-bromide plates prepared by the Liverpool Dry Plate Company. Recently he came across a packet that he had had by him ever since. He was curious to try them. The results were truly surprising. After seventeen years, he says, he obtained with the same length of exposure as he originally gave negatives as clean and brilliant as if the plates had recently been made. The only difference he noticed was a slight tendency of the films to "go" at the edges of the plates. Development was finished in three minutes, and he employed pyro-ammonia, with glycerine and potassium bromide, according to a formula of Mr. Edwards's. Probably this is "record" for longevity in sensitiveness. Will gelatine plates beat it?

To get rid of the yellow stains on negatives, M. Robicheck recommends their immersion in a weak solution of bromine water, and their exposure to the solar rays, when the stain will discharge in the course of six or eight minutes. The plate is then passed through alcohol and dried. Commenting on this method, M. Balagny stated that it was necessary to take care that the plates had not been put in alum, and that the bromine solution should not be acted upon by light, but preserved in a blue or yellow bottle, bromine which has been subjected to the feeblest luminous action losing the property of "clearing" negatives. But why *blue* or yellow? Is it not the latter, and not the former, which cuts off luminous action? Apart from the fact that the remedy is not particularly new or original, we are afraid that it will find its occupation gone, in this country at all events, where, if we may judge of the colour of the many negatives which pass under our inspection, the days of yellow stains demanding removal are, to all intents and purposes, gone by. Is this also not the case on your side of the water, M. Balagny? It should be.

But M. Balagny, besides taking a brother worker's yellow stain-removing remedy by the hand, and, metaphorically speaking, patting it on the back, also gives the world the benefit of an alternative plan of his own suggestion. This is simply the conversion, by means of the old time-mixture of bichromate of potash and hydrochloric acid, of the negative into silver chloride, and, after washing, its immersion in a used hydroquinone developer. The picture upon redevelopment, M. Balagny informs us, will have lost its yellow colour. This is a remedy which we should hesitate to recommend ourselves, since, on the first blush, a used (and presumably discoloured) hydroquinone developer seems to be more likely to promote rather than remove stains; but perhaps some of our readers have found the contrary. M. Balagny, like many other people who recommend curative remedies, omits to tell us whether his advice is based on actual and successful trial.

On the authority of *Helios* (a Brussels journal) we are told that mica is being much employed in Germany as a support for sensitive emulsions in place of glass. It is said to compare favourably with the latter and celluloid as regards price, and allows of the negative being printed from either side, while the sheets remain perfectly flat during the various operations of development, and so forth. We should like to know whether mica as a support is being really "much" used abroad, that is, outside the paths of experiment. Announcements of the same tenor as we have quoted above are old acquaintances of ours, but so far we have not received any intelligence tending to confirm our contemporary's statement. Have any of our readers had experience in that direction?

In the *Photo Gazette*, M. Leon Degoix observes that the "oxides of the alkaline metals, or their alkaline salts, are not the only accelerators which may be used in pyro development, two oxides of the metals of the alkaline earths—calcium and barium hydrate—being also useful." The second, although giving good results, is, on account of its great attraction for carbonic acid, of little practical use. Not so with the first, providing that not ordinary lime water, but a sucrate of calcium, be taken. It reads funny to be told that such-and-such a thing is good for certain purposes, provided that something altogether different is substituted for it. Calcium sucrate is lime dissolved in sugar water, its solubility therein being much greater than in pure water. Even in this state, however, it is precipitated by carbonic acid, so that it is at some disadvantage compared with other alkaline solutions. Here is M. Degoix's formula:—

Solution A.

Pyro	10	grammes.
Sulphite of soda	20	„
Citric acid	2	„
Water	120	„

Solution B.

Water	1000	grammes.
Sugar (as much as can be dissolved)		

To which sufficient lime is added to saturate the solution of sugar. This will give a highly concentrated, intensely alkaline solution.

To develop, take 2 c.c. of solution A in 80 c.c. of water, and, after allowing the plate to soak therein a few seconds, from 1 to 2 c.c. of solution B. The latter is a very energetic accelerator. The author admits that, though the developer gives good results, the negative is more or less stained, as with older combinations. The editor of the *Photo Gazette* reminds his correspondent that his idea is not new, but thinks that it deserves study. We quite agree with him.

Madame la Duchesse d'Uzès has been elected a member of the Photo-Club de Paris. This is the lady who spent some millions of francs in support of "General" Boulanger and his movement.

We can promise Madame (who is a Society brilliant of the highest lustre) that her new craze, if cheaper than her first, is not nearly so likely to "fizzle out" in a short year or so, and that, if she practises it with the same earnestness as she bestowed upon the abortive agitation for which she so handsomely supplied the sinews of war, she will reap more profit and advantage than she has done from politics and revolutionary plots against the State.

PHOTOGRAPHY AND ART.*

It seems to be lost sight of both by artists and photographers that photographs are essentially *miniatures*. A photograph may contain as much detail in an inch as a painting does in a foot, and for this reason the painter cannot paint more detail than he can see in Nature, and a photograph, taken with a twelve or fifteen-inch focus lens, will give as much, or more, detail as can be seen without the aid of a telescope. Bearing in mind, then, its nature, it becomes artistic stultification to print a photograph upon a rough surface—a throwing away of artistic means to an end, viz., an expression of what is meant. We hardly think that the artists who most favour badger-hair softening have the highest repute, though the process is quite legitimate, crispness of touch, showing the artist's evident intention, being of greater account. A single daub of paint may represent a group of several leaves, which, in a photograph, would be rendered separately; but the former may be all-sufficient, and display the greater crispness. No printing, however, on rough paper will convey the idea of the artist's touch, but will certainly help to destroy the crispness of the photograph. We regard this seizing upon the accidents of art as evidence more of the want of, than the possession of, artistic feeling on the part of photographers. There is so much written about art nowadays, and chiefly not by artists, that it is not much to be wondered at that the photographer gets bewildered. The art critic often sees what the artist never thought of, while quite missing what he did.

Let us just consider the now common way of presenting a platinotype or bromide print to view. It is an obvious imitation (but imitation is not art) of an engraving printed upon India or Japanese paper. There is the India paper, real or simulated, the black colour of the ink (as near as the process will give it), and the imitation of the plate-mark. So far it resembles an engraving in its accidents, but in its essentials it does not, for the photograph is printed upon rough paper, whereas the surface of the print would be as smooth as a polished copper-plate would make it, the work of the engraver only standing in relief upon it. The India paper is used because it picks up the ink more cleanly from the plate, and gives a tone to the lights of the subject, while the plate-mark is there because the pressure of printing has produced it. Usually the photographic print contains a whiteness in the lights altogether inconsistent with the colour of the India paper surrounding it. So, after all, the resulting imitation is as much a failure as a success, and quite as vulgar as a brass-and-glass finger-ring.

It is the plate-mark that does all the mischief. The India-tint effect can have some artistic reason given for it, because it is a means of softening off the abrupt transition from the photograph to its mount, and if there are any quite white lights in the picture, as there always should be, they possess greater sparkle, in consequence of being shielded by the tint from the undue contrast of the mount. Even this could, we think, be better managed by printing with a masked margin, afterwards sunned down in tone, and, though it could be more easily done by ordinary printing, it would not be impossible when development was employed. Artists do not imitate engravings in mounting their water-colour pictures, but they do use rough paper to paint them upon; so why should not photographers imitate them? Well, principally because they should not imitate at all, and next, because, when they do, they fail to get what the painter achieves so readily. Why does the painter employ so rough a paper? It is not for the sake of gaining mere roughness, but because he gets a better effect upon it than he can upon smooth cardboard. It may seem strange, but it is a fact, that in using rough paper he more effectually loses the idea of surface than if he employed a smoother tablet. The colours lie somewhat differently in the hollows to what it does on the prominences, and produce a stippled effect, which assists the imagination in looking into the picture rather than on it—in fact, it helps to get rid of the idea of surface. Take a mounted water-colour picture, and, holding it in front of you, approach a light, say, from a window or a lamp, letting the light come towards you from over the top of the picture. Now change it gradually from the horizontal to an almost vertical position, and watch the effect of the light upon it; see how illusion and richness of effect is increased as the vertical position is being approached. Again, turn your back to the light, letting it fall full on the picture, and note how richness and depth are replaced by poorness of colour and flatness of effect; then you will understand why artists use rough paper. As compared with ordinary photographs, artists in water colour work to a much larger scale, so that on rough paper they can put as much detail as they care to give; but, if they were required to put as much detail in a given space as there is in a photograph, they would choose a smoother surface. So the miniature-painter works on ivory and vellum, and gets his effects by stippling.

* Continued from page 571.

Is the gloss of an ordinary silver print vulgar? Using the word vulgar in a reproachful sense, we say, No. If the gloss were given to the photograph simply for the sake of making it glossy, it would deserve the reproach of being vulgar; but it is not so done. Its object is to prevent the buried effect of plain paper printing, *and to get rid of the idea of surface*, in which latter respect it is analogous to the rough water colour, though so differently brought about. Take the case of a photograph mounted in optical contact with glass, and note how effectually the idea of surface is got rid of. We know a surface is there, but we never think of it; we look *into* the picture. So it is with a collodion-enamelled photograph; we are enabled to look into it in a similar manner, but the moment you put it into a die, and give it a convex surface to imitate an enamel, you make it decidedly vulgar. In all cases the gloss has the one disadvantage of being highly reflective, but not so much as the piece of glass in front of a water-colour drawing when framed. There is, to our mind, an infinite amount of interfering surface on a rough bromide print that is particularly objectionable. In consequence of the natural gloss of the gelatine, which is indispensable in the manufacture of the emulsion, all the shadows are cut up by a multitude of lights, and the picture seems covered by a veil that compels you to look *at* it instead of *into* it. This want of transparency is very marked in the ordinary bromide enlargement until it is touched up, and then the rough surface is very valuable as a means of holding the strokes of the crayon.

If the photographer wants to show that he is an artist, he must exhibit it in the photograph itself, and not trust to an imitation of the accidental accompaniments of some other art product. If the unmounted photograph do not show art qualities, the method of mounting will never infuse them, and they will show themselves, if they exist at all, in whatever mode of printing may be adopted. We do not say that the colour of the print does not affect the result at all, because we should not ourselves be satisfied with printing a snow subject, for instance, in warm tones.

We have before said that there is no reason why a photographer should not be an artist. He can show it equally with the best of our painters in the selection of his subject. In spite of all that has been said to the contrary, he can show it in development, and he can exhibit it in printing; he can make it tell in the retouching of his negative. He is certainly more restricted than the wielder of the brush, for he cannot readily omit obstructive buildings, trees, or telegraph poles; introduce rocks, trees, and foreground bits from other localities, or make his mountains twice the height they show upon the focussing screen. He can, however, in many ways differentiate his work from that of the ordinary camera man, and be a true artist, though considerably trammelled by the limitations of his process. Probably it is true that artists are born and not made; so, why should not a born artist become a photographer?

Among many artists there exists an antipathy to photography, though it has undoubtedly taught them better how to see. Photography properly used makes no mistakes about perspective, but the same cannot be said of some of even our best artists, as the present year's Royal Academy Exhibition bears witness. Photography was lately rabidly attacked by a person who showed that he knew nothing about it, and with as much reason as a photographer would have for condemning painting on account of the vagaries of one of its professors. Artists differ among themselves as to what does, or should, constitute art, though they are at one in acknowledging it to be something beyond mere drawing, painting, or chiselling, and call it feeling. Some could give a reason why they do so-and-so, while others would be simply content in saying they feel it ought to be as they have done it. The laws of art cannot be codified, nor its rules formulated, and when it has been attempted some rebellious fellow has shown by his practice that he was superior to them. Drawing, painting, and sculpture may be taught, but art belongs to the individual, and is incommunicable, and can only be exercised on the occasion that inspires it. It is not imitation—photography can imitate the sculptured bust; but, when it is printed, it is art that perceives that some of its lights should be heightened, while part of its shades should be deepened.

It is no use to preach to a true artist what he should or should not

do. If he knows that he can paint a sky best with a trowel, he will do it—and he ought to; but the man who paints with a trowel because Mr. So-and-so does, when he could produce better effects with his brush, is an imitator deserving censure. What is wanted in all art work is the impress of the man, and in photography, as well as painting, that can be accomplished. W. D. Richmond.

ON THE PRODUCTION OF INTRODUCTORY SLIDES FOR LECTURE SETS.

II.

In a previous article I offered a few suggestions which might with advantage be followed by those who aspire to the position of amateur lecturers, and stated that a very simple way of getting the groundwork prepared for a design such as I instanced, was to get a ticket-writer to do the printing part of it, and then, after having selected the most suitable portrait or picture to employ, to photograph each separately, which is a more elegant and better way than merely pasting the portrait on to the groundwork or ticket. Of course, this means taking two negatives; but it is far better in the long run, because by combining the two negatives into one positive by means of double printing through the camera there is an entire absence of any patchwork or seams or joints, which are very liable to show when the one picture is pasted over the other. I take it for granted that any one desirous of undertaking this work will have at hand some suitable simple arrangements beside him for reducing large negatives into lantern slides; if not, the sooner he rigs up some kind of box to hold his large or small negatives the better. There is no difficulty about it, and should any one desire information on this point let him turn up some of the past numbers of the Journal, or its Almanac, where doubtless he will find numerous illustrations of the sort of thing he wants.

We have therefore now to consider how to combine two negatives into one positive. I think I cannot do better than state simply how I do it myself. All my lantern slides are made with my ordinary whole-plate camera, and I make most of them with wet collodion. On the ground glass or the focussing screen I *very carefully* register the exact centre of the screen, so as to perfectly coincide with the centre of a sensitive plate when placed in a carrier on the dark slide. Some little labour must be expended and pains taken to do this exactly, for on it much depends if the worker is using three and a quarter by three and a quarter or lantern size plates only. If larger plates are used and then cut down it is not of so much importance, but it is best to do it, for if a thing is worth doing it is worth doing properly. Having found the exact centre of the ground glass coincides with the exact centre of the plate when in the slide, the next step is to take the lantern mask that it is intended to adopt for the entire lecture set, and gum this on to the ground glass, so as to have the centre of the ground glass exactly in the middle. The background negative is then placed in the front copying box, and the picture reduced until it forms the exact size desired, and assumes its proper place inside the mask. There will be but little trouble in registering this correctly, and when done, let a plate be placed in the dark slide and exposed. Now withdraw the slide and take out the background negative from the front copying box also, and proceed to lift up the ground glass, and with a camel's-hair brush and some suitable paint, or colour, mark on the focussing screen, by little dots or suchlike inside the mask, exactly where the portrait or picture negative is finally to be printed, also let these marks indicate the proper size or outside dimensions of the portrait or picture negative. This done, shut down the ground glass, place the second negative in its copying box, and reduce and register its image till it exactly coincides with the colour marks on the ground glass inside the mask; then expose as before on the same plate. The whole thing is done in less time than it takes me to describe it, and the result is nearly always a success if a reasonable amount of pains be taken in carefully registering the centre on the focussing screen. It all lies in this.

Now I have described this method of making combination pictures that are very suitable for introductory lantern slides, and in doing so I have perhaps given a key also how to produce combination negatives from positives. There is a wide field here for any careful worker to enter upon.

It will be at once obvious that when a small picture is intended to be enlarged upon a screen by projection through a lantern, that some thought or consideration must be bestowed on the proper size of the lettering and figures which forms the slides, so as to convey to an audience as natural an appearance as possible; by this I mean portraits should, when viewed from the standpoint of the lantern, not show larger than life-size, and this same holds good with animals and all other subjects, for it is not an enlargement beyond natural sizes that is required. This being so, some consideration should be given to the dimensions of the letters which form an inscription and the size of a head when a figure is introduced. Now, as an ordinary rule, a life-sized head is reckoned to be about eight inches when viewed from a normal distance, and a worker must therefore study to make his calculations tally as nearly as possible with this. Of course, in the selection of his ticket or card with lettering or inscriptions, this must also be looked after. As a rule, I think it will be found a beginner is more prone to err in the direction of making his lettering too large, just as is the case when inserting moons into slides.

I may just remark that a very suitable size of card to get a ticket-writer to provide is one of a dimension about whole-plate size; but of course this does not matter so much—it is the size of the lettering in proportion to the size of the slide that is important; and, therefore, as a guide, I may say that half-inch letters suit well as a rule, and when these are reduced into a slide the letters should be just about a quarter of an inch, or rather less. A very little calculation will enable any one to fix on proper proportions. In this sort of work there is also great scope for artistic designs and scroll work, but a beginner at starting should be satisfied with a bold lettering and suitable picture. T. N. Armstrong.

A RATIONAL METHOD OF REDUCING THE INTENSITY OF NEGATIVES.

A New Process.

The *clichés* may be too intense either from yellow fog, over-development, or local opacities.

We have nothing to say on the means employed to remove yellow fog—they do not alter the character of the picture, nor on those which attenuate the contrasts or local opacities, which, if done by redevelopment, answer pretty well; but we think that the reduction of *clichés*, generally too intense, is effected by chemical actions which are often objectionable.

Among the processes employed for the purpose in question, the old one, that which we first employed, both in the calotype and the collodion process, consists in treating the *cliché* with a solution of potassium cyanide. It is the best on account of its simplicity, and of not requiring much after-washing. The drawback in the gelatine process is that the solution of the commercial article, K Cy, has, on account of its strong alkalinity, a tendency to produce blisters and frilling by softening the film. This can, however, be easily prevented by using pure potassium cyanide in solution in alcoholised water.

The next process in order of publication is that devised by Alexis Gaudin. The reduction is effected by ferric sulphate (Monsel's salt). This process requires to eliminate the iron salt by first washing the gelatine film in a diluted solution of hydrochloric, citric, or oxalic acid, &c. It is little employed.

Then come Spiller's process, which consists in treating the *cliché* by a solution of cupric bromide and common salt; that of Farmer, who uses potassium ferricyanide in solution with sodium thiosulphate; and, lastly, Monckhoven's process, by which the reduction is effected in attacking the silver with ferric oxalate, the silver salt formed being dissolved by sodium thiosulphate, as in Farmer's process.

The latter processes—those of Farmer and Monckhoven—require prolonged after-washings to eliminate the thiosulphate. For this reason the process of Mr. John Spiller is preferable, as the solvent of the cuprous and silver bromides is simply the common salt, an entirely harmless compound, should any traces of it be left in the film.

As it is seen, in all these processes *the intensity is reduced by dissolving the metallic silver forming the image.*

If employed for the reduction of *clichés* generally too intense from over-development, the relative value of the local intensities may be little altered, provided the operation be conducted with great care, otherwise—and, indeed, this is of frequent occurrence—it happens that the penumbras and the details in the shadows, being formed by their layers of metallic silver, are dissolved, and, as a consequence, that the *cliché*, if not spoiled past remedy, has lost that admirable gradation from lights to shades, that delicacy of details, which make a photograph such a beautiful realistic image of nature.

A rational process would be to reduce the intensity not by dissolving the silver, but by transforming the colour of the image into one more actinic, or rendering the *cliché* more transparent, so that not only the desired de-intensification would result, but if the intensity were too much reduced it would always be possible to strengthen it.

For example, the *cliché* previously soaked in water is immersed in a very diluted solution of nitro-bromhydric acid or of nitro-chlorhydric acid (*aqua regia*). In the solution the image, viewed by transparency, seems to intensify on account of the formation of the silver

bromide (or chloride), but when exposed to sunshine for a certain period, it becomes more transparent from the reduction of the silver haloid, and turns to a bluish or violet-black, that is, a more actinic colour than the original one.

The operation should be made by diffused light, and the *cliché* allowed to dry before exposure to the luminous action, for, if dried in the light, the silver reduction would be of unequal intensity, the parts drying first being the lightest. In fact, when exposed under water, or, better, in presence of an absorbent of chlorine or bromine, the reduction is more complete and darker, which is generally advantageous.

Of course, the de-intensification is proportionate to the more or less complete transformation of the metallic silver, the image, into silver haloid. And it is in this where resides the difficulty of the process; it requires some experience to succeed. There is, however, little danger of spoiling the *cliché*, for should it be too much weakened from being bleached through, the remedy is at hand; it suffices, *after the insolation*, to redevelop with a very weak developer—pyrogallol, eikonogen, &c., or to intensify with mercuric chloride, or by any other intensifying processes.

No fixing is required after these operations. It is only necessary to well wash the *cliché*.

We have also experimented with iodohydric acid, and, in lieu, with iodine; but the results were not generally as good. The silver iodide does not blacken in the light, and remains apparently not acted on, and when treated by the developer gives rise to a great increase of intensity. This can be regulated during the redevelopment, and an after-treatment with a solvent of silver iodide, sodium thiosulphate, &c.

The iodide process has given us satisfactory results for the intensification of very weak negatives. As said above, the redevelopment should be done after insolation, and with diluted developers, in order to have the action well under control. P. C. Duchochois.

—*The Photographic Times.*

LIGHTING IN PORTRAITURE.

Light and shadow is the soul of art. There is no higher expression of art than in fine sculpture; and as the beauty of form in sculpture is developed by light and shadow only, and as light and shadow is the sole mode of expression of photography, we may, I think, be permitted to use sculpture as a basis from which to draw our comparisons, and upon which to form our principles.

The Sun, the great giver of light and of life, is also the great sculptor and painter. We poor mortals, admiring the infinite beauties which he constantly spreads before us, are ever in vain trying to imitate them. To our perceptions, when the sun is doing its great work, it is ever above us; as it descends it becomes more feeble, till, as it passes beneath the horizon, its work is done, on our half of this sphere, for the day. The objects which constitute nature, to our perceptions, are never lighted from beneath. Has Nature purposely so designed her infinite creations that they may appear the most interesting by this lighting from above? Or are we, through mere habit, so accustomed to it that we accept it as the right? We think we may safely hold that the former is far the more likely, as in both animal and vegetable growths we universally see the greatest beauties of conformation and colouring upturned, as if thus to receive, to the best advantage, the descending rays of the glorious sun.

In the human countenance, and its portrayal to the best advantage, which forms the theme of our present writing, we have the finest example of the influence of light and shadow in developing properly Nature's finest work, if we adhere to what she has evidently pointed out as her intention. Let us take the features separately. The forehead, the seat of the highest intellectual qualities—how can it be lighted to show its beautiful conformation but from above? Then the eyes and eyebrows—how else can we see their force and detail and brilliancy than by an upper lighting? Take a fine nose, and place a light beneath it, and what can you make of it? Of the mouth, chin, and cheeks—nay, even the ear—can we say aught else than that when lighted from underneath their individual interest is lost, and their beauty destroyed in place of being developed? How, then, taken as a whole, can we make anything but what we may almost call an absurdity of a human head under a false lighting?

Nothing is more easily and plainly exemplified than the unpleasant effect of ill lighting. Let the handsomest member of any family, favoured with average good looks (whether it be man or woman, old or young, it matters not), stand himself up at night, or in a darkened apartment, and let another member of the family take a good lamp and place it at any angle or in any position which he may choose with regard to the head and face of the individual posed, so that he always keep it below the level of the head; and let the other members of the family decide whether they would admire and value a picture of the one so seen under any of the varied aspects which he or she would present. I think we may safely say that in ninety-nine cases out of a hundred they would not.

The mode of studying the varied effects of light and shadow by a lamp placed in different positions with regard to the head and face is a very simple and excellent one. It is open to all who feel sufficiently interested in art to give a few minutes to it, and exemplifies the wonderful effects of light and shadow in either the making or marring of a good human countenance.

It may be objected that this mode of lighting is too strong and too exaggerated (and so it would be for refined countenances) to be photographed. Of course we must then have a softer and more diffused light; but the principle is precisely the same, whether it be a soft or a powerful light. It must fall from the proper direction.

From centuries past to the present day, and notwithstanding the various whims and freaks of fashion which, arising from a vulgar rage for novelty, are constantly assailing all well-founded truths, it has been the custom in academies and schools of art, and in all galleries purposely constructed for the display of sculpture, to use a lighting that falls at an angle of forty-five degrees, or above, on the sculptures used as models to draw and paint from, and to be exhibited to the greatest advantage to intelligent people. What would we know of the solemn grandeur of the bust of Homer, or of the beauty of the head of the Apollo Belvidere, if we had never seen them properly lighted? How could we read the various characteristics of the Greek and Roman philosophers, statesmen, and rulers, as we do in the portrait sculptures that have come down to us, did we not have the power of casting a well-arranged lighting upon them?

The photographer may say, "What have we to do with Homers and Apollos and sculpture; are we not working from, and catering to, the flesh and blood of to-day?" But I say, Are we not men? Do we not furnish now as fine specimens of the human countenance as existed in the period of Greek art? Certainly. We have our great statesmen, generals, and philosophers, and alas! they are too often trusting to the camera alone for the perpetuation of their semblance. Possibly no mode can so truly convey to us as can the photographic art the actuality of a countenance. But we must never lose sight of the fact that that countenance, if it be the index to a mind worthy of perpetuation, must be portrayed under a lighting in conformity with the inscrutable laws of nature and of art.

We must beg to be pardoned if we speak strongly upon the importance of this matter of lighting in portraiture. During the past few days the subject has presented itself to us more forcibly than it probably has ever done before. One of our most distinguished citizens has just passed away. He stood amongst the few very highest in science of any time or country. Immediately we see large photographs of him placed in the windows of some of the photographers. They are splendid works as regards technique; but why should the noble face have been buried in shadow, a harsh line of light cutting down one edge only? Was it ignorance or thoughtlessness on the part of the person who posed this distinguished sitter? He surely had the means in his skylight of letting nature's illuminating rays fall broadly and truly upon this noble countenance, so that the grandeur and dignity which it possessed might have been perpetuated to us to their full extent and value. Those photographers who profess to do only a respectable business, should pay more attention than they do to this all-important subject, and we would admonish those who are at the head of leading galleries, and whose duty it daily becomes to affix the images of our greatest men of the day, that they are doing wrong in not making a regular art study of their pursuit. They should secure a few fine casts from the antique, preferably portrait busts, and study them and photograph them under various lightings; see how they may be made to look dignified or mean, grave or ridiculous.

You will, no doubt, think it a very easy matter to talk, and especially for one who knows little or nothing about the practical business of running a photographic gallery. There is no one better acquainted with the difficulty of producing a very fine photographic likeness than the writer. It is something which he is constantly striving to do, yet never satisfying himself; and, moreover, he is thoroughly acquainted with the trials to be contended with in catering to an uncultivated public. Our ideas upon the subject of art portraiture could not be put universally in practice. Ignorance and fashion cannot be stormed and annihilated. The mind must be led; good comes about gradually.

What we would have is, that the portrait photographer properly and conscientiously prepare himself, as an artist does, for the work that is to be his calling, so that whenever an opportunity occurs to get in some real, good, artistic work, he may do it. By artistic I do not mean what the whim of the day may call artistic, but artistic as founded upon the genuine high art of the past, and the rules of good taste and judgment that have stood the test of ages.

Let him, when a distinguished man with a fine forehead comes along, secure one or two admirable negatives of him. The man himself possibly may not like them so well as a commonplace portrait. Never mind; a fine work of art will have been put in existence. At a proper time it may be brought forth. If it should be engraved, it will be spread broadcast, and go down to posterity. When it is looked at in future years, by persons of good taste and sound judgment, they cannot say of it, "What a pity the abominable fashion of shadow-pictures was in when that distinguished man was photographed," or, "Pity he did not pose to one who had some artistic knowledge." But, on the contrary, they may say, "What a noble head; the man who posed it was truly an artist."

As to the practical details of lighting, all good photographers are pretty well provided with the means of securing almost any lighting which they may require. The main points to be looked after are to have plenty of height, not too much over-head light nor too much side light, and be very wary of any light below the level of the head. Perhaps the greatest difficulty in lighting is to secure the very nice point between too diffused and too concentrated a light. In too diffused a light we have a want of force and breadth of light and shadow, and consequently a want of expression and vigour in the head; and on the other hand, if the light be too much concentrated, there is a harshness and force of character which is not only less agreeable than when a softer light is used, but far less likely to make a portrait that will be as acceptable to the general run of sitters as the soft lighting.

The timing of the exposure is of the utmost importance. The correct limit is extremely narrow in the highly sensitive plates now used in portraiture. An under-exposed plate is worthless. If we over-expose, we have a resulting flatness in the picture, which, if to be overcome, as it sometimes may, is only at a too great expenditure of time and pains to be admissible in gallery work.

In a properly lighted head, with correct exposure and development, in many instances very little retouching would be required. Certainly what constitute facial blemishes may in all cases be removed, but with persons of average good looks, as they advance in years, the stopping-out of all marks of time and character, and attempting to restore the look of youth, should be universally deprecated by persons of good sense.

XANTHUS SMITH.

PHOTOGRAPHIC CHEMISTRY.*

THE haloid salts of silver will, of course, demand a considerable share of attention from the photographic chemist. The preparation and properties of these compounds should be studied in detail; their solubility in well-known reagents, such as ammonia, potassium, cyanide, and sodium thiosulphate, should be made the subject of practical exercises, and the chemical changes undergone can be made readily intelligible to the student whose elementary training has reached the necessary stage of efficiency. It will add to the thoroughness of the instruction if the student is made to realise that the statement that the silver haloid is soluble or insoluble in such or such a reagent is by itself inadequate; he must understand that solubility means the formation of a new compound which is more soluble than the original haloid. Thus the absorption of ammonia by silver chloride can readily be shown by putting some of the dry haloid into a tube, weighing, and then passing dry ammonia gas till there is no further increase in weight. Then, again, silver chloride may be dissolved in strong ammonia, and the solution allowed to stand till the crystals of the ammonio-silver chloride separate. The preparation of the soluble silver sodium thiosulphate, by the method of Lenz,† is a good practical exercise, and the study of this salt will help to make clear why the silver haloids are dissolved by the thiosulphate. It is necessary to point out that by the same reagent three‡ distinct products may be obtained:—

1. Silver thiosulphate, $Ag_2S_2O_3$, by adding a solution of sodium thiosulphate to a solution of a silver salt, keeping the latter in excess. This is a white insoluble salt, which soon darkens by the formation of the sulphide:—$Ag_2S_2O_3 + H_2O = Ag_2S + H_2SO_4$.

2. The insoluble double salt $Ag_2Na_2(S_2O_3)_2$, formed by adding silver nitrate solution to a solution of sodium thiosulphate till a permanent precipitate is formed. The product is dark-coloured, and probably contains sulphide; it gradually becomes darker on standing, owing to decomposition with the production of sulphide.

3. The soluble double salt $Ag_2Na_4(S_2O_3)_3$, formed by the action of excess of sodium thiosulphate upon the last salt, or by adding a silver salt to a strong solution of the thiosulphate, keeping the latter in excess. In the solid condition this is a white crystalline salt, readily soluble in water, and much less prone to decompose into sulphide than the preceding salt.

All this is, of course, only ordinary chemistry, but it must be taught, and cannot be better taught than by letting the student prepare the compounds for himself and study their properties. The utility of this knowledge will become obvious when the fixing process is dealt with.

Among other properties of the silver haloids to which attention may be directed are their decompositions by various haloid acids and salts. This information cannot but be of the greatest use in practical photography. I have summarised the facts in the form of a table:—

Reagent.	Ag Cl.	Ag Br.	Ag I.
Cl	No action	Ag Cl formed	Ag Cl formed
Br	,, ,,	No action	Ag Br formed
I	,, ,,	,, ,,	No action
HCl	,, ,,	Ag Cl formed at high temperature	Ag Cl formed at high temperature
HI	Ag I formed	No action	No action
KCl	No action	,, ,,	,, ,,
KBr	Ag Br formed	,, ,,	,, ,,
KI	Ag I formed	Ag I formed	,, ,,

"No action" must be taken as meaning no decomposition.

The haloid salts of the alkaline metals and of ammonia, especially when in concentrated solutions, dissolve more or less of the silver haloid, with or without decomposition. The silver haloid is thrown out again, either in an unaltered state or transformed into another haloid by decomposition on diluting the solution with water. The solubility of the silver haloids in solutions of other salts is a feature in their chemical history which the photographic chemist will find it useful to be put in possession of. Thus these haloids are to some extent soluble, and especially the iodide, in strong solutions of silver nitrate. It must be pointed out that, in all cases where a silver haloid is dissolved by another salt, a double salt is probably formed. In fact, many of these double salts have been isolated, and I subjoin a list, coupled with the caution that I do not hold myself responsible for the formulæ:—

AgI, 2 KI and AgI, KI. Bollay, *Ann. Ch. Phys.*[2], xxiv., 377.

AgCl, NH_4Cl, and Ag Cl, KCl. Becquerel, Gmelin's Handbook, I., 401.

AgBr, $AgNO_3$. Schnauss and Kremer, Jahresb., 1855, 419; Riche, *ibid.*, 1858, 701; Risse, *ibid.*, 1859, 229.

AgI, $2\,AgNO_3$. Weltzien, *Ann. Ch. Pharm.*, xcv., 127; Risse, Jahresb., 1859, 228; Stürenberg, *Arch. Pharm.* [2], cxliii., 12.

AgI, $AgNO_3$. Schnauss and Kremer, Jahresb., 1855, 429. See also Stürenberg, *Arch. Pharm.* [2], cxliii., 12.

$4\,AgI, 2\,Hg(NO_3)_2, H_2O$. Preuss, Gmelin's Handbook, vi., 199. See also Wackenroder, *ibid.*, 159 and 165; Licbig, *Ann. Ch. Pharm.*, lxxxi., 128, and Debray, *Compt. Rend.*, lxx., 995.

R. MELDOLA, F.R.S.

(*To be continued.*)

* Continued from page 570.

† A solution of silver nitrate is added, drop by drop, to a strong solution of sodium thiosulphate till a permanent precipitate (the insoluble double salt) just begins to appear. The solution is filtered and alcohol added till the white crystalline (soluble) double salt separates out.

‡ There are probably many more double thiosulphates of silver and sodium, and even this series of salts requires further investigation. Thus Mr. C. H. Bothamley informs me that by mixing 4 $AgNO_2$ with 5 $Na_2S_2O_3$ and adding alcohol, he obtained a white precipitate in which the ratio Ag : S was 1 : 1·961. The ratio calculated for $AgNaS_2O_3$ is 1 : 1·683. This salt is *soluble* and stable. By the action of 3 $Na_2S_2O_3$ on Ag Br and fractional crystallisation, he has isolated two crops of crystals corresponding with the formula $Ag_2S_2O_3$, 3 $Na_2S_2O_3 = Ag_2Na_6(S_2O_3)_4$.

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

II.

AT a conversazione given on Tuesday evening, the 1st inst., the exhibition was formally opened by the Lord Provost, and although the weather was most inclement the rooms were crowded by a brilliant assembly of invited guests. After Mr. John Morrison, jun., who filled the chair on the occasion, had welcomed the visitors, the Lord Provost said that, considering the stormy night, he was much pleased to see such a large gathering to inaugurate the opening of the exhibition. After making some remarks upon the great and steady advance of the art science since its birth fifty years ago, he said that he was pleased to know that the amateur photographic ranks in Glasgow were going on increasing, and that they had achieved many artistic results. Photographic exhibitions were not a thing unknown to the city, he continued, for one had been held in the Corporation Galleries, and another in the Great International Exhibition. He then introduced the various attractions that were to be provided at this exhibition for the benefit of intending visitors, such as lantern shows, lectures, musical promenades, &c. He closed his remarks by saying he was sure that they would all join with him in wishing every success to this International Photographic Exhibition, which he then declared to be open.

Mr. Blanchard, one of the Judges, then made a few remarks in which he stated that he had been to many exhibitions of the kind in London, and various parts of the country, but that this one was the largest and most representative he had ever seen. There were many magnificent examples done by Glasgow photographers, and by others from various

parts of Scotland, and, judging from these, he felt that they could hold their own with photographers in any other part of Great Britain.

After a short speech from Mr. C. W. Hastings, and a few remarks by Mr. Welford, a hearty vote of thanks to the Lord Provost was given, proposed by Mr. Lang.

With his Lordship's reply the opening ceremony ended.

Mr. Coles's orchestra was in attendance and played during the evening, the company enjoying a promenade, the rooms being far too crowded to allow of viewing the pictures with any comfort.

Turning our attention to the pictures, and beginning with Class 1, which represents portraits by professionals only—sets of four whole-plate sizes and over.

In this class there are over sixty exhibits, mostly large work, which gives it an effect of considerable importance, the work being, with very few exceptions, of a very high standard of merit. A gentleman who was examining this section, and who possessed a thorough knowledge of photography, remarked to us "that this class alone would make a photographic exhibition itself worth coming a long way to see." For special excellence a gold medal was awarded to H. Vanderveyde in this class for his frame of pictures 59 to 62. As artistic productions they are simply exquisite, especially the two groups, which remind us of Watteau's charming compositions, so finished is the grouping; and one of these groups is composed of four figures, not a happy number to arrange. No one can look at these pictures without feeling that this exhibit was well worthy of the Judges' award.

The silver medal was awarded to W. M. Warneuke. This young artist is making rapid strides, his artistic productions having already placed him in the front rank. It will be remembered that he gained the only medal awarded for photography at the East-end Exhibition lately held in Glasgow. Of all the pictures he shows in this section, perhaps the most pleasing to the casual visitor will be No. 54, a study of a little girl, and every detail in her dress shown up, while at the same time the whole is filled with an effective softness, which is one of the charms of the artist's work.*

W. W. Winter was awarded the bronze medal for his set, 1 to 4. The arrangement of these pictures is artistic, but there is a want of sparkle about all of them, a feeling of dulness all over the surface. Whether it is the brown tone in which they are printed, or if this effect is produced in working up, it is not easy to say; but certainly, at a little distance, it appears as if a faint mist veiled them all over.

Taking Ayton's, Chancellor's, and Tunny's exhibits in this class, and placing them together—which they are pretty well so situated on the walls—we feel, as we look at them, that they are all worthy of medals; and now and then, when we visit the same corner, we wonder, as we look at them, why the award tickets are not fixed on the fronts of the frames.

Nos. 9 to 13.—W. J. Byrne's exhibit shows up well. These are four examples printed in silver, in a rich, brown, velvety tone. J. I. Liphon, No. 10, is a vigorous and polished piece of work, the whole set, however, being noticeable for good lighting and careful rendering. There are only four exhibits in silver in this No. 1 Class of over sixty pictures, platinotype being represented by some eight, which clearly shows how rapidly the less pronounced, but more artistic, picture is coming to the front; but it was a set of silver prints that gained the gold medal.

21 to 24. Ferrier.—The velvet in the frames is too strong in colour, drawing the attention away from the pictures themselves, a set of four groups, 22 and 24, being the best examples.

25 to 28. R. C. Platt. "Bromide on Ivory."—These pictures are printed far too black, the half-tones being entirely lost, and the gradation in vignetting is far too hard and decided for artistic effect.

Sweet and Kenlock. 41 to 44.—Of this set of four groups No. 42 is the best composition.

J. H. Hogg shows four red carbons in oval frames, evidently untouched. It is not a safe thing to send untouched work into such an exhibition, for the surrounding highly finished pictures tend to make it look more commonplace than it really is. Any little virtue that they possess, if placed by themselves, gets quite absorbed and lost in their present position. The lady in the hat has certainly the least pretensions to merit of these four. The oval frames is also a mistake, for so much drapery has to be used to complete the square necessary for the hanging arrangements that it tells considerably against the general effect of the exhibit.

A. Swan-Watson shows six pictures in this class. They were sent in for the second class; but, being disqualified owing to their being too large for the second, they were placed by the hanging committee in the first. These pictures show a new departure in lighting, and are bound to create considerable attention. The effects are evidently produced by cross-lighting, and the faces are all in shadow, with the high lights coming from the back and further side of the sitter, the profiles and prominent parts being strongly lighted up, showing tips and glints of light which are very attractive. Such lighting is sure to be considered by many more false than true. One thing that this high lighting, so prominent, and in many cases so local, has a tendency to produce, and that is a flattening of the shadow parts, which, in these pictures, is nearly all the faces. One of these pictures—a little girl—where the artist has produced the effect of high lights playing all over the front of her dress and face, is a very atttactive bit of work. This set is well worth a study.

* In our notice of last week a ypographical error occurred, in which this artist's name is given as *Warnerke*, instead of *Warneuke*.

An extra bronze medal was awarded to M. Gruel for his exhibit, but we have not had the opportunity of seeing these pictures yet; they were away being framed when we wished to inspect them. You will remember these pictures just came in when the Judges were working on the class, and an hour or two would have rendered them out of the running, so Gruel, saving himself by a few minutes, was lucky.

The second class—for portraits by professionals under whole-plate size. —This class is represented by twelve exhibitors; but, as each exhibitor had the option of sending two sets if he wished, five of the twelve availed themselves of this rule, which swells the section considerably.

Harold Baker was awarded the silver medal for his frame of cabinet portraits, 73—carbon work—of a pleasing warm tone. The lighting of these pictures has been well studied, and are artistically effective.

The bronze medal in this class was taken by W. J. Byrne's Studies of Children, in silver printing, No. 75. This is a very charming set of pictures. *The Three Little Maids from School*, from the *Mikado*, is probably the best in the frame for artistic and mechanical qualities. The effect of the two figure pictures on each side of this seem to us marred by being placed too close to the background. The little baby in shoe, with the umbrella over her head, is a very effective pleasantry.

Nos. 70 and 71, Winter.—A varied set, composed of heads, half-lengths, and groups, produced in a warm tone, same as larger work. One of the most effective pictures where all are good is the group of two little girls, after Kate Greenaway's style of old-fashioned childhood.

Clayton, jun., 72, a set of fine heads in platinotype, the vignetting softly and carefully managed.

No. 76, portrait by Chancellor & Son.—This is a set of cabinet pictures, possessed of considerable artistic merit, spoiled by the velvet mat to which they are affixed; the plush mat, of deep decided grey tint, tells so against the delicate grey of the platinotype pictures that it makes them look old and faded, where, had any contrast been used instead, the pictures would have looked fresh and in harmony. The set in silver, 77, by the same artist, shows much better in this respect, the velvet being deep morone.

Lambert, 85.—To show lighting. Good heads, but considerably re touched.

Mr. G. Comrie Smith's frame, 82 and 83, portraits, are very effective. Up to this point we have only come across one frame of pictures mounted in optical contact, and this first love of so many seems to be dying out. This frame does not look happy among the other exhibits. We fancy that glass mounting has had its day. The commercial opaline pictures, published and sold broadcast, will very likely have hastened the end of this style of popular mounting.

The next class, No. 3, is enlargements, professional, portraits only.

The silver medal was taken by Vanderwyde, No. 101, an enlargement of one of the group in his set that gained the gold medal, Class 1. The enlargement loses much of the sparkle in the high lights which is seen in the whole-plate copy, and which is one of its great charms.

The bronze medal was awarded to Messrs. T. and R. Annan & Sons for an autotype enlargement of the late Professor Jenkins. Both this picture, 92, and Professor Max Müller, 93, are good examples of Messrs. Annan's work, which is invariably well lighted, artistically composed, and carefully executed.

Ferrier, No. 94, A Girl Resting on a Stile.—The pose is easy and graceful. No. 110, Portrait Study by Alexander Brothers.—This composition is something after the style of Burne Jones' pictures; this, as well as 109, Archbishop Eyre, are highly artistic, showing a considerable amount of hard work; however, we think that they would have shown up better with more mount margin between picture and frame. Nos. 104 and 105, in carbon, J. Lafayette, are quite up to his usual standard, which is of the highest class.

The No. 4 Class, other than portrait, one picture.—The silver medal was awarded to Alexander Brothers for No. 121, *A Thing of Beauty is a Joy for Ever*. The subject is a sculptor working in his studio; the lighting is managed with great skill, and, if it were not for a feeling of the overcrowding of accessories in this picture, it would be very perfect. The other example that he shows, 120, *Dustye Miller*, pleases us quite as well as the prize picture, the light coming in through the window and lighting up the old man's face and figure, while a slightly Emersonian effect of being slightly out of focus all over, which suits the subject, gives a charming effect to the whole of this composition.

The bronze medal was taken by Messrs. T. and R. Annan & Sons by an enlargement made from a hand-camera exposure. This picture is printed in a dark-bluish carbon, conveying a dark evening effect, the figures on the hill being in shadow, the distance in front of them being lighted up. A remarkable picture that commands considerable notice. We never look at it but it reminds us of the engraving representing Wellington on the field of Waterloo after the battle, the figures and general effect bringing that picture to our mind's eye every time we see it.

This class is represented by only eight competitors, the general work being good.

The lantern entertainments have proved a great success up to date, as was to be expected. Paul Lange's *Iceland* scored one, and Mr. T. N. Armstrong's lecture on the following night, "A Photographic Tour in a Caravan," was given to a crowded house, who from beginning to end were highly entertained, and showed it by their applause. Of course, only a few nights have passed, but, if the people continue crowding in as they show a willingness to do up till now, the success financially is assured.

The *Bailie* (the Glasgow *Punch*) in its last week's issue published a page of portraits of the executive of the exhibition, all of which are capital likenesses, and the notice issued with this page of workers must have been very gratifying to them, as it must show them that their labour of love is not lost.

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

Mr. John Morison, jun., and those gentlemen who so ably assisted him, must have felt much gratified at the brilliant assembly which took place at the opening of the Exhibition. The entire arrangements were most complete, and every one present appreciated the magnificent collection of pictures which it had taken months of arduous labour to bring together. The undertaking was entered into from the first with much pluck, and when it is said that somewhere about six or seven hundred pounds was expended in promoting and bringing together this truly large collection, some idea may be formed of the determination to spare nothing in the shape of trouble but also expense. Nothing niggardly will do nowadays in such a venture as the Glasgow photographers have entered into, and therefore it is with feelings of more than ordinary pleasure that the promoters have witnessed the extraordinary rush on the part of the public to secure season tickets, and to be early in the rooms at the limelight entertainments. Nothing succeeds like success, and this has been clearly demonstrated at the Glasgow Exhibition. It has caught the public taste, and large crowds are flocking day and night to the Fine Art Institute, so that a handsome surplus is assured.

Not only were the executive fortunate in their choice of the Fine Art Institute as the *locale* for the Exhibition, but they were equally so in the choice of those gentlemen who they invited to act as Judges—a duty which nowadays often brings but little thanks to those who undertake such onerous work; but in this case Messrs. Adam Diston, Valentine Blanchard, Richard Keene, W. Young, and Francis Powell have made their awards without, so far as the writer has been able to learn, one single cause of complaint, and, more than this, they have clearly established new lines in the judging, for in not one single instance have they awarded a prize to an exhibit but what is as unlike the photography of ten years ago as chalk is like cheese. A fresh school has sprung up, and they have encouraged it. This is notably the case in the landscape class, where I notice a very fine set of four landscapes by Horsley Hinton. These pictures have given rise to no little discussion, every one with any artistic taste feeling that both in tone and selection of subject quite a fresh departure has been made from the old school. There is not one single portion of these exquisite pictures that can be said to be actually sharp or in focus; still, the effect is most pleasing, and they do not contain that element of fuzziness which out-of-focus pictures generally show. Some considerable amount of speculation has been expressed as to how this result or effect is produced, and one clever worker from Gourock, who admires the style very much, may not be very far off the mark when he says that he imagines the lens has been stopped down a good deal, and then the entire image has been purposely thrown out of focus. The Judges appreciate the work, for they have awarded a medal.

After the opening ceremony the enthusiasm ran so high that several of the old as well as young people intimate in photographic circles determined not to separate without a dance, and thanks to Mr. Miller, who on the spur of the moment acted as master of ceremonies, an impromptu dance was arranged, and about a hundred-and-fifty couples joined most heartily, and danced with right good will till early morning, the finish being a Scotch reel, danced by a selected party especially for the benefit of Mr. Valentine Blanchard and several other gentlemen from over the border, who had never seen this characteristic dance. At last the hour of parting came, and, when every one in the room joined hands and sang "Auld Lang Syne," the picture was complete, and will never be forgotten by those who took part in it.

Very many funny little incidents occurred at the opening. The writer heard of a case where two well-known photographers, who came from a distance, forgot their dress clothes. One of them, an octogenarian, easily got over the difficulty by borrowing the waiter's. I must say, however, he looked very like old Toole.

At the lunch given to the Judges on Monday, at which only a very select few were invited, the old collodion days were referred to, and regret expressed by many that but few of the new school now know anything about the wet process. It was very curious, however, when scanning the faces of those present, to find out that all the photographers present were old collodion workers. These were Adam Diston, Richard Keene, Valentine Blanchard, Archd. Watson, Ralph Elder, William Lang, P. Falconer, Craig Annan, and T. N. Armstrong, and they all love it yet.

The limelight entertainments are pulling big houses, and form a special feature of the Exhibition.

The Judges left Glasgow with much regret, having formed many new acquaintances, and spent a most agreeable time of it. In fact, in one case, Mr. Blanchard, after being on his way home, he returned again, and Mr. Morison, the President, insisted on his going through the Trossachs on Friday, the 4th inst., so Mr. Blanchard turned up again on Friday night, looking very holidayish, but speechless with admiration of the scenes he had that day witnessed. The weather was magnificent, and the glorious scenery of the Trossachs and Loch Lomond was seen *at its very best*.

T. N. Armstrong.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.—PHOTOGRAPHIC DEPARTMENT.

Completion of Awards.

Messrs. Taylor, Taylor, & Hobson, of Leicester, send a pair of nine-inch focus lantern objectives, which the Judges put to a practical test, and Mr. Brooks used them at his lantern entertainment. Their performance left nothing to be desired, and the Judges have awarded them a first silver medal.

Mr. R. R. Beard exhibits a pair of his gas governors, with special packing to prevent straining and bursting of the pressure gauge, which seems to be very efficient. To these have been awarded a first bronze medal. He also sends a carrier for dissolving effects with a single lantern, which is a very clever arrangement, and is highly commended. The same exhibitor shows a compact little optical lantern, which packs into a very small compass, which will recommend itself to those who admire portability.

Our Editorial Table.

Materia Photographica.

By Clement J. Leaper, F.C.S. London: Iliffe & Son.

As a teacher of photography in the City of Dublin Technical Schools, and as one whom we know to be a careful experimentalist in the higher walks of the art-science Mr. Leaper is well qualified to write a work on *Materia Photographica*, and in this work (one of 252 pages, price 5*s*.) he does it thoroughly and well.

As may be surmised from the title, the book deals with the preparation and properties of the substances employed in photography, and a general knowledge of theoretical chemistry on the part of the reader is assumed, without which, as the author justly observes in his introduction, it is impossible to practise photography in anything but a hap-hazard manner.

Part I. is devoted to apparatus and reagents, and their uses. The second part, which occupies the greater portion of the work, treats of photographic chemicals in alphabetical order. This is followed by a photographic formulary, followed in turn by the utilisation of photographic wastes and quantitative chemical analysis. We give a cordial welcome to Mr. Leaper's useful volume.

Military Photography.

By Captain Owen E. Wheeler. London: Iliffe & Son.

The chapters constituting this little book appeared originally in the form of a series of articles in the *Broad Arrow and Naval and Military Gazette*. They are of interest mainly to professional military men. Forty-three pages, price, in paper covers, 1*s*. 6*d*.

Holidays with the Camera.

London: Hazel, Watson, & Viney, Limited.

This forms a series of illustrated "outings" in various places and by various authors, some whom are not yet known to fame. The frontispiece, *The Road to the Sea*, painted by Thévoz from a negative by John E. Austin, is, without doubt, the finest picture in the collection, which embraces several that their producers will scarcely feel elated at now that they are before the world. Price 2*s*.

Die Elemente der Photographischen Optik.

Von Dr. Hugo Schroeder, Optiker und Mechaniker. Berlin: Verlag von Robert Oppenheim.

Although contributions have recently been made to the Society of Arts by Messrs. Conrad Beck and T. R. Dallmeyer on what we may term the mathematics of photographic optics, and which have appeared in our pages, anything of a similar nature emanating from such a well-recognised mathematician as Dr. Schroeder is certain to be studied by lens-makers with that interest due alike to the subject and the eminence of the writer. While it is mainly adapted for the manufacturing optician, for it deals comprehensively with the properties of glass and the radii of lens curves, yet will it prove of advantage to all whose desires are towards the attaining of a thorough mathematical knowledge of the subject, and whose acquaintance with German enables them to do so by the aid tendered in this volume, which is written in the German language. Dr. Schroeder includes among his "Beschreibung der Linsensysteme" those lenses formed of Jena glass, recently introduced, and for which patents were obtained in this country two or three years ago. The work displays much research.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,689.—"A Photographic Lantern Slide and Transparency Printing Frame." A. R. WORMALD.—*Dated August* 31, 1891.

No. 14,695.—"Improved Photographic Dark Slide for use with Celluloid Films." H. E. COLVILE.—*Dated August* 31, 1891.

No. 15,032.—"Improvements in Photographic Shutters." E. L. CONINCK.—*Dated September* 5, 1891.

SPECIFICATIONS PUBLISHED.

1891.

No. 2031.—"Photographic Cameras." BROOKER.—Price 6*d.*

No. 2675.—"Optical Lanterns." ROCKLIFFE.—Price 8*d.*

No. 10,379.—"Embellishing Photographs." STERNBERG.—Price 6*d.*

PATENTS COMPLETED.

IMPROVEMENTS IN AND CONNECTED WITH PHOTOGRAPHIC CAMERAS.

No. 2031. ALGERNON BROOKER, 52A, Robertson-street, Hastings, Sussex.—*August* 15, 1891.

THIS invention consists in improvements in cameras, or of external boxes to hold cameras, by dividing the camera, or external box holding the camera, into three transverse sections. The sections so divided are to be so put together by pull-off hinges, or other suitable fittings, that the front and back portions may be either closed to form a box-shaped hand camera, swung open to allow of the use of a short-focus lens, or immediately taken off altogether, so that the middle portion may be used alone without the two end portions.

The back portion, in this manner, may be slipped off, if the camera is required for daylight enlarging purposes, or should it be required to use a roll holder or more bulky dark slide than is usual for carrying the dry plates or films used.

A metal, vulcanite, or other suitable door is fitted to cover the slit where the dark slide is put in, to lessen the risk of fogging sensitive plates after the shutter of the dark slide has been withdrawn ready for exposure.

A hole of any suitable shape is made in the back to look through when focussing, thus forming a dark chamber, rendering a photographic dark cloth unnecessary.

AN IMPROVED REGISTERING APPARATUS FOR OPTICAL LANTERNS.

No. 2675. WILLIAM ROCKLIFFE, 35, South-street, Durham.—*August* 15, 1891.

THIS invention consists of an oblong receptacle, with an opening from back to front, and from side to side, and is large enough, internally, to admit magic-lantern slides, besides leaving plenty of room so that the slide can be moved in the said receptacle a certain distance up or down, or from side to side, at the will of the operator. The opening from back to front of the aforesaid receptacle is to allow the light to pass through it, and the slide to throw the picture on the screen in the ordinary way. The opening from side to side of the receptacle is to allow the slide to pass through it. The aforesaid receptacle is large enough, externally, to fill up the whole of (what is termed) the opening or staging of the lantern, and can be inserted and withdrawn at will.

On the front of the said receptacle, at each side, I have thumbscrews, or their equivalents, for the purpose of securing and keeping the slide in its registered position. To prevent the receptacle from going too far when inserted into the lantern stage, I have a check on the top or bottom, which stops it when it is far enough in. When I wish to obtain a true registration with my improved apparatus, I first insert the aforesaid receptacle, which, being large enough to fill up the whole of the opening or staging, it cannot move either one way or the other. This is a decided advantage, and an entirely new idea, inasmuch as it entirely dispenses with wedges, thin slips of wood, &c., which have to be used with the present methods. Everything that has been hitherto introduced and used for the purpose of registration of pictures requires to be moved in the opening or staging aforesaid. In nearly all cases, wedges, thin strips of wood, and other troublesome things are used to obtain a registration, which is very seldom true. When I have inserted the receptacle as aforesaid, I then insert the slide, with the picture I wish to register, into the receptacle, and after I have moved it (in the receptacle) to its true position, with the picture on the screen, I secure it there with the aforesaid thumbscrews, or their equivalents. The receptacle, with the slide and picture, can now be withdrawn, and inserted as often as the exhibitor wishes, and a fresh and true registration obtained in the easiest, quickest, and most economical process possible, and can be put by, just as it is, ready for future use.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 14 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 15 ...	North London	Wellington Hall, Islington, N.
,, 16 ...	Bury	Temperance Hall.
,, 16 ...	Hyde	
,, 16 ...	Manchester Camera Club	Victoria Hotel.
,, 16 ...	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 16 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 17 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 3,—Mr. G. W. Atkins in the chair.

In the absence of the Hon. Secretary, Mr. Drage, a letter was read by Mr. Freshwater from the Photographic Society of Great Britain, inviting the Association to take part in the display of lantern slides during the forthcoming exhibition. Several catalogues, &c., bearing upon the subject for discussion, were received.

The subject for the evening was *Dark-room Appliances*, and Mr. W. E. DEBENHAM mentioned that people often found they had to give up photography on account of the unpleasantness of ruby light to work by. He referred to Mr. Chapman Jones's writings and Captain Abney's experiments in support of the superiority of yellow light for dark-room purposes, particularly when it became necessary to diminish the amount of light. With the two lights at first of the same power it was found that upon equally diminishing them a smaller unit of the yellow could be used than of the red.

Mr. T. E. FRESHWATER employed two thicknesses of canary medium, and found it quite safe. He was surprised that most lamps sold had ruby glass.

Mr. MACKIE considered that commercial lamps were much too small. He used candles in preference to gas or oil, and found two thicknesses of yellow fabric a pleasant light to work by. In collodio-bromide work he dispensed with one of the thicknesses. He referred to the dark room of the Photographic Society of Great Britain, which he considered most admirably arranged. The window is glazed with corrugated glass. Inside there was a sheet of comparatively pale orange glass, and several separate windows sliding across it having golden fabric, cherry fabric, red, and green, so that a variety of different lights could be obtained. Mr. Mackie then went on to refer to fixing baths, and thought one bath should hold several plates; a number of dishes came expensive.

Mr. DEBENHAM thought flat baths a mistake, and had seen many negatives that were spoilt through the use of them. He instanced the appearance of brown spots on some negatives, which he considered caused by the unequal action of the hypo. In a vertical bath he had never found them appear.

The CHAIRMAN inquired if any of the members had experience of rockers and celluloid dishes.

Mr. MACKIE humorously remarked that he found the first work beautifully, but only with an empty dish.

Mr. COWAN suggested a heavy pendulum would improve the oscillation.

Mr. DAVIES had been trying celluloid dishes; but, using a silver intensification process, he had found the white dishes stain badly, and also that, when drying a negative with alcohol in one of them, a strong odour of camphor arose.

A member pointed out that this was putting celluloid dishes to uncommon uses.

Mr. TEAPE said that he had used them for several years, and still used them for developing purposes.

As to sinks for developing purposes, Mr. MACKIE had had a wooden one in use for many years, which was simply waxed and resined. It answered capitally.

In reference to a recommendation of Mr. Haddon's to use sulphurous acid as a preservative of pyro, Mr. EVERITT asked whether Mr. Haddon did not get air bells upon the film when using such a preservative? He (Mr. Everitt) constantly got them. They did not appear when he used sulphite of soda.

Mr. HADDON had not had them, and could not see that sulphite of ammonium, which would be formed in the developer, would have the effect spoken of.

The arrangements for the Association's "outing to Greenwich" under the guidance of Mr. Haddon, were briefly discussed, and the meeting closed.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 1,—Mr. Coventon in the chair.

This being a technical evening, Mr. Bishop asked for a good test for hypo in prints or negatives, and Mr. Mackie drew attention to the starch test, and the Secretary to the plan recommended by Mr. Bothamley for removing hypo from the film, in which a well-washed negative is soaked in water, to every five ounces of which has been added about a dram of a twenty-volume solution of hydrogen peroxide. The plate is soaked for some time, then washed, and allowed to dry, with free exposure to the air. Alum, acidified with hydrochloric, or, better, citric acid, may be used in place of the peroxide.

A short discussion then took place on various developers. Mr. BISHOP gave the potash developer, which he used, and which was a modification of that originally issued by Mr. Platt.

I. SODA SOLUTION.

Carbonate of soda (ordinary, not bicarbonate)	16 drachms.
Sulphite of soda (crystals)	8 ,,
Water	8 ounces.

II. POTASH SOLUTION.

Carbonate of potash (ordinary)	16 drachms.
Sulphite of soda (crystals)	8 ,,
Water	8 ounces.

III. PYRO SOLUTION.

Pyro	80 grains.
Bromide of potassium	40 ,,
Sulphite of soda	20 ,,
Nitric acid	10 minims.
Water	5 ounces.

For ordinary exposure two parts diluted pyro and one part combined soda and potash (combined in equal volume), and apply direct to the plate. For rapid exposures the pyro and combined solution applied in equal parts.

Mr. PARFITT showed an enlargement on bromide paper, and gave Mr. Cowan's developer for bromide paper and negatives, viz., four grains of eikonogen, sixteen grains of sulphite of soda, two grains of carbonate of lithium to the ounce of water. Double the quantity for negatives. No clearing solution is used, wash under tap, and put into water. A quarter of a grain of bromide of potassium can be used if necessary.

A question having been asked about mountants, Mr. MACKIE said that the secret of making starch paste was to use as little water as possible, and to have it boiling.

Mr. FARMER asked if it made any difference in development whether bromide of potassium or bromide of ammonium was used in a developer.

Mr. MACKIE said that virtually it made little difference, but less bromide of ammonium was wanted than that of potassium, and a greener tinge was given to a lantern slide when using the former.

The Society has determined to support the affiliation scheme of the Photographic Society.

On Tuesday evening, September 15, Mr. Howson, of the Britannia Company, will give a demonstration on the *New Gelatino-chloride Paper.*

HOLBORN CAMERA CLUB.

SEPTEMBER 4,—Mr. E. H. Bayston presiding.

The subject for discussion was *Architecture (Exterior and Interior).*

Mr. FRED. BROCAS opened the discussion on Exterior Architecture, which he said might mean anything. It might mean a doorway, or a gateway, a house, or Westminster Abbey. It did not appear difficult, but there were certain lines to be observed, among the chief being "never get directly opposite the subject." He then showed various photographs demonstrating this axiom. Another was that the camera should be perfectly level. He also gave some excellent hints which experience had taught him during his life as a camera man.

Mr. GOLDING then gave the members present his experience in taking interiors, which he characterised as the most difficult branch of photography. One of the chief difficulties was the exposure, which would differ in every "interior" taken. Experience alone would enable one to gauge the right exposure. Slow and thickly coated plates were best. The plate must be backed, or halation would certainly be present in the resulting image. Backing does not do away with halation altogether, but it does certainly lessen the evil. A good backing was a piece of insensitive carbon tissue, preferably black, soaked in weak glycerine, and then squeegeed on the back of the plate. It could easily be stripped off before development and used over and over again. He thought it was a mistake to get the whole of the interior of a church on the plate. A mass of detail is lost in this way which is perhaps the most interesting of an interior. With regard to exposure, the rule is to expose for the shadows, and not to give too short. He had found Watkin's actinometer of some use to him in arriving at the right exposure. Another important matter was judicious and cautious development. He used pyro and ammonia, and commenced with the following:—Half a grain of pyro, one grain of bromide, and half a grain of ammonia to every ounce of developer. When the high lights begin to show, coax detail out with ammonia, then add pyro, and obtain sufficient density. He showed an excellent 12 × 10 interior, illustrating various points in his speech.

Some discussion followed.

Members are requested to turn up in force next Friday night.

A copy of Messrs. Davenport & Co.'s catalogue was laid on the table.

Next Friday, *Ilford Gelatino-chloride Paper*, by John Howson.

RICHMOND CAMERA CLUB.

SEPTEMBER 4,—Mr. Hunter presided.

Mr. Richardson showed an actinometer of his own devising for timing the printing of platinotype, carbon prints, &c.

The subject for discussion was *Testing Lenses.*

Mr. ARDASEER explained the mode of testing for faults in mounting and grinding, and for the colour of the glass, and for iridescence, bubbles, flare spots. "ghosts," spherical aberration, noncoincidence of visual and actinic foci, curvilinear distortion, astigmatism, flatness of field, and covering power.

Mr. CEMBRANO added some remarks on polish and striation, and the importance of accurately measuring the focal length of the lens and the apertures of the stops, and showed some plates which he had exposed to test covering power.

Other members took part in the discussion.

Outings took place on the 22nd ult. to Cobham, and on the 5th inst. to Pinner, both being favoured with fine weather.

LEWES PHOTOGRAPHIC SOCIETY.

SEPTEMBER 1.—Annual Meeting.—Mr. J. G. Braden in the chair.

Mr. BEDFORD (Hon. Secretary) read the annual report of the Council, which expressed pleasure at the continued prosperity of the Society, and went on to say that four new members had been elected during the year, and three had resigned, leaving forty on the books. Ten ordinary meetings had been held during the year, at which interesting papers were read and demonstrations given. The Council called attention to the quarterly competitions, which have been established to promote friendly competition and criticism of members' work, and which the Council also venture to think would tend to individual progress and improvement. The excursions, taking into consideration the unfavourable weather experienced during the season, had been very well attended. The exhibition of members' work, held on January 28, brought together a very interesting collection of photographs, &c., and was a success, although, owing to the weather, there was a financial deficit. It was hoped members would avail themselves of the opportunity of using the Society's lantern during the coming season; and, the bookcase having now been purchased, the Council hoped that a library might soon be formed, and would be glad to receive books or pamphlets from members or others towards its formation. The Treasurer's report was satisfactory, showing a balance in hand of 1*l.* 19*s.* 4½*d.*, notwithstanding a deficit of 3*l.* 9*s.* 9*d.* in connexion with the exhibition, and also several heavy items in the expenditure, which would not occur another year.

The report was unanimously adopted, the Chairman remarking that it was a very satisfactory document.

The election of officers was then proceeded with as follows:—*President:* Mr. J. G. Braden.—*Vice-President:* Mr. Tunks.—*Committee:* Messrs. W. B. Funnell, E. Miller, P. Morris, G. J. Wightman, and H. B. Constable, the last-named gentleman being appointed in the place of Mr. C. R. Wells, resigned.—*Hon. Secretary and Treasurer:* Mr. E. J. Bedford.

The set of hand-camera pictures by Mr. Percy Morris, which gained a silver medal at the Cardiff Photographic Exhibition, were on view in the room, and were much admired.

During the evening certificates were presented to Mr. W. Young for enlargements, and Mr. J. Tunks for lantern slides.

LEEDS PHOTOGRAPHIC SOCIETY.

SEPTEMBER 1,—Dr. Jacob in the chair.

The evening was devoted to an exhibition of negatives, prints, &c., taken during the holidays. Amongst the examples of work brought for exhibition, the following may be mentioned:—Mr. Robert Bownas, aristotype prints; Mr. T. Butterworth, a collection of 12×10 prints in silver and Obernetter paper; Mr. A. R. Dayson, hand-camera views; Mr. Herbert Denison, 7½×5 and hand-camera prints on Obernetter and platinotype; Mr. E. Kinsley, half and whole-plate Obernetter prints; Mr. A. A. Pearson, a large collection of hand-camera views of Whitby and neighbourhood; Mr. R. W. Savage, Obernetter and matt-surface prints; Mr. H. S. Walker, negatives of Derwentwater, &c.; Mr. S. A. Warburton, pictures mounted in optical contact with the glass. An agreeable evening was spent in discussing the various exhibits and processes involved.

On Monday evening, the 21st inst., Mr. G. H. Rodwell will give a demonstration of *Lantern-slide Making.*

HALIFAX PHOTOGRAPHIC CLUB.

SEPTEMBER 7,—Mr. Ed. J. Walker in the chair.

Mr. Thomas Illingworth (Vice-President) gave a "practical demonstration of the process of development" upon a series of plates, which had had different exposures, varying from 10, 15, 20, 25, 30, 40, 50, and 60 seconds. The resulting negative, in every case, was very good.

ROTHERHAM AMATEUR PHOTOGRAPHIC SOCIETY.

SEPTEMBER 1,—Mr. E. I. Hubbard (a Vice-President) in the chair.

Negatives and prints, resulting from the excursion to Roche Abbey on the 8th August, were exhibited and criticised.

The fourth excursion of the season was arranged, the place selected being Conisborough Castle.

Mr. JAMES LEADBEATER (Hon. Treasurer) gave a practical demonstration of the working of Eastman's bromide paper, producing three excellent prints, which were handed round for inspection. He referred to the artistic possibilities of the process, and to the convenience of manipulation, both these qualities making it especially suitable to the requirements of the amateur. A further advantage of bromide-paper printing was that the exposures could be made to gas or oil light.

A vote of thanks was passed to Mr. Leadbeater at the close.

Correspondence.

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

TONING BROMIDE PRINTS.

To the EDITOR.

SIR,—I notice in your issue of August 28 an article on bromide toning by Mr. Thomas Bedding, and venture to send you the result of some experiments lately made by me with bromide paper.

I find if developed with eikonogen, quinol, and sodium carbonate, they come up slowly, and of a yellowish brown colour, very fugitive in the hypo; but, if immersed in a sulphocyanide of gold and hypo bath, they as rapidly gain density, and finally a most beautiful deep blue-black tone, much more agreeable than the usual rusty bromide tone.

If, after fixing and washing, they are quite bleached out in cupric chloride (salt and bluestone), they may be redeveloped with quinol soda in daylight to a brick red, and then readily tone to a chocolate-purple or black in the sulphocyanide bath.

Prints that have nearly disappeared in very strong hypo, or prints lacking density, rapidly gather same in hypo which contains plenty of silver, to which is added excess of quinol soda developer.—I am, yours, &c.,

S. F. BLYTON.

P.S.—I have made a very fair matt-surface gaslight printing paper by sponging paper well with a ten per cent. potass bromide solution, drying, and floating in ruby light on a sixty-grain nitrate silver bath one minute. Requires long exposure, 120 seconds at two feet.

DISCOUNTS.

To the EDITOR.

SIR,—Referring to your paragraph in last week's JOURNAL on amateurs obtaining material on the same terms as professionals, I was speaking to

an amateur on the subject the other day, and was surprised to find that, in a large number of cases, amateurs obtain photographic materials very much *cheaper* than professionals. This gentleman told me he was able to get *one dozen* plates at the Civil Service Co-operative Stores at a price which was twelve and a half per cent. cheaper than I was able to get them through the dealer, although I ordered by the *gross*, the terms in both cases being cash. It is only fair to state the gentleman, on hearing this, very kindly offered to get any material, &c., I might want from the Stores, an offer which, of course, I gladly accepted. Surely dealers could offer their *professional* clients better terms by way of discount!—I am, yours, &c., PROFESSIONAL.

GOLD-PRINTED MOUNTS.

To the EDITOR.

SIR,—Your article in your issue of August 28 on gold-printed mounts is useful as pointing out to the profession what is a real danger to those who do not know the facts. We think you would have been safe in saying that all mounts which are printed in gold on back, and all mounts which have a printed gold rand round them, are unsafe, because they are printed in gold powder, and cannot be printed otherwise. It is, perhaps, theoretically possible to use a gold powder made of real gold, but we never heard of such a thing being done, and if it were done the price of the mounts printed with it would be considered prohibitive by the British professional. There are various gold powders in the market, which are guaranteed to be "practically untarnishable," or "absolutely safe with care," but any man who uses them runs a great risk, and even if the metal does not spoil the prints it soon tarnishes and becomes dull, so as to spoil the appearance of the mounts. From your article photographers would almost be led to believe that gold leaf cannot be economically imitated. This was the general opinion until recently, but other metal can be supplied which is quite equal in appearance to real gold when first used, and which costs about one-tenth of the price per one thousand leaves. This metal has been used, and is being used, not only in gold stamping, but also in gilding the edges of mounts. In some cases we have known it to be used mixed with real gold leaf, so that perhaps three sides of the mount would be real gold and the fourth imitation, or "mystery" gold. Any given edge or piece of stamping can easily be tested by the application of a drop of strong sulphuric acid. If the gold is real, it will be broken up by effervescence of some of the materials of the mount underneath it, but it will retain its colour. If it is imitation, it will at once change to a verdigris green. This imitation gold will tarnish very rapidly if exposed to the atmosphere, especially in rooms where gas is used, but it is perhaps well to point out that with long exposure to gas and miscellaneous fumes a tarnish will form even upon pure gold itself, so that edges or stamping must not be condemned for tarnishing unless the circumstances of their keeping are thoroughly known. –We are, yours, &c.,

September 7, 1891. PERCY LUND & Co.

MODERN AMATEUR WORK.

To the EDITOR.

SIR,—There are many types of the amateur photographer, but, with all the variations, there is one thing they seem to be born with and have in common, and that is a blind trust in Providence, plus the plate-makers, that any special pet view they take is bound to turn out all right. "Oh, that's all right, my boy." "Perfectly sure I gave it enough." "Bound to be right," &c. These phrases are common enough. And if, as is not unlikely, *it* is not all right, and leaves something to be desired or supplied by the spectator's imagination, who gets the blame? Amateur photographers being ordinary mortals, the tools, and not the operator.

From experience gained in developing some hundreds of negatives taken by amateurs, the writer is convinced that too often their knowledge of the action of light is as dark as the Chinaman's was on electricity. He remarked, on seeing an electric car in motion, "No pushee, no pullee, go like hellee!" But the Celestial's knowledge compares favourably with that of people who buy, and use for all purposes, and in all lights, the press-the-knob-and-we-do-the-rest class of machine, with the distant thought of the medal in the autumn, visions of which must and will arise in the brain of any one who has any ambition at all, be he amateur or professional.

There is one amateur not unknown to fame who, when out pot-shotting, packs his exposed plates all together in boxes in the most delightful confusion imaginable; so that, on returning to the dark room, to say which plate is which is out of the question till it is developed, and even then the remark "Where the dickens is *that* place?" is not infrequent. Yet, after all, it would not be so very troublesome for him to scratch the number of the plate on the backing when refilling the slides at night. But, no; the blind, trusting faith is too great to be bothered with such a petty detail as knowing which plate will be developed next. No doubt that this is an extreme case; but, if he, why not others? There seems little of the patient toiling nowadays, the prayerful work that made art noble in the days gone by, when every touch on a Madonna's face bore witness of a murmured "Ah!" the smile on the infant's cheek told a tale of devotion that is seldom seen in art now. Bougereau has some of the spirit sometimes, but paints as if he knew it; and our greatest painters—great as they undoubtedly are as painters—make art their slave, instead of being servant to it. As the amateur photographers are not on their level, their increasing self-assertiveness gives one much to think and wonder over. It may be thought that the writer is nothing if not pessimistical, but that is decidedly not the case. His ambition—almost his only one, as far as photography is concerned—is to see the art keeping pace with the science. Every day brings with it fresh facilities for the worker, opening out pathways that seemed impossible to travel over; and yet, excepting in the case of the few, hap-hazard chance is the master spirit.

Take the various society reports of summer outings. What is more common than the following, which might be an extract from any one of them: "The members then availed themselves of the favourable opportunity given them by taking numerous 'shots' at the magnificent ruin" (a landscape, or ruin, or village *pump*) "or whatever it may have been that their excursion had brought them to; and afterwards did ample justice to the excellent tea provided by the host of the 'Pig and Whistle?'" No doubt that the meal was excellent, as the "Pig and Whistle" generally knows its business. The one word "shots" expresses the general tendency to a nicety. Of course, if the amateur's idea is fresh air combined with a general leaning to messing about and vexing the soul of his wife or mother with pyro stains, all right; he is simply a private source of grief to his owners; but, when he gets to exhibiting, he becomes a public nuisance, and ought to be restrained; and that is a thing that might be easily accomplished by making it a rule at all exhibitions that all persons, excepting those whose names are a sufficient guarantee of excellence, shall, when applying for space, send at the same time a print of the subject they propose exhibiting, accompanied by stamps for return, the selection to be made by a hanging committee of men of recognised ability.

It is with no wish to force his own private views on the public that the writer makes this suggestion, and he would be only too glad if some one would suggest an easier, and therefore better, means of raising the standard of excellence at our ever-increasing exhibitions, and *keeping out the bad work*.—I am, yours, &c., GEORGE P. NEWMAN.

DEVELOPING COMPETITIONS.

To the EDITOR.

SIR,—I see, from the report of the Birmingham Photographic Society, that they have been holding a developing competition. I have read the particulars given—they are very few—with great interest. I hope the Birmingham professional photographer who did the exposing was pretty sure that his exposures *were* "under," "over," and "about right." It is a pity that the Society does not tell us how the forty-three competitors who didn't get prizes—what *was* the prize?—got on, and what sort of negatives they made. I am sure it would be most interesting. Did they all know which was the properly exposed plate, the over-exposed, and the under-exposed?

Mr. Thomason says he would like to have had the plates exposed out of doors. Why? Does not the light of a studio vary, as well as out of of doors? Mr. Middleton says it is impossible to expose forty-eight plates out of doors in a constant light. So it is in a studio. Why, where on earth is there a more inconstant thing *than* light, in a studio or out of a studio? People say, "Oh, in a studio you can tell the value of the light so well that you can always hit the correct exposure." Well, and so can a man who is always on outdoor work, can't he?

But, Sir, I suppose amateurs, as well as the rest of us, like a bit of fun at times, and these developing competitions of theirs must be amusing, as well as easy exercises in negative-making—that is, if they know which is "under," "over," or "about right beforehand." If they don't, it is better fun still. As for me, my business is a kind of developing competition without end—and no prizes. I suppose in the course of a year I get some thousands of plates to develop, and with most of them never a hint that I can rely on as to the subjects, exposure, and so on. There *must* be something on the plate—I was going to say even if the cap hadn't been off or the button hadn't been pressed—otherwise how should I get on for printing orders? These pay, and developing doesn't. The next time the Birmingham Society hold one of their little affairs I should like to send them a dozen or two exposed plates to operate on, and if their Secretary—but no, they have done me no injury so far, and so I'll say no more about it, except this, that, as an old reader of your paper, I'm glad to find a Society striking out a new path, and hope others will follow suit.—I am, yours, &c., A TRADE PHOTOGRAPHER.

Notting-hill, September 7, 1891.

PHOTOGRAPHY AT THE NAVAL EXHIBITION.

To the EDITOR.

SIR,—"A. H. B.'s" complaint on this subject is perhaps natural enough with the example of the French Exhibition before him. This, however, I take it, cannot fairly be expected to apply to the Naval. Is there not in the latter a great deal of Government property, the presence of which may account for the official reluctance to allow photographers to ply their art within the precincts of the Exhibition? If I am not

mistaken, you are not allowed to photograph in dockyards, arsenals, and other establishments of the kind, and I suppose the Naval is virtually on the same footing.—I am, yours, &c., A. W. DUPONT.

Streatham, September 8, 1891.

Exchange Column.

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

Wanted, good half-plate tripod (one fold and one slide); exchange, nickel-plated banjo. —Address, BERNARD, 101, Goldhawk-road, W.

Photographic News, over two years, unbound, in exchange for singing bird and cage.—Address, J. B., 4, Carlton-terrace, Westbourne Park, W.

Oval embossing press, for C.-D.-V. and cabinets, cost 25s; exchange for head-rest for either sitting or standing figure.—Address, J. W. C., 162, Carr-road, Sheffield.

Wanted to exchange, Optimus embossing press for C.-D.-V. and cabinets, for exterior background, 8×7.—Address, with photograph of background, T. COUPE, 40, Bank-top, Blackburn.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "*THE EDITOR,*" 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPH REGISTERED:—

John Stuart, Glasgow.—*Portrait of Professor A. B. Bruce, Glasgow.*

G. STRINGER.—You omitted your address.

P. Y. R. O.—See our reply to T. H. Holding in last week's JOURNAL.

CATFORD.—Any wide-angle non-distorting lens will do for the purpose.

W. S.—The formula inquired for will be found in the ALMANAC for the current year.

IN A FIX.—We should recommend you to try fixing by repeated applications of an *old* and moderately strong cyanide solution.

A. HEATH.—Your complaint is no longer tenable, as you will see elsewhere that, on account of the fall in platinum, Pizzighelli paper will, in future, be considerably lower in price.

C.—A solution of potassium cyanide, saturated with iodine, or a strong solution of red prussiate of potash, to which hyposulphite of sodium is added, applied with a brush, will remove all trace of the fixed image from a transparency.

NERO.—1. We are unable to give you the address of a maker who is willing to supply unmounted lenses. 2. Why not perforate a metal sheet yourself, using a needle point and, say, tinfoil? We cannot give you the firm's address who are producing perforated metallic sheets for pinhole photography.

MESSRS. C. EASTMENT & SONS write: "Will you oblige us with formula for making the blue (American style) toning bath? We have tried to get it from several of our local photographers, but none of them seem to have just what we want."—Perhaps some of our readers know which formula is meant.

SPOTTER.—By touching out the spots on the prints with water-colour mixed with albumen. They should not be disturbed in the burnishing, provided the prints are lubricated with Marseilles soap dissolved in alcohol. The alcohol, if not too strong, has a tendency to coagulate the albumen. See that the prints are sufficiently dry before they are burnished.

DETECTIVE.—The fault—want of sharpness—is not, as you surmise, due to the lens, but to the camera not being held still during the exposure. All the outlines are blurred, and clearly show the movement. When an exposure of seconds or minutes has to be given, use a stand. This applies also to an interior. If a proper camera stand is not at command, a pair of steps or a table may be extemporised.

C. J. T. writes: "I should be obliged if you would state (1), what caramel has been found by Mr. Debenham and Mr. Teape most successful for backing plates, and where it can be obtained; also, (2), what quantity of water, if more than just sufficient to dissolve the gelatine is desirable, should be used with one ounce of caramel."—Would Mr. Debenham or Mr. Teape kindly supply the required particulars?

W. BLAKE says where he lives he cannot get distilled water unless he obtains it from London, and the water from his well, when the nitrate of silver for the printing bath is dissolved in it, makes a milky solution. He asks if this can be remedied.—Yes, but only by distilling the water. However, this is not necessary, as the turbidity will do no harm if the solution be filtered, or allowed to clear itself by subsidence, and the clear portion decanted.

HANTS.—A good work on the early history of photography is the *Manual of Photography* by Robert Hunt. The work has been out of print for many years, but it may occasionally be met with on the bookstalls. All the processes about which you inquire are given in the book. Practically there is very little difference in the method of photographic engraving described by Talbot and that most generally used for intaglio work of the present time.

ADAMS.—1. We do not know where the transfer paintings in question can be obtained, unless they may be had from Mr. Chatham Pexton, 22, Gray's Inn-road, W.C. 2. We cannot say which is the best developer for lantern slides without knowing by what process they are to be made. There are so many methods of making lantern slides—wet collodion, collodio-bromide, gelatino-bromide and chloride, albumen, &c.—all of which, of course, require different developers.

C. RAY.—You are quite right, the albumen process is a very slow one, even when used for making lantern slides—that, is by working it in the ordinary method. Yet one of the quickest successful exposures ever given was made by this process something like forty years ago. At the Royal Institution the late Mr. Fox Talbot took a photograph of some printed matter fixed to a rapidly revolving wheel by the light emitted by the discharge of a Leyden battery, and the letters were perfectly distinct. How much more can be done at the present time?

H. W.—Our correspondent has several lenses, ranging in focus from twenty-two inches downwards. Desiring to copy a picture which, from his description, appears to be of no great size, he asks if the longest focus in his possession will not prove the best, especially as it covers an 18×15 landscape well. In reply: So far as we can diagnose the case, "H. W." does not seem to realise that in copying an object, such as his picture, its own size, the lens mentioned is no longer twenty-two inches in focus, but just twice these figures, or three feet eight inches. If his camera will extend so far, well and good; but we would recommend him to try a lens of, say, fifteen inches solar focus, which, when employed for copying a picture to its own size, will elongate the focus to thirty inches, quite long enough for the purpose indicated.

MR. F. W. HART has removed to 96, Stoke Newington-road, N.

SEVERAL correspondents who forwarded us Messrs. Austin & Eldy's circular are thanked and referred to the editorial pages. References to the matter have also appeared in the lay press.

PHOTOGRAPHIC CLUB.—September 16. Subject for discussion: *Reducing and Intensifying*. September 23, *Enlarging*. Saturday outing to Ockley; train leaves London Bridge at fifty minutes past twelve.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—September 17, *Demonstration of the Lantern Microscope* by Mr. T. E. Freshwater. September 24, Ordinary meeting. Visitors cordially invited.

FOLLOWING upon the reduction in price of metallic platinum, Mr. C. A. Rudowsky announces that the Pizzighelli paper of Dr. Adolf Hesekiel & Co., for which he is agent, will forthwith be reduced in price twenty-five per cent.

INTERNATIONAL PHOTOGRAPHIC EXHIBITION AT BRUSSELS.—From the list of awards to English exhibitors given in our issue of July 24, we omitted the name of Mr. Henry Flather, who receives a bronze medal for his series of "Dry Point" enlargements.

AS we are being frequently asked where collotypic reproductions of the same character as the admired Convention Group presented with the JOURNAL of July 31 may be obtained, we take this opportunity of mentioning that Mr. J. R. Gotz, of 19, Buckingham-street, Strand, is the London agent for Messrs. Thevoz & Co., the producers of the pictures, and that such inquiries should properly be addressed to him.

A WILY YOUTH.—"I'm to have my photograph taken to-day," she said. "Indeed?" he replied. "May I beg one when it is completed?" "Oh, I couldn't think of letting you have one." "Well," he said, resignedly, "I'm sorry." Then he added: "There is one thing the photographer won't need to do when he is taking your picture." "What is that?" "He won't need to tell you to look pleasant, for you always look pleasant." "Perhaps I may be able to spare you one," she said, after a pause.—*New York Press.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1612. Vol. XXXVIII.—MARCH 27, 1891.

PORTRAITURE BY COMMON GASLIGHT.

Starting with the truism that daylight is *par excellence* the best source of illumination for portraiture, and at the same time realising that artificial light, such as that obtained from electricity and magnesium, has also conduced to the production of unexceptionable results, we still recognise that there are circumstances under which neither of these can be utilised. Those who reside in the metropolis, or who have visited it during the months when fogs are prevalent, those especially whose livelihood depends upon the practice of portraiture, are at that time only too well aware of the unstable nature of that force upon which they must primarily rely for conducting their business. The amateur, too, is handicapped in his home efforts after portraiture, especially the one whose avocations necessitate his attention to business from a moderately early hour in the morning until the shades of evening render its practice difficult or impossible.

Of the various sources of artificial illuminants which are capable of being employed in portraiture with success, common house-gas has received the least attention, and yet, as we shall see, it is possible to be thus employed both successfully and economically. Indeed it is no new thing, for our volumes of some years back attest that Mr. Laws, of Newcastle-on-Tyne, among others, has made use of it for this purpose; but the way in which we are now to describe its employment differs in some important respects from any others of which we have been made aware, and is that which we were shown by Mr. John J. Atkinson, of Liverpool, during a recent visit to that western maritime metropolis.

A short distance in front of the camera is a partition, which, to suit the exigencies of the individual case, may be six, eight, or ten feet square, and in it is an aperture or proscenium through which the lens sees the sitter, who is seated at a distance of a few feet behind. Along the top of the proscenium, and, of course, on the side next to the sitter, runs a piece of gaspipe pierced at suitable intervals for the insertion of gas-burners. In the one we saw there were six, these being of the fishtail class, with a strip of curved tin running behind them to serve as a reflector to each. A similar gaspipe, also containing burners, indeed a continuation of the other, was carried down from the top in a slanting direction to the floor at one side of the sitter, the space between the proscenium and the sitter on the side opposite to this slanting row of jets being occupied by a white reflecting screen. The whole arrangement was such that the sitter sat in a small chamber under very strong illumination, with a dominant top and side light, and with no harsh shadows, on account of the diffusion of the primary light and the influence of the reflecting screen.

The only condition for working the camera is that it shall be placed so as to include the sitter properly on the plate that is to be employed, and that none of the lights which illuminate the side of the figure shall be allowed to fall upon the lens. As for the top lights, they cannot under any circumstances obtain access to the lens.

With such an arrangement as we have described, the time of exposure required with a portrait lens is ten seconds.

It will at once be apparent to the thoughtful reader that by employing gas-burners giving a greater illuminating force than those described, the duration of the exposure may be shortened to a very considerable extent. For example, by making use of an albo-carbon burner with even the poorest gas, its illuminating power will be increased much more than a hundred per cent. without entailing a greater expenditure of gas—a point which is important, because unless the supply of gas is obtained from a point near the mains, it is not every house in which the fittings will permit of the number of burners required for the purpose of portraiture being adequately supplied.

THE PERMANENCE OF DEVELOPED PRINTS.

Printing by development seems to be coming more and more into favour, we allude more particularly to bromide and chloride emulsion papers in which the image is brought out by a developing agent. The point to be considered in the present article is the probable permanence of these pictures, in which the image consists of silver alone, as compared with those made by printing out, and subsequently toning, when the image is composed of both silver and gold—or platinum, as the case may be. We are led on to this subject from being shown, a short time back, a number of pictures made by development on rough drawing paper more than a quarter of a century ago; to be precise, as memoranda on the back show, in March, 1864.

These pictures are evidently as brilliant and free from any kind of discolouration, or fading, as they were when first produced. This is not a little surprising under the circumstances, which are these:—The prints were the results of a series of experiments made to find a satisfactory formula for the preparation of drawing paper to give a good colour in enlargements by the electric light. Therefore, as the prints were only required for a passing object, it is, as the producer, Mr. E. W. Foxlee told us, highly improbable that any time or care was bestowed upon the washing. When done with they were cast aside and got stowed away and forgotten, with some old photographic lumber till recently unearthed. Some of the things that had been so long in their company had suffered consider-

ably from damp and mildew; but, notwithstanding all this, the prints show no sign of any deterioration whatever.

The date on the baek of the pietures enabled the produeer to look up the formula by which they were made. The papers were salted with a bromide, iodide, chloride, and eitrate in varying proportions, the bromide in all instanees largely predominating. They were sensitised on a strong solution of nitrate of silver, very slightly aeidified with aeetic aeid, by swabbing it over with a pledget of swansdown. The pictures were developed with a hot plain solution of gallie acid, also by swabbing, and fixed with hyposulphite of soda.

The stability of these pietures eannot, however, be quoted as indisputable evidence that modern developed prints will prove equally permanent, beeause the conditions under whieh they are made are widely different, and these we will indicate. In the present development emulsion papers, whether bromide or chloride, there is no free silver; consequently, the image is formed entirely of the metal reduced from the silver haloids alone; whereas the old papers contained a considerable amount of free nitrate, hence the image was not dependent upon the metal reduced from the haloids, but was formed by that redueed from the nitrate. Therefore, it will be seen that the modern emulsion prints can scarcely be considered as analogous to those just referred to. However, it is quite evident that the developed silver image does not require toning with either gold or platinum to render it permanent in the ordinary sense of the term.

It is now a tolerably well-recognised fact that ordinary silver prints made from strong negatives on highly salted and sensitised paper prove more permanent, all things being equal, than those made under opposite eonditions, simply on aceount of the greater amount of metal of whieh they are composed. In faet, the image formed under the former eonditions somewhat resembles a developed print as regards the quantity of silver it contains.

Let us next consider the question of developed emulsion prints, say on bromide paper. There is no question that there exists, in eertain quarters, a prejudiee against bromide pietures on the score of permanence, and there is no denying the faet that a eonsiderable number of them have shown a deeided change within a comparatively brief period, inasmuch as the lights have become yellow. But we have not yet seen an instanee of the aetual fading of the image. The yellowness in all eases that have eome under our notice has been elearly attributable to careless workmanship—for example, prints plaeed in the fixing bath while still in an aeid eondition—or to want of permaneney in the paper itself. Although the old developed prints contained free aeid after development, it was more perfeetly eliminated from them before fixing than is generally the case now; for if the gallie aeid was not washed out of the paper before fixing, the whites suffered, and in getting that out the free aeid was almost removed. Furthermore, as the surface of the paper had no coating, sueh as gelatine, this end was more readily attained.

If the stability of silver prints, whether by development or otherwise, is influenced by the amount of metal of whieh the image is eomposed, then should even some bromide prints, theoretieally, be better ealeulated to withstand the aetion of time and deleterious agents than others. For example, a print that has reeeived but a minimum of exposure, and is foreed in the development with a strong developer, eonsists of a larger proportion of reduced silver, particularly in the shadows, than one that has received the opposite treatment. While the development is prolonged, in order to obtain detail in the lights, reduetion is still going on in the other parts of the picture so long as any silver remains in the haloids. If a maximum exposure be given, so that the pieture comes out rapidly and the development has to be stopped quickly, the image will be more attenuated and superfieial than in the former case. With a very prolonged exposure and a weak developer it is possible to obtain bromide prints of quite a red tone, but then the image is very thin and contains but little silver.

It is, however, a question whether the most attenuated, developed image does not contain far more metal than a modern albumen print, to say nothing of the more favourable eondition in whieh it exists, and for that reason it should be more permanent. That the silver image, pure and simple, is to all intents and purposes permanent, the prints referred to at the beginning of this artiele, and the old calotype and wax paper negatives, amply testify.

EMULSION MAKING FOR AMATEURS.

It is not often of late years that we have been in a position to observe that anything of a novel kind in the shape of a paper or subjeet for discussion has been brought before a photographic society; indeed, we have occasionally felt it our duty to remark upon the excessively hackneyed nature of the topics chosen, with the idea of indueing the cultivation of more originality and enterprise among those whose task it becomes to arrange a society's syllabus. We are glad, therefore, to notice a recent departure from the beaten traek of "development," "platinotype printing," "art in relation to photography," and other venerable themes, although we are obliged to withhold the adjectival expression "new" therefrom. We refer to a demonstration given before the members of the Derby Society a few weeks baek upon *The Art of Emulsion Making*, by Mr. H. Pickering. The comparative antiquity of the subject does not diminish its novelty as a souree of discussion, inasmuch as writing offhand, it seems years, and maybe is, sinee it came under treatment at a photographic society's meeting.

Mr. Pickering, who is, we believe, an experienced ehemist, appears to have dealt with his subjeet in a practical manner, which we commend for imitation to all those who undertake to address a society upon this or kindred matters, for, as we are told, not only did he demonstrate the preparation of a sensitive gelatine emulsion, but he distributed some of the mixture made in the room among the members of the Society present, who, we hope, found it not inferior in quality to that upon whieh the "excellent lantern slides" exhibited were impressed. We also gather that he "advised amateurs to coat their own plates, on aceount of the additional interest and pleasure it would give, and on eeonomical grounds," and for these, as well as for several other reasons, we quite endorse the advice.

There was a time when a great many amateurs and professionals prepared their own gelatine plates, and if our readers will turn to our volumes for nine, eight, and seven years ago, they will come across plenty of evidence to support what may, to many photographic tyros, seem a curious statement to make. There were few so-called "secrets" about dry-plate making in those days; indeed, as an industry, it was by no means well-established, and very many of the most indefatigable experimenters of the period were amateurs who, in these columns, and at the few soeieties then existing, freely published their experiences, successes, and failures, and so enabled all to profit

by them. The case is entirely different now. No professionals, that we are aware of, and very few amateurs, prepare their own plates. We altogether miss at the exhibitions the once familiar inscription on the frames—"Plates: own make." The manufacture of dry plates is in the hands of a few firms, who jealously guard their methods of working from the public eye.

If it be asked of us, "Why advise photographers to make their own plates?" we reply as we replied years ago: Because they will then be independent of the makers in several respects. At present they are at their mercy in all. Some time since we named a few of the mechanical defects to which commercial gelatine plates are frequently liable, and we now suggest that a clever and careful amateur has it in his power to obviate such drawbacks. We have reached a juncture when circumstances are peculiarly favourable to those who may be tempted to prepare their own plates. Since the times we speak of, one of the chief constituents of an emulsion, the gelatine, has been produced by the makers with a degree of purity and excellence undreamed of ten years ago. Then, again, the conditions necessary for obtaining sensitiveness are better understood; the operations of emulsification, washing, and so forth, are improved and simplified. The fact that a properly prepared emulsion will keep for a long period in the state of jelly has been fully proved, while our knowledge as regards the exposure and development of the films has likewise advanced. Thus, to those of our readers who have never tried their hands at emulsion making, and who may be half inclined to do so, such facts as we have alleged, when contrasted with the uncertainties, difficulties, and ignorance of former days, should be highly encouraging.

The secret of success in gelatine emulsion making, either in large or small quantities, lies in the selection of suitable materials and their manipulation amid properly bestowed surroundings, as well as exactitude and care in the various operations, especially with regard to the regulation of the temperature at which they are conducted. There is no other "secret," for if ever a modern process has been thoroughly and exhaustively exposed, so that all who run may read, mark, and learn, that process is gelatine emulsion making. Given observance of the conditions above mentioned, an intelligent amateur could, after a few trials, make, say, twenty or thirty ounces of emulsion of the sensitiveness and quality sought for although it might puzzle him to repeat his success on the following day without materially varying the characteristics of the emulsion. This is one of the drawbacks of emulsion making on a large scale, namely, the mysterious difficulty in getting regularity of results, despite the most scrupulously minute attention to every single detail and the employment of haloid salts, nitrate, gelatine, water, &c., drawn from precisely the same sources as those of the preceding day. We are told that there are men who have been making emulsions ever since gelatine displaced collodion who still have their failures, which baffle them to explain or account for.

Let not this, however, appal the amateur meditating his first essay, for, as it has been said, there is all the difference in the world between making a few ounces of emulsion and as many gallons. As the preparation of slow plates is considerably easier than rapid ones, it is in this direction we suggest that the amateur's attention be turned. Lantern plates for exposure in contact, chloride plates for printing out, and slow landscape plates, are all within his compass. For the first and third named it would be an easy matter to select a formula giving about 12° according to the Warnerke method. We are not in the secret of the preparation of commercial lantern plates, but we are prepared to find that they very often consist of bromo-iodide films. However, eschewing practical details on the present occasion, we content ourselves by remarking that innumerable formulæ for all three kinds of plates, together with those of medium rapidity, are to be found in the back volumes of the JOURNAL and ALMANAC, of which, as well as what has been written in reference to the details of procedure by recognised authorities, we recommend a careful study. The mechanical appliances necessary are, as is well known, of a simple kind and readily accessible to most. Might not some of the societies in search of fresh attractions encourage their members to undertake, say, lantern emulsion making by instituting competitive contests?

Reference to the requisite appliances reminds us that at page 199 of our volume for 1885 Mr. William Brooks describes a simple contrivance which he had used himself for years, and which deserves the title of a portable emulsion maker. It consisted of a metal boiler fixed over a stove with an oil lamp, and holding a jar for mixing and heating purposes, while at the side of the boiler was fixed a glass bottle with a syphon for the silver solution. The whole thing has a very compact appearance, and might be easily imitated at a slight cost. Thus the amateur could always have his principal appliance handy for use at a moment's notice.

A NEW use has been discovered for pyrogallic acid by Herr Max Rosenfeld, namely, as a test for nitric acid. As the pyro is such a familiar chemical, and the photographer often requires to test the properties of the water he employs, a brief description of Herr Rosenfeld's plan will be interesting. It is especially applicable, he states, to spring water. A solution of one half to one per cent. of pyro is used. About three-quarters of a drachm of the water to be tested is put into a taper-shaped test-glass, and to it is added, as quickly as possible, twice the bulk of strong sulphuric acid and a drop of pyro solution. According to the amount of nitric acid present, the liquid takes at once, or slowly, a violet to dark-brown appearance. One milligramme per litre is readily detected. The varying depths of colour produced enable the estimation to be quantitatively made up to the proportion of fifteen milligrammes per litre. It is curious that the delicacy of the test is such that it will be interfered with if the interior of the test-glass be wiped with a linen or cotton cloth, since very small quantities of cellulose in contact with pyrogallic and sulphuric acid produce the colouration of pyrogallic acid.

IN a recent number of the *John Hopkins University Circular* an account of the valuable work done in the photographing of the spectra of all the known elements is given. To execute the important work of measuring the lines, a special measuring machine has been constructed with a screw to fit these photographs. The Rowland grating is, as our readers will remember, not a flat but a curved surface, hence the spectra are all normal and to the same scale. The engine measures the wave lengths direct, so that no multiplication is necessary, only a slight correction is required to get the figures correct to one-hundredth of a division of Angström. The greater part of the lines in the map of the solar spectrum have been identified, the substance producing them noted. Incidentally, the writer remarks that were the whole earth heated to the temperature of the sun, its spectrum would probably resemble that of the sun very closely.

FOR some time the theory of a common genesis of all the elements has been thought to be strengthened by the alleged dissociation in the sun's atmosphere of some of the usually accepted elements. Professor Rowland's photographs disturb the ingenious explanation, for

he says, "Altogether there seems to be very little evidence of breaking up of the elements in the sun as far as my experiments go."

At the meeting of the Microscopical Society on the 6th inst., photomicrographs were shown taken by a little camera attachable to the eyepiece of a microscope. Some years ago something of the sort was made in Dublin, and the idea has been improved upon by Mr. Walmsley, of Philadelphia. He makes the camera with a bellows body, fitting upon an adjustable pillar stand. This, of course, does away with most of the value of such an instrument, which, of course, consists in its want of value, if we may so express ourselves, that is, the cheapness and easy production. For many objects a square pasteboard envelope box, painted black inside, fitting on to the microscope tube by means of a hole cut out of the bottom, has answered the purpose of an elaborate camera. The ground glass is supported by corks glued to the inside of the box, and when it is replaced by the sensitive dry plate during the turning down of the light, the latter is kept from acting upon it by the simple expedient of putting the lid on the box, the light is then turned on for as long a period as is deemed necessary.

According to the statistics published by the Meteorological Office, the amount of sunshine recorded last month was unusually large. Considering what a great amount of fog there was, the statement will cause some surprise. The average amount of sunshine in the Channel Islands, for instance, in the mouth of February is eighty-nine hours, but last month there were 167 hours. Similarly, the south of Ireland, the extreme north of Scotland, the numbers of seventy-two and forty-six hours were increased to eighty and fifty-four, while in various parts of England the average increased from forty per cent. upwards

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A similar increase was shown in the Royal Botanical Society's Gardens during last year compared with its predecessor. The latter half of the year almost entirely accounted for an increase of 149 hours. Considerable ignorance seems to prevail as to the actual amount of sunshine in a year. Taking Mr. Lecky's district, the total possible amount of sunshine in a year is 4455 hours, the actual amount was 1092 hours. There was no sunshine at all in December, as most photographers know to their loss. The East End would appear to be the best for photographing, for places situated, as the Gardens are, in the north-west get most of their sun in the afternoon, owing to the difficulty the sun has in piercing the smoke and mists from the eastern districts as it rises.

PYROXYLINE OR PAPYROXYLINE FOR LANTERN EMULSION.

The greatest trouble experienced by those who at the present day adhere to the use of collodion emulsion for lantern slides lies in securing a pyroxyline suitable for the purpose. The difficulty is all the greater now than it was formerly, because the demand for photographic pyroxyline being so greatly reduced, the supply has declined proportionately, and comparatively few manufacturers now give adequate attention to the production of a good and uniform article.

In the days of wet collodion, when cotton for photographic purposes was an important article of commerce, there was some inducement to devote a considerable amount of care to the particular requirements of photographers; and if every sample of collodion made was not perfectly adapted to emulsion work, it was easy, with the same amount of care and slightly altered conditions, to turn out the correct article. But now, beyond the few old-established collodion firms who still continue in the trade, it seems to me that none of the manufacturers pay any attention at all to photographic requirements, and so long as the product will explode, or at least inflame, it is good enough to sell as pyroxyline for any purpose. Certain it is that it is far more difficult to procure the proper kind of cotton even for wet-plate purposes than it used to be, unless from the recognised photographic makers of the article, whereas a few years back most of the leading manufacturers of, or dealers in, general chemicals supplied reliable preparations even for the most particular emulsion work.

Where collodion emulsion must be used, it becomes, therefore, almost a necessity to prepare the pyroxyline specially for the purpose, and it is here that the amateur manufacturer is at a palpable disadvantage as compared with the commercial manufacturer. In many processes the worker on a small scale may consider that he is peculiarly able, by the devotion of extra care to his work, to compete with the large maker in the quality of his product; but this can scarcely be alleged of pyroxyline making. Depending as it does so intimately upon the maintenance of a fixed strength of acids and of an exact and unvarying temperature, it will be readily understood that the difficulty in securing these conditions is vastly greater when minute quantities are manipulated than when they are considerably greater. The large maker buys his acids in quantity and of uniform strength, where the amateur, who handles but a few ounces at a time, finds that every different batch varies more or less in strength, if indeed he take the trouble to investigate that important point. Then, again, there will be a far greater fall in the temperature of, say, ten ounces of mixed acids during an immersion of ten minutes than if the volume is twenty times greater, when, of course, the heat is retained for a longer period. And, finally, the absence of proper appliances for manipulating the cotton introduces further chances of uncertainty, and renders the process as generally unprofitable as it is undoubtedly unpleasant.

I have had some experience both in the purchase and manufacture of pyroxyline in comparatively large as well as small quantities, and I do not hesitate to say that looking at it from whatever way you will it is an unsatisfactory subject. But I am constantly being applied to for advice on various points of detail, and find it practically impossible to enter sufficiently minutely into particulars in each individual case, so take the opportunity of treating the subject generally in the pages of the Journal.

I have omitted to say that for the particular purpose under discussion—emulsion for transparencies—there is an additional difficulty which does not prevail, at any rate with the same force, when the product is required for negative work—I allude to the difficulty of securing perfect transparency and freedom from "structure" in the dried film. Some of the most suitable samples of guncotton, so far as photographic properties are concerned, will be found on close examination to dry with a faintly opalescent or "ground-glass" appearance, which, though scarcely visible, certainly not injurious in a negative, spoil the transparency. In fact, in the case of papyroxyline, I have had some of the richest and most beautifully graded images, with any amount of capacity for intensification, produced upon film that dried as opaque as the paper I am writing on. Much of the "structure" or opacity disappear on varnishing, but then it should be borne in mind that most transparency makers object to varnishing their slides.

This fault forms a very general complaint, if not the most prominent one, when an otherwise suitable pyroxyline is found, that is to say, a sample that is free from structure or horniness, develops and takes density readily, and gives good colour and gradation. In proportion as the transparency of the film increases, so, unfortunately, in too many cases does the tendency to crapy marking and thin, slaty images. If, then, the only fault in the collodion be a slight opalescence, I should in all cases advise the making "a virtue of necessity" by varnishing the slide with a suitable varnish as being the easiest way out of the pyroxyline difficulty.

After all, the prejudice against varnishing is to my mind based on a fallacy, an erroneous idea that the sharpness of the details is thereby lowered. Ordinary negative varnish that is calculated to stand the strain of hard printing must naturally possess some body, and such a preparation not infrequently is apt to "run thick," and more often still to exhibit the details of the picture in considerable relief when dry. Under such circumstances it is not impossible that the more delicate lines of the picture may lose a portion of their fineness when projected on the screen, but it is by no means necessary that it should be so, for by employing a thinner varnish neither the unevenness nor the relief will be produced, and while the transparency of the picture is promoted its safety is secured by the protection of the covering glass.

This opalescence or want of transparency is more prominently noticeable in the so-called "high temperature" cottons which are

sually supposed to be essential to the production of the best class of esult. So far is this from being the case, I have known some of the est and quickest emulsions to be made from pyroxyline produced t a temperature not higher than 130° Fahr., and papyroxyline under 00°. Let the cotton be judged on its merits, then, without reference o any fancy names.

Such samples as exhibit opalescence will usually be found to possess therwise great freedom from structure and crapiness, and to flow moothly on to the plate; but they are more prone to unevenness in evelopment, and are also especially tender, and require very careful anipulation. Contrary to the once generally accepted idea, the temperature" and "powderiness" of the cotton have little or othing to do with its capacity for intensification, as they as frequently produce thin images as dense ones. The character of the eposit, too, in the case of "high temperature" or powdery cotton is uite different from that formed with tougher kind; for in the former ase, irrespective of density, the silver is reduced in a dusty, opaque orm, while in the latter it is of a more homogeneous and transparent ature. As a matter of course this is the better kind of image, since t not only lends itself to the more delicate rendering of the gradation f the picture, but helps the production of variety of tone.

If we turn to the reverse kind of pyroxyline—call it "low temperature," or "horny," or what you will—as many variations will be discoverable in its working. So far as physical properties are concerned, t is perfectly easy to distinguish between the two kinds of cotton, the irst being dusty and short in staple, and usually possesses more or ess yellowness of tint, while the other is clean, white, and long in taple, differing only from the raw or "unnitrated" cotton in its ougher or harsher feel. The chemical qualities, however, are only liscoverable by actual trial, and are, as I have said, as varied as in igh temperature cotton.

As a general, though not invariable rule, the cleaner or freer from powderiness the tougher will be the film and the less fluent the collodion, while the more pronounced will be the structure, though these qualities will vary to some extent with the strength and proportions of the solvents. The thicker and tougher the film the thinner and more delicate will be the image produced, but this again is not an infallible test, for it is often found that by greatly reducing the proportion of cotton in the collodion it becomes sufficiently fluid to spread without structure, still retains its power of suspending the silver bromide, while it is porous enough to permit the developer to get at the sensitive material. The cause of the want of intensifying power with horny collodion is to be mainly traced to its impermeability, it being, in fact, practically waterproof, and so the developer fails to act properly.

It very often happens that one of these low temperature samples will answer admirably if properly used; indeed, if the capacity for density be there, it is seldom impossible to get over the physical difficulties by reducing the quantity of cotton and varying the proportions of solvents. The thicker and more viscous the collodion, the greater is its suspending power, that is, the power of preventing the precipitation of the silver bromide in a granular or flocculent form. This remark applies at least to the first formation of the emulsion in its unwashed state, but it frequently turns out that the very opposite result is produced in a washed emulsion, as a considerable proportion of the more viscous constituents disappear in the process of washing.

Such cottons, when kept in solution, gradually lose more or less of their viscidity, and become in time perfectly fluid and structureless, specially if kept in the bromised state. If the only fault at the outset be the presence of structure, that is to say, if on trial an emulsion is formed capable of giving a good strong image, then it is tolerably certain that if the collodion be allowed to "ripen" for a few weeks it will be quite usable; in many cases, even when the image at first produced is thin, especially if it be of good colour, the collodion is susceptible of improvement by keeping, but if the image be thin and "slaty" and granular instead of transparent, it may be put on one side as useless, and that sample of cotton may be reserved for the 5th of November.

Short of making one's own cotton, and making it properly to begin with, there is no better plan to adopt than to get a tolerably good sample of "low temperature" cotton, and to dissolve and bromise it; then set it aside for a few weeks or months and it will go on improving.

It is an easy matter to make twenty or forty ounces of collodion, and that quantity represents a vast number of lantern slides.

W. B. Bolton.

COPYING BOOK ILLUSTRATIONS AND OTHER SIMILAR SUBJECTS BY MEANS OF ARTIFICIAL LIGHT.

VII.

When it is desired to produce lantern slides from negatives of book or other illustrations by means of the now popular lantern plate, the pictures or objects are best copied on plates of a similar size as the resulting transparency is to be by means of contact printing, and precisely the same points as I have specially dwelt on in my previous articles when dealing anent the production of negatives must be observed when making such negatives for contact printing. With most workers contact printing is deemed so easy that it is looked upon as child's play. I have long ago, however, come to the conclusion that but very few of the new school of workers really know how to properly set about the contact printing of lantern slides. The mere placing of a sensitive plate in contact with a negative and giving it a flash exposure to a gas jet is, doubtless, the commonly accepted form of all that is needed to produce a lantern slide by contact; but this becomes a very uncertain and unsatisfactory method of going to work when a worker comes to know the more certain and sure method of setting about the operation.

The exposure of a plate to a naked gas jet in itself is by no means the best way of making the exposure: first of all, no two exposures are made alike, or at least it is very difficult to do so owing to the uncertainty of holding the plate on all occasions at exactly the same distance from the flame. In preference to a naked gas flame for this purpose is the use of a paraffin lamp having two protecting glasses, the inner one of ground glass, which may be a fixed screen, and an outer folding screen of ruby glass. When such a lamp is easily manipulated from the outside in the matter of raising or lowering the lights, it stands out far in advance of a common gas jet for contact printing. Such a lamp is best placed in a fixed position in the dark room; and at distances varying from three or four inches to a foot are placed on the table or bench in front of the lamp square on to its face guiding bars to so place the printing frame with negative against, by this means the picture is always held square on to the source of light; then again it will be found in practice that according to the density or colour of the negative so should the lamp be adjusted as regards a strong or weak light to print the same. How many workers I wonder ever give a thought to this matter? Thin or dense, it is all the same to them—up goes the gas jet, the negative carrying the sensitive plate is held at arm's length in front of it, and they trust to luck for a fair exposure. Then, again, how few workers fully realise the fact of the light striking in through the sides of the glass and fogging the plate for a considerable distance round the edges of the picture? In olden times it was recommended to edge the glass with black varnish to prevent this—a very good and safe preventative truly, but I find a much simpler plan is to make a printing shield by cutting a square aperture about a sixteenth of an inch less than $3\frac{1}{4} \times 3\frac{1}{4}$ out of a piece of opaque paper; this shield is then gummed down on to a sheet of glass 5×4 inches, and when the negative and sensitive plate are placed just right in their place on the shield, there no light can possibly enter at the edges and cause fog. With such a simple little printing contrivance almost perfect results are obtained. An intelligent worker must study to give a correct exposure in contact printing, and this exposure must dovetail with the particular form of developer he is accustomed to work. I prefer long exposures, sometimes they run into minutes instead of seconds as some would give to a gas flame; but then I make the amount of light suit the density of my negatives.

When dealing with the production of lantern slides from book illustrations, it has occurred to me that were I to relate a very neat and simple way in which a particular class of illustrations may be readily produced by a mere tracing operation it might tend to cause some beginners to practise this neat way of turning out a hand-made slide.

In my practice I always keep a stock of gelatinised glasses ready for my collodion work, and I find that with such I can trace over and make excellent productions by using a fine etching pen and ticketing ink. If any of my readers should have difficulty in procuring this kind of ink they can make a very good substitute by dissolving a piece of lump sugar in ordinary writing ink. When doing this

tracing operation the main thing is to get the ink to take kindly to the glass. If a worker will prepare a very weak solution of gelatine and flood the face of the glass plate, and then carefully dry the same free from dust, he will find he can write or sketch with the greatest of ease on its surface, and this being so it becomes a very easy matter to copy some rough sketches by hand, which, when projected on the screen in the shape of a lantern slide, will give unbounded satisfaction.

T. N. ARMSTRONG.

SURFACE EFFECT.—IN TWO CHAPTERS.

CHAPTER II.

Now as to the effect of different degrees of rough surface. The first removal from smoothness is the ordinary matt-surface paper, which is identical with that used for albumenising. Practically, it is a smooth paper, and it is only by contrasting it with the highly glazed albumen surface that it can be classed with rough papers at all. The matt surface allows a much *nearer* approach to engraving effect than is possible with albumen paper; *identical* effect is out of the question, for the reason that in an engraving we have *two distinct qualities of surface*—one where the ink lies, and the other the unaltered surface on which it is impressed; this gives a velvety richness quite distinct from any photographic imitation, which necessarily has a uniform character over the whole image and support. The next paper available is drawing paper of various degrees of roughness, which is slowly coming into the market prepared for photographic purposes. Photographers up to recently, if they wanted anything besides the well-known Rive and Saxe paper, had to prepare it themselves, and overcome the trouble of unequal absorption as best they could, always a matter of the greatest difficulty with all papers, except those named and prepared especially for photographic processes. This difficulty overcome, the rest is tolerably plain sailing, and I think drawing papers in the near future will become very popular, more especially for large-sized photographic *pictures*, there being no doubt that when a suitable negative is used very taking and satisfactory results are obtained.

The idea of imitating an engraving should be discarded in general *pictorial* work, because it is not a sufficiently high standard to work up to, being at best the rendering of some painting into black and white, with a certain amount of mannerism and conventionalism introduced; and I cannot see why engraving quality ever should be thought so superlatively good *from a picture-making* point of view. Unless it is for the actual copying of an engraving, which belongs to quite a different phase of the art, and is quite incompatible with the use of coarse surfaces, we had much better take monochrome drawings by our leading artists, and try to the best of our ability to emulate their treatment and effect. By so doing we have a better chance of success all round, and more scope for individuality. Photographs and photographic pictures are so very opposite in their character and intention, that it is impossible to judge them by the same rules without doing injustice to one or the other.

Since the impetus given to plain paper printing by certain pictures in the last exhibition of the Photographic Society of Great Britain, a few remarks on the treatment of such papers may not be out of place.

In treating any kind of non-albumenised paper, we must remember we are working under entirely different conditions than those requiring attention in dealing with an albumen surface, and if we hope to secure satisfactory results, must of necessity conform to them. The kind of paper is an initial matter for consideration. If Rive or Saxe, as made specially for photographic purposes, is used, the departure from the ordinary routine will be of the least, but when other papers, drawing cartridges, for instance, are brought into use, many precautions heretofore unnecessary have to be taken. The thicker the paper the more care is to be exercised, notably, by reason of its unequal absorption of the solutions applied to sensitise and tone. In the preparation of all papers, the dominant idea is to keep the image on the surface. Now in any plain paper there is a great tendency to a sunk-in effect, unless means have been taken to render it less absorbent than it is in its original condition. The softer the paper, the greater the absorption, and consequently more troublesome to deal with, and more wasteful in the matter of materials. Floating for a short time produces a very unequally sensitised surface; to overcome this, a preliminary treatment with a spirituous solution of colourless resin is sometimes used and the floating prolonged. If this operation has been improperly performed, the surface will, on exposure to the light, become covered with spots or patches of different tints instead of being uniformly even. It has been found preferable in salting the paper to immerse it wholly in the solution instead of floating it as in sensitising, and also to combine a small proportion of an organic salt with the chloride, and impart a slight viscidity with gelatine. The advantage of so doing is the improved colour and brilliancy in the print, and the avoidance of the cold, slaty tone that has done so much to prejudice the popularity of plain paper work.

The exposure to the light must be continued until the image is much more deeply printed than with albumen papers, as it will be found to lose considerably in toning and fixing. A weak toning bath is best, on account of the greater uniformity of its action, and being better under control. The fixing bath should be somewhat weaker than ordinarily used, and the prints kept in it rather longer. An important matter often overlooked is the temperature of the solution, which should be kept as nearly as possible between seventy and seventy-five Fahrenheit, greater heat leads to trouble in a variety of ways, besides making the paper soft and difficult to handle without damage.

Whatman's drawing papers are about the best of the rough surface varieties, being fairly tough and even. Some of this paper has been recently introduced to the notice of photographers by Mr. Rudowsky, and is an admirable example of what a rough-sensitised surface should be. The preparation of it is a secret, but the results upon it are surprisingly good, almost any colour from a cool grey to a rich sepia is readily obtained. Bistre-coloured prints, closely resembling the numerous etchings we see exhibited, are obtained with facility; the unusually rough surface giving a velvety-like effect utterly absent in the smoother kinds.

As to the permanency of such prints, there is no reason to suppose they will differ from other properly prepared plain paper prints toned in a similar manner, and as all require somewhat stronger negatives to get the best effect, the image is more deeply impressed, and consequently more likely to withstand the effect of time; and it is universally acknowledged that prints from strong negatives are more permanent than those from thin ones. With all papers ready sensitised (and I suppose Rudowsky's is not superior to this condition), it is imperative that they are kept dry and in the dark. The total exclusion of air and moisture is absolutely necessary to keep them for any length of time in proper working condition. If they do not discolour, there will be difficulties arise in the toning that proper storage would obviate. Rough-surfaced papers lend themselves admirably to artistic work, and I think before long will be very generally used, especially for large work, as *nothing* will give a similar effect to that produced by the grain of the paper itself. To sum up, it must be borne in mind that in the treatment of all plain paper rough or smooth, to print deeply, tone lightly, and fix and wash thoroughly.

EDWARD DUNMORE.

NEGATIVE MAKING.*

EXPOSURE.—One of the greatest difficulties in producing a negative is determining the correct exposure, especially if the work varies much in character and conditions of lighting. This is not surprising considering the different and ever-changing factors that have to combine to produce the result.

1. The subject and its capability of reflecting *actinic* light.
2. The quality of the light, varying with the time of day, season of the year, and the state of the atmosphere.
3. The rapidity of the lens, regulated entirely by its working aperture.
4. The rapidity of the plate; and
5. The character of the result required, this being too frequently overlooked in estimating the exposure.

Many attempts have been made for the benefit of those commencing photography to approximately tabulate these factors, one of the first being Mr. W. K. Burton, who published a simple and admirable table of comparative exposures. Others following him have gone very much too far spending a considerable amount of time in compiling most elaborate tables that could have no other effect than making the user a mere machine who when about to expose would simply refer to a book which would tell him, rightly or wrongly, most frequently the latter, to give so many seconds. Against such tables I cannot speak too strongly, the exposures necessary for varying subjects and conditions can only be learned by experience, the most that can be taught is the general principles governing exposure and the approximate relative times that different subjects would require under favourable conditions. There is no teaching so valuable as the experience gained by careful observation and due consideration of the conditions of each exposure made, though a simple table is a very great assistance while gaining that experience, and as a basis on which the conclusions and judgment are formed. All teaching and training must have some system or basis, and those who protest against a beginner employing

* Continued from page 186.

y table or similar assistance whatever, are, I think, fully as illogical as ose who, going to the opposite extreme, would place in the hands of ery amateur, tables or mechanical aids intended to supersede the use of dgment or even common sense. Without assistance, tabulated or herwise, no one commencing the practice of photography could possibly rm any idea of the radically different exposures required by varying bjects and conditions, or even of the approximate exposure for any one bject; and the hopeless errors and number of plates spoiled in gaining perience would be terrible to contemplate, and sufficient to disgust many enthusiastic beginner, but even a worse alternative would be depending tirely on books of tables for all exposures; experience would never be ined, judgment never formed.

The following is a short list of comparative exposures compiled from y own work, which I consider a sufficient guide or basis for working. ney are for plates of the rapidity of Ilford Rapid (white label), and *f*-16 op, and best spring or early summer light:—

Sea and sky: instantaneous exposures at sea..... $\frac{1}{40}$ sec.
Open landscapes: very flat subjects, no objects near camera ..... $\frac{1}{16}$,,
Landscapes with objects in foreground but no deep shadows ..... $\frac{1}{8}$,,
Landscapes with trees in foreground..... $\frac{1}{4}$ to $\frac{1}{2}$,,
Under trees ..... 5 to 10 secs.
Interiors, well lighted ..... 10 to 30 ,,
Interiors, badly lighted..... up to 5 mins or more.
Portraits and groups outdoor, according to surroundings..... $\frac{1}{2}$ to 1 sec.

Such a table can only be very approximate; it is difficult to convey a fficiently definite idea of the character of the view intended. In photoaphy, as in all artistic work, every one who would succeed must learn think for himself.

In estimating the exposure for general landscape subjects, the most imortant points to consider are—the intensity of the deepest shadows, the mount of detail in those shadows that we wish to secure in our picture, eir distance from the camera, and, if near, the colour of the object—the arker and nearer, the longer the exposure. Foliage, from its non-actinic lour, will require a longer exposure than any other object at equal disnce, and the surrounding objects may sometimes modify the amount of ght reflected from parts of the picture. The character of the negative quired must not be overlooked, as this is a factor in determining the posure. If a vigorous result is required from a very flat view, especially the principal shadows are a moderate distance from the camera, the ortest exposure that will give the necessary detail should be given. On e other hand, from subjects possessing good contrast of light and shadow, soft negative, full of detail both in high lights and shadows, can only be tained from a full exposure. At the same time, softness and delicacy gradation are not inconsistent with brilliancy, and there need be no ar of loss of vigour unless the exposure be excessive. The result of a ry prolonged exposure is a very flat, grey effect, which may be useful in very few cases only.

Variation of Light.—The exposures given are for the best spring or rly summer light and fine weather. While it is hardly necessary to ll attention to the fact that towards evening, and as winter approaches, posures must be prolonged, many do not allow sufficiently for this ference, or are not aware how great it is. Sunshine, even on a clear y, has not always the same value; as the sun approaches the horizon rays lose much of their actinic value, considerably more than their parent brightness would indicate, and exposures must be proportionately ngthened.

As it is difficult to estimate the variation, the following table, compiled Dr. J. A. Scott, will be a great assistance.

Hour of day. A.M.	P.M.	June.	May. July.	April. August.	March. Sept.	Feb. Oct.	Jan. Nov.	Dec.
12		1	1	1¼	1½	2	3½	4
11	1	1	1	1¼	1½	2½	4	5
10	2	1	1	1¼	1¾	3	5	6
9	3	1	1¼	1½	2	4	12	16
8	4	1½	1½	2	3	10		
7	5	2	2½	3	6			
6	6	2½	3	6				
5	7	5	6					
4	8	12						

The exposure in June being taken as a unit, the figures show the proportionate amounts for different times of the day and year. While I recommend the use of this table when convenient, a fair idea of the general variation should be formed so as to be able to judge the actinic value of the light independently of any table. These figures being for the best condition of the atmosphere, if the weather be at all hazy or dull, two, three, or even four times the exposure otherwise necessary must be given according to circumstances.

Rapidity of Lens.—There is one factor in estimating exposures that is purely mathematical, and can consequently be accurately reduced to figures, that is the rapidity of the lens, depending entirely on the aperture of the diaphragm. Since the exposure required is directly proportional to the amount of light reaching the plate, it follows that it is in inverse ratio to the area of the stop, the areas varying as the squares of the diameters, so that with a given lens four times the exposure is necessary with a stop half an inch in diameter that one an inch in diameter would require.

All exposures that I have given are for *f*-16, as this seems to me to be the most convenient standard unit for general work, far more so than *f*-4, the unit of the Photographic Society of Great Britain. Estimating landscape or interior exposures for *f*-4 would be an absurdity, in addition to the difficulty of multiplying mentally by the very large figures that would represent the relative values of the other stops; but if *f*-16 is taken as a basis, exposures can always be readily determined for that standard, as this is a practical size for most classes of work, and as the stops used for all except portrait work in the studio vary from *f*-8 to *f*-64, their relative values can easily be used as multipliers, a good plan being to mark the stop itself with a number by which the exposure for *f*-16 has to be multiplied to give the corresponding exposure for that particular stop, so that the proportionate value is seen when inserting the stop. The simplest method for obtaining this figure is to divide the aperture (expressed in fractions of the focus) by 16, the square of this result being the multiplier. For example, *f*-32; 32 divided by 16 is 2, 2 squared gives 4, and *f*-32 will require four times the exposure that would be correct with *f*-16.

Development.—This is by far the most important operation in the production of a negative. By skilful development errors in exposure can frequently be rectified. Strictly speaking, under or over-exposure are only relative terms, we expose our plates to suit our means of developing and the result that we require—to obtain by developing with our usual reagents a negative of suitable gradation and density to produce the intended effect in our method of printing. Judgment in exposure will frequently err, even with the experienced, and one method of development will not suit all subjects, especially with those whose aim is artistic work. The value of a perfect knowledge of the methods of handling a developer, therefore, can hardly be over-estimated.

Considerable attention has recently been given to a series of experiments by Messrs. Hurter and Driffield, by which they have sought to prove that given an exposed plate, and let it be developed to a certain density in its high lights and a certain amount of detail, then only one result is possible, that the relative values of the half tones are definitely settled by the proportionate exposure each part has received, and that to alter the *relative* densities of these intermediate tones by varying the development is an impossibility; that given a number of identica exposures the scale of tones must be the same in each, no matter how developed.

The position taken by Messrs. Hurter and Driffield seems thoroughly untenable. A few careful experiments in ordinary work would prove that it is radically wrong. It is th is power of altering relative values by skilful development, even so far as changing the whole character of the negative, that places such an immense power in the hands of an artist and gives development its importance in photography. After a plate is exposed, it has great capabilities before it, but what it may become finally depends entirely on *how* and by *whom* it is developed.

So much prominence has been given to these experiments and conclusions of Messrs. Hurter and Driffield by Dr. Emerson in his *Renunciation* and published correspondence relating to it, by his contending so strongly in consequence, that photography does *not* possess the power of artistically treating a subject by modifying or controlling the effects of light and shade, that it is especially necessary in speaking of development to refute them as strongly as possible. Dr. Emerson says: "The limitations of photography are all I have said, I regret it. I have been in correspondence with those able investigators, Hurter and Driffield, ... and understand the matterthoroughly. I have confused nothing, the *control of the values* is most limited, and *by development there is no control*" (The British Journal of Photography, February 20th, 1891, page 200).

In taking up a position so diametrically opposite to this, I am not relying solely on my own work, but equally in this as in all other matters

on which I place my conclusions before you, I never give the results of the work of others, unless I have, by repeating their experiments under ordinary conditions of working, obtained the same results as they. If there were no control over the *character* of the negative (and I use the term "character" quite independently of its density or thinness), then development would become purely a mechanical operation. It would lose all its fascination and all its importance. A ready-made developer, "equal quantities of each" of two unknown solutions, would equal the careful work of the most skilful. In support of my views I will quote from a leading article in The British Journal of Photography, February 13th, page 98: "It has been before now abundantly proved that in the choice and proportions of the ingredients of a developer, a skilful operator may provide himself with means which will give him a mastery over the character of his resultant negatives, perhaps equalling that with which his own intelligence supplies him, and answering to his will because of the control which his intimate knowledge of it gives him."

A paper of this kind, however, is nothing if not practical. It is useless to talk of controlling or altering "values" if methods are not given, so I will now ask your attention to the *practical* consideration of development, and the means of obtaining artistic rather than mechanical results, giving the practical methods of working being essentially necessary if the theory of "no control of the values" is to be refuted.

H. W. Bennett.

(To be continued.)

THE LIVERPOOL EXHIBITION.*

We now turn into Class IX.—"Landscape—any size, any process introducing important figure subjects which may be made to tell a story, or illustrate a poem or poetic thought." Here, one would think, was an excellent opportunity for showing the imaginative possibilities of photography. Nothing, however, has come of it. Countess Loredana's burlesque of *Romeo and Juliet* does not approach her other work in the exhibition. Mr. Lyd Sawyer's is, after the latter, the only picture in the class that has any pretence to carrying out the idea given. The judges, however, did not give him a medal, and we do not disagree with them. The best picture by far hung in the class is 385; but it has not a figure in it, and so is disqualified. There was an unfortunate blunder in sending it in that class, for it is an exquisite piece of landscape. Class X. is exceptionally strong—marine and cloud studies, and the judges have awarded both a silver and a bronze medal. Is it because this kind of work is more easy, or more attractive, that so many beautiful examples, and in sets of four, are shown? Perhaps it is that our Liverpool friends and their skilful brethren on the Cheshire side have better opportunities of selection than most photographers, owing to the close proximity of two noble estuaries. Among so many good works it is almost invidious to name any particular one.

In the silver medal set, the quiet peaceful feeling of the picture entitled *The Sinking Sun, Killarney* (434), presents us with an aspect of nature that could scarcely be more effectively treated by the brush of a Hook. Mr. Thos. Glazebrook's 407–10 are strikingly effective; the marvellous and varied sky being worthy of all praise, but the landscape is too black. Mr. R. J. L. Mackrell's beautiful set of boat scenes suggest that Hoylake must be a happy hunting ground for this kind of picture. Mr. Stanistreet's cloud effects greatly attract; he should not, however, have vignetted that capital view of ship with masts tapering into the sky, set off with a gap in a bank of dark clouds—a picture is spoiled. Class XI. gives us one or two interesting animal studies. The silver medal pictures (Walter Pollard, 485) are splendid examples of difficult subjects carefully chosen and well photographed; the grouping of the cattle would almost suggest a pre-arrangement, did not this class of subject at once negative the idea. 490 to 493 are excellent work, and failing the presence of Mr. Pollard might have been rewarded. The dogs clambering up to get to the "rats" gives all the animation and "go" of a number of terriers in a capital fashion.

Class XII. (Outdoor Groups).—Mr. F. Sutcliffe's merits have been highly recognised in the award of a silver medal, three of his pictures being excellent. The fisherwoman with nets is well arranged, but the absence of any indication of horizon suggests rather the edge of a precipice than a pier. No. 503 is a perfect gem—three girls carrying a baby sister in a basket, and a fourth tiny creature looking on, and wishing she were to travel so comfortably. The figures in light frocks, illumined by the setting sun, are so cunningly arranged that very little of the figures are in the direct rays, one of the trio screening most of the direct light from the others. The whole are relieved by a background of field and sky simply suggestive. No. 506, three figures well arranged, and comfortably standing on what at first appear like incoming waves, but which close inspection shows to be shelving rock. Composition and grouping excellent, but the *motif* not self-evident. In No. 508 Mr. F. Brenner gives us some bright pictures instantaneously taken of difficult and troublesome subjects, *Indian Outdoor Scenes*. They are full of life and go; laden bullocks, natives in all sorts of picturesque attitudes and occupations, the brilliant sun of early morning casting long shadows that give relief to the figures.

Class XIII. is a very weak one, Mr. C. Cole, in 565–8 gaining a bronze medal for a set of interiors, and one delicately and clearly modelled representation of the altar of All Souls', Eton College. A set in platinotype, by Mr. G. Bankart, are specially noticeable. The Saxon doorway is spoiled, first by the figure introduced, next by the white peep of sky beyond, which ought to have been toned down. Class XIV. is a small one, nine exhibits only, most of them neat and clean, Mr. G. E. Thompson having selected the prettiest "bits," and taken his negatives at well-chosen times for light. Class XV. A, Flash-light pictures. More has been written than done well in this walk, hence the pictures by the Countess Loredana da Porto Bonin come upon us as a most agreeable surprise, which is intensified upon closer examination of the pictures, all being of so high a degree of merit that any living photographer might be proud to be the author of them—a dozen pictures of village life in many phases in a continental country. It is difficult to select any particular picture of the set for special laudation, all being so well executed, so well composed, so well arranged, so well lighted, the expression so natural; so well done indeed that many have thought the photographs were copied from pictures. *The Village School* is very droll, the priest carefully explaining his lesson to one lad, behind whom we see a tired little fellow gaping with weariness, and just above him a pair of sinners giving and receiving a "crib," no doubt; the picture being completed by one doleful youth using his pocket-handkerchief. *The Politicians* is excellent: two working men eagerly discussing a knotty point, sitting at a rough table; glass of wine at elbow, of course. The retouching in all is well done—perhaps in a few a little overdone. *The Future Schoolmaster*, a little boy with a big hat and a ferule, is brightly conceived and executed. *Il Baccio* is perfectly idyllic. The sleeping duenna really appears to sleep, and to be wholly unconscious of her ward's happy acquiescence in the stealing of a kiss by the bold youth at her side. Note the dexterous way in which a shadow is thrown on the light-coloured wall, just between the two figures, so as to prevent the picture separating into two subjects. The rest of the class is good, but is too completely overshadowed by the pictures of the Countess.

In Class XVI. (*Genre*, groups or figures to form the principal element of the picture), Shapoor N. Bhedwar's *Two's Company* is conspicuously good. Here we have a girl in soft white robes toying with feathered pets, all being in excellent keeping with the surroundings. The picture, like those in Pall Mall last year by the same artist (here seen in the "Challenge Class"), is printed in sepia-toned platinotype.

No. 648 is a nice study of a boy pretending to sleep. No. 675, *The Little Old Woman who had so many Children, &c.*, is good in conception. The children (dolls) did not move, but the "mother," a bright child, did; yet even then we see the intention in the expression.

In Class XVII. *Early Morning* (685) receives a medal as being the best enlargement in the class, and this it is from almost all points of view. The title in this case does really describe the picture, a long village street receding from the spectator till lost in the grey mists of dawn, through which dimly looms a wooded height, crowned by what we can just discern to be a castle. *A head*, of heroic size, by Mr. Albert Smith, is really better than the original small one exhibited by its side. *Eventide* (683), Fred. Anyon, is another river

* Continued from page 183.

scene, and an effective one. We have sea, river, sky, with a distant ship sailing along, and leaving a track of silver waves behind, lighted by moon or bright clouds. 684, *Enlargement of Spider on its Web*, repels or attracts according to the idiosyncracies of the beholder. 695, *Watering Horses*, reminds one of the proverb about "One man taking a horse to the well," &c.—here we have several horses, and one of them is drinking. This is well taken; but it is an incident, not a picture. In Class XVIII. we are glad to see brilliant signs of the revival of the stereoscope. There are many good sets, but Mr. Houghton carries off the palm, and obtains a silver medal for his set (726).

Lantern slides appear in Classes XIX., XX., and XXI, and we are told that several hours were occupied by the judges in passing all of them through the lantern. Nearly three hundred slides were sent, and all are good. They were divided into three classes, "Marine, clouds, &c.," "Town or country life, landscape or general work," and "Architecture—interior and exterior." The collections were of a very high class, and the general verdict was that a difficult task had been well performed when the judges awarded in this class silver medals to Messrs. Priestley & Sons and Mr. G. E. Thompson, and bronze medals to Messrs. John Carpenter, F. Anyon, W. L. Howie, and J. W. Wade, and again to Mr. F. Anyon.

The few remaining classes we will describe in our concluding article next week.

ERRATA.—Last week, for "Miss Barraud" read "Messrs. Barraud," and in reviewing Mr. Ralph Robinson's snow pictures, for "clean" read "clever."

MERCURIAL VAPOUR DEVELOPMENT.

SINCE the vapour of mercury refused to attack the exposed silver haloids contained in a gelatine film, I decided to make one or two experiments which would, I surmised, afford the "developer" a less restrained access to the invisible impression.

First of all I tried the effect of soaking an exposed plate in plain water for a few minutes, and then squeegeeing off the surface moisture. Subjected to the action of the mercury vapour, an irregular, patchy reduction, having the appearance of a highly polished metal substance, resulted; but side by side with this the gelatine suffered so seriously, being heated to such a degree as to commence to "run," that I saw it would be unprofitable to pursue the idea. The deposit, moreover, disappeared in the fixing solution.

Then I sought to take advantage of the assumed possibility of condensing a layer of iodine upon gelatino-bromide films, reasoning that, in the event of iodine vapour acting in the manner suggested, the developer would be enabled to reach an impression unenclosed by any obstructive vehicle, and, given a sufficient exposure, might actually penetrate to the invisible image formed in the gelatino-bromide. Moistening a little iodine with alcohol and placing the vessel containing it over a water bath, the halogen freely vaporised, and I, in turn, subjected both exposed and unexposed plates to its action, and, having exposed the latter to light, submitted both kinds to the "developer." Whether the vapour of iodine really attacked the films I am unable to say; but the result of the attempt was a signal failure to advance beyond a condensation of mercury on both kinds of surfaces.

But of course there were other and more certain ways of bringing iodine in intimate contact with gelatino-bromide films. Iodine is soluble in a solution of iodide of potassium as well as in alcohol. The latter, taken in the proportion of ten parts to one of iodine, forms, I believe, the well-known tincture. In such a solution I soaked both exposed and unexposed plates, and after drying and exposure of the latter, attempted to "develop" in the manner already mentioned. I was still unsuccessful.

Some plates, however, on which the tincture had not quite dried behaved altogether differently. Held over the vessel of mercury, a rapid "development" occurred (not of a picture, though), the effects presenting the appearance of highly polished silver. This substance resisted removal in the fixing bath, but the resultant deposit was weak and granular. The fact of such a "reduction" taking place upon a film still moist with the iodine tincture partly hinted that herein perhaps lay the key to success; but although I made the most careful repetition of the experiment, I was unrewarded with the slightest sign of success.

In recording these attempts and failures to adapt the leading principles of Daguerreotypy to modern gelatine dry plates, it is possible that I may be instrumental in putting some abler experimentalist in the way of solving a problem which I am loth to regard as insoluble. It has been said that in experimental work the records of one man's failures have frequently proved the indices to another man's success, and in quoting the saying I feel that I have advanced a sufficiency of justification for raising a subject without adducing any positive practical data to uphold its *raison d'être*.

Anticipating some such question from the reader as, What benefit to photography would arise if gelatino-bromide plates were developable by mercury? I say, without hesitation, that if the ordinary negative image resulted, little, if any; but if, on the other hand, as I half hoped, but hardly dared expect, in the course of my fruitless experiments a positive picture appeared, then I believe the modernised Daguerreotype would be welcome to many, always assuming, of course, short exposures and other conditions favourable. A good camera positive process, involving simply vapour development, toning, and fixing, would, I am confident, be very useful at times. Some years ago the Earl of Rosse contributed to the JOURNAL a short description of a direct positive process adopted at a charitable bazaar where rapidity of delivery was a *sine quâ non*. The negative image, developed with ferrous oxalate, was, after fixing and washing, bleached with iodine dissolved in potassium iodide. The plates, after washing, were dried and varnished and backed in frames with black velveteen. Development of a gelatine positive at one operation, and that operation so simple as the application of mercury vapour, would certainly simplify and expedite matters in a case of this kind.

Harking back to the question whether the undeveloped images of Daguerreotype and gelatine plates consist of the so-called sub-haloids, I should like to ask to what are we to attribute the circumstance that in the one case a positive is produced by development, and in the other a negative? Eschewing means and observing only the end, were Daguerreotype pictures partly the outcome of the phenomenon of solarisation?

THOMAS BEDDING.

PRACTICAL HINTS ON DIAPHRAGMS.

AMATEURS have frequently been advised to make use of a series of diaphragms of such a kind that any one of the number represents an exposure of double the time required with the next larger stop of the set. Such an arrangement is very convenient, as it eliminates all trouble in calculating, and tends to diminish the likelihood of errors in exposure.

It is, however, at the same time liable to the rather serious objection that the number of diaphragms which can be arranged on this principle is too small for practical purposes. Let us suppose that the largest stop employed has an aperture of 43 mm. If it be desired to use a stop that will necessitate an exposure of double the time, one with an aperture of 30 mm. would have to be employed. But it is quite certain that in taking a portait or instantaneous view one might find it requisite to use a larger stop, say 36 mm. Thus it is of more importance to be able to use diaphragms differing but slightly from one another in aperture than to have only five or six for the purpose of facilitating calculations. Still, as there are a good many amateurs who are not very proficient at calculating relative exposures from the apertures of their diaphragms, we give here a method of attaining the desired end with promptness and precision.

The aperture of the objective is measured, then that of the diaphragms, in millimetres, commencing with the largest. These numbers are written along a horizontal line, and then along a vertical line, and each number of the horizontal line is divided by each number of the vertical line.

Each of the quotients thus obtained is then multiplied by itself, by which means we obtain the following table:—

DIAPHRAGMS TO BE USED.	DIAPHRAGMS USED.					
	Objective, 43 mm.	No. 1, 36 mm.	No. 2, 29 mm.	No. 3, 18 mm.	No. 4, 12 mm.	No. 5, 5 mm.
Objective, 43 mm.	1	0·7	0·45	0·17	0·08	0·014
No. 1, 36 mm.	1·4	1	0·64	0·25	0·11	0·02
No. 2, 29 mm.	2·3	1·4	1	0·38	0·18	0·03
No. 3, 18 mm.	5·8	4	2·6	1	0·46	0·07
No. 4, 12 mm.	13	9	5·6	2·25	1	0·17
No. 5, 5 mm.	74	52	34	13	5·8	1

A few examples will show how the table thus obtained may be made use of:—

First Example.—We have made an exposure of 6″ with diaphragm No. 5, and we wish to use diaphragm No. 3; what will be the corresponding exposure? We look out No. 5 along the head-line, and then descend until we reach the horizontal column of diaphragm No. 3. This gives us the number 0·07. Multiplying the former time of exposure, six seconds, by 0·07, we obtain $0·07 \times 6 = 0·42$ seconds; in other words, the required exposure is half a second (nearly).

Second Example.—With diaphragm No. 1 we have given an exposure of a quarter of a second; what will be the exposure with diaphragm No. 4? We perform a similar operation, and find the number nine, which, multiplied by the original exposure, gives $9 \times \frac{1}{4} = 2\frac{1}{4}$ seconds.

Third Example.—Supposing that with No. 4 a satisfactory negative is obtained with an exposure of eleven seconds, what diaphragm would we have to employ to obtain the same effect in two seconds? To solve this problem we proceed inversely to the previous method, *i.e.*, we divide the exposure desired by the original exposure thus—

$$\frac{2 \text{ seconds}}{11 \text{ seconds}} = 0{\cdot}173.$$

If we look for 0·173 in the vertical column of No. 4, we shall not succeed in finding it, which proves that we have no diaphragm exactly of the required dimensions. We find, however, 0·18, which is sufficiently close, and this is in the horizontal column of No. 2, which is consequently the diaphragm we select.

We need not dwell at length on the services this simple table may render to the amateur. It may be copied on a card and kept in the case along with the diaphragms, where it will always be convenient for reference.

—*Der Amateur Photograph.*

PICTORIAL COMPOSITION.*

"THE man and not the tools," of course. For instance, look at Jones. "What in the world is Jones doing? He has been fidgeting about amongst those boulders for the last half hour at the risk of his neck and his sticks; he has only taken one shot this morning. I have taken a dozen. Why don't he fire away?" Listen to the hare and the tortoise. The hare's negatives are exuding hypo amongst the "spoilers" on a damp shelf now, but the tortoise has won a medal; for not having either broken his neck or his sticks, he has with infinite pains found the very spot where the church tower comes in just right with the trees, whence the straggling village creeps down to "the haven under the hill." Ah! and how he waited for the light, too! And it came, as everything comes to those who can wait, just in time to catch the fishing-boat with the big white sail before she put to sea. Look how she comes out against the deep shadow, bringing the light down into that corner exactly where it is wanted. See, too, how the hill greyly softens off in the modified light of the lovely afternoon. "Yes, Jones has got a picture; I can't show it you, I regret to say. Why can't I get a picture? I am a better photographer, you know, than Jones." And so on. Well, let us see what Jones is made of, what manner of man he is, now we know what work he can do. And it turns out that Jones perhaps did not take lessons, even in a school of art; self-taught, and that sort of thing. But he was always fond of pictures, and it is said he can tell a Hobbema from a Cuyp when he sees them together, and he has said that he used when a boy to copy engravings, old steel-plate engravings—the kind of illustrations, you know, you don't find in books now, photography having improved them out of existence. Jones takes his sister to the Academy for their annual headache, and visits the National Gallery as a religious obligation twice a-year. I am told he once borrowed Burnet, and actually possesses a copy of Harding. A curious fellow Jones. Knowing something of Jones and a little of Harding, I thought I might do worse, perhaps, than bring some of Harding's ideas on pictorial composition this evening, that we might look them over together, for I think that many of the things he points out for the consideration of the painter may be made exceedingly useful to the photographer. Before, however, we try to assimilate and profit by any of Harding's teaching, let us see as nearly as may be where we are.

I think most of us will admit that, however simple may be the means of reproducing a scene by the camera, successful composition—in landscape especially—is unquestionably a far more difficult thing to accomplish in photography by any artist than it is with the brush or pencil. The most naturalistic photographer, though dangerously near it, has not gone quite so far as to say nature is art; and we are most us of pretty well agreed now that nature supplies the elements of art at our discretion, and in slightly modifying some of nature's arrangements in landscape, simple enough with the pencil, the photographer, if he has any art feeling at all, is often very hard pressed indeed to obtain any artistic result with the camera. It is all very well to say, "If the mountain won't come to Mahomet, Mahomet must come to the mountain," but unfortunately it is not always easy, but often most difficult, for him to get to the mountain; and it is only by long study of composition in art, and considerable tact and practice in the field, that he is enabled to find the right spot to get a tolerable arrangement of nature's elements of beauty, even in very beautiful places. The scene looks so different in the natural vignette of our binocular vision to what it does when you cut a square or oblong out of the picture and bind it by a hard and fast line with any lens of any angle.

But this is what the photographer has to do, and he stands all the better chance of doing it successfully if he is warned where he is likely to fail, and shown mistakes which the cleverest among us may fall into.

Let us turn now to J. D. Harding, who, in his *Principles and Practice of Art*, may do something for us with pen and pencil. Harding says: "In the composition the painter makes his first effort to convey the idea of the separation of the various objects, and to overcome those difficulties (which have been pointed out) as connected with the flat surface on which he paints. To effect this, none of the principal or leading features of his picture should be perpendicularly over or horizontally level with each other, because if they be so placed they either repeat actually or by suggestion the horizontal and perpendicular lines which artificially limit his picture, and which require to be concealed as much as possible from observation. The consequent advantages may be seen by comparing the Examples 1 and 3, 2 and 4, in Plate X., with each other. In Examples 1 and 3 the leading objects and features are so placed that they are neither level with nor over each other, and the expression of space is the result. Here, forgetting the surface and its boundaries, we feel able to penetrate into the pictures and move among the figures, trees, and buildings, to float in the sky, or walk along the ground. In Examples 2 and 4, however, no such feelings are suggested; at least, not by the composition. In Examples 2 and 4, a line drawn across the picture from C to D, and also from E to F, would show that several of the objects are on the same level, and again they are perpendicularly over each other. For instance, in Example 2, the church in the distance is over the man in the foreground, who thus appears to be supporting it on his head; the apex of the mountain is just above the spire of the church; and the castle on the hill is immediately over the bridge; each important feature of the distance surmounting another important feature of the foreground, all idea of space between the foreground and the background is in consequence negatived. As the artificial boundaries of the picture are thus emphasised and repeated, the flat surface is so continually suggested that the mind cannot free itself from it. If light and shade only were expressive of space, each of the four examples would express the idea of it equally. We, however, fail to obtain in Examples 2 and 4 the same idea of space as in Examples 1 and 3, although all have like advantages in other respects.

P. H. NEWMAN.

(*To be continued.*)

* Continued from page 185.

PROPOSED FEDERATION OF PHOTOGRAPHIC SOCIETIES.

A MEETING of delegates appointed by various London and suburban photographic societies to consider the proposed scheme for federation of photographic societies was held, on Monday last, at the rooms of the Photographic Society of Great Britain—Mr. L. Biden in the chair.

The Chairman said that the responses to invitations sent to photographic societies had, for the most part, been favourable. In the cases where societies had declined to send representatives it was generally on the ground that it was not desirable to form a federation unless the Photographic Society of Great Britain were at the head. That Society, however, were favourably disposed to the idea of federation, and had sent two representatives to the present meeting. He thought, however, that, in the first place, they would get on better by framing resolutions to suit themselves. The object of the Photographic Society of Great Britain was very much the furtherance of the photographic art, and they might look forward to the Photographic Society being at the head of the federation eventually, but he thought they could not ask that body to put themselves on an equality with societies of only three years' standing. This object was primarily to benefit smaller societies which were in need of some such scheme. He therefore proposed a resolution to the effect that the majority of those present were in favour of a federation of photographic societies.

Mr. H. Mackie suggested that it would be better for the propositions that might be submitted to be moved and seconded in the ordinary way.

Mr. W. Bedford wished to know how far it was understood that speakers at the meeting represented photographic societies. He had not been appointed as a delegate, and wished to know whether it was intended that delegates only should be heard.

Mr. Leon Warnerke said that he and Mr. Addenbrooke had been appointed by the Photographic Society of Great Britain, together with Sir Henry Trueman Wood, who was unable to be present that night, to consider the question of federation generally, and to attend this meeting and report to the Council thereon.

Mr. Brown, of the West London Photographic Society, asked what were the societies that had given in adhesion to the scheme.

The Chairman replied that he had heard favourably from about twelve societies, but they all harped upon the same string, the lecture list.

Mr. Brockhurst, of the Holborn Camera Club, said that it was a weak part of the scheme that it only proposed to federate societies. There were a large number of persons working in photography who did not

belong to any society, and he thought many of these might be induced to join a federation individually.

The Chairman replied that there were already a great number of Societies, and he did not propose to add one more to that number, and enter into competition with them. His object was to help societies, particularly in the way of enabling them to get lectures, loan of lantern slides, and other advantages, by union or federation.

The first resolution, "That it is desirable to form an Association, or Federation, of Societies and Clubs whose members are interested in Photography," was then moved by Mr. Mally, of the Toynbee Photographic Society, and seconded by Mr. Goodhugh, of the North Middlesex Society.

Mr. Bedford thought he might say that the Photographic Society of Great Britain was favourably disposed to the idea of federation, and was only waiting for some definite suggestions to be made.

Mr. Brown, of the West London Photographic Society, said that what had struck him and his colleagues was that so much depended upon whether or not the Photographic Society of Great Britain was prepared to join the federation or not. If that Society had any idea of a federation apart from the one now proposed, the latter could not stand.

Mr. Warnerke said that at the last meeting of the Council of the Photographic Society there was nothing against the proposed federation, but in order to give an answer to the question as to whether they would join it they must know what it is that the federation proposes.

Eventually the first resolution—that it was desirable to form a federation—was passed, and another, to appoint a Committee who should consider the proposed rules, was also passed. The Committee appointed consisted of Messrs. Barrett, People's Palace; Brockhurst, Holborn; Biden, Toynbee; Cherry, North Middlesex; Clark, North London; Edwards, South London; Rumbold, Sydenham; and White, of the Ealing Photographic Societies.

After votes of thanks to the Photographic Society of Great Britain for the use of its rooms, and to the Chairman, the meeting was adjourned.

NOTES FROM NEWCASTLE.

The Bewick Club Fine Arts Exhibition, which closed last week, has been the great item of interest in art circles lately. I have noticed at the various *conversazioni* many prominent photographers; let us hope they have gained something, but I very much doubt it. The *Daily Leader*, in winding up its criticism of the exhibition, complains, not without reason, of the prominence given on the walls to a lot of frames which would never be hung but for the fact that their owners are members of the Bewick Club. The authorities don't seem to draw a line anywhere, and, like the promoters of many photographic exhibitions, hang "anything and everything." In the present case it is the more annoying as better pictures are badly placed. I take the following from the *Newcastle Weekly Chronicle*:—"Dog or Guinea Pig?—Stranger at the Bewick Club Exhibition to man with catalogue: 'Bey pardon, sor, but will ye be se good as tell us what this pictor is?' 'Oh, that's a dog.' 'Begox, but that's a claggor! Aa thowt it wes a guinea-pig; on my way, it's the syem colour!'"

Some peculiar photographs are to be seen hereabouts just now in the showcases. I forget whether I mentioned it before, but one cabinet photograph is still on view—a large imperial bust, profile, the print trimmed down to cabinet size, the nose cut off at the end an eighth of an inch to make it fit! Another is a whole-plate portrait of a gentleman full face, the toe of his right "blucher" projected full out in such a way it looks like a club-foot; beneath the chair is to be seen the base of a gigantic head-rest, and the gentleman's back hair is distinctly raised by the apex of that machine.

Professionals seldom shine in the art of grouping, and even groups of *two* are mostly dismal failures, particularly when sweethearts, or, say, man and wife. Two or three such, presumably in the latter relationship, may be seen. In one a lady is sitting upon a couch and gazing with fondness in her eyes at her lord and master (an unhealthy-looking, bald-headed coon in specs) seated in an armchair, and apparently quite unconscious of the adoring glances of his spouse. Just think of a print like this hanging for an indefinite period in one's house! It might, perhaps, be the means of preventing connubial "tiffs."

Mr. Lyd Sawyer exhibits an extremely good life-size enlargement of a young lady—one of the osculatory variety—which our amateurs, young and old, should crowd to see. In Mr. Bacon's window I never saw a better display, platinotype being still in full force.

The recent snowstorm brought out numerous cameras, and the usual results were doubtless experienced of failures. There was too much wind for one thing, and there was more actinism in the light than many calculated upon; hence over-exposure, ruinous and fatal. In my opinion, snow scenes as photographs for sale are a frost (no joke intended).

Mr. Parry's new studio was opened last week, and, by all accounts, it is a very fine place. I hope to pay it a visit shortly.

The Associated Societies of Newcastle had their annual *conversazione* on the 13th inst. and made a brilliant assemblage, presided over by the Mayor. Our photographic society was of course *en evidence*. D. D.

Foreign Notes and News.

More light on the Lippmann discovery! The French *savant* has written an autograph letter to Professor Vogel on the subject, sending him a specimen of his photographed spectrum. Professor Vogel appears to have made a remark to the effect that static (or standing) waves were the cause of deposition of the laminæ in the film. To this Professor Lippmann says, "There are three sorts of such waves produced by reflexion from a mirror. 1. Those of Fresnel, in which the interfering rays form an angle greater than 0°. 2. Those of Zenker, in which the angle is greater than 180°. And 3. Those of Wiener, in which it is greater than 90°, and which cannot be produced with ordinary light, and are consequently not of importance in my process. Owing to the want of sensitiveness of the plates I have hitherto employed for green and red, I have since tried orthochromatised plates with good effect."

At the last meeting of the Friends of Photography, in Berlin Dr. Miethe seems to have thrown a good deal of doubt on Professor Lippmann's "explanation" of his colours and the mirror-business generally. He exhibited some ordinary chloride paper which had been over-exposed, and showed interference or iridescence colours.

According to *Liesegang* some one has been raising a scare about hydroquinone injuring the fingers, and recommending the application of laneal oil as a remedy. We were not, however, aware that any such effect had been observed.

According to a recent paper by Herr Archenhold in *Himmel und Erde*, a new method has been devised of utilising photography for accurate determinations of the time at which a particular star crosses the meridian. A plate is fixed up in the focus of the equatorial on which the image of the star, supposing it to be sufficiently bright, traces a thin, straight line. A mechanical arrangement is introduced for the purpose of imparting a slight up-and-down motion to the plate every second. The regularity of the line is in this way interrupted, which enables the moment in which it is actually intersected by the image of the micrometer wire to be determined with great accuracy.

A new amateur photographic society is in process of formation in Vienna. The Committee of formation as yet, however, only numbers Messrs. Emil Kanitz and Max Frey.

The arrangements for the International Exhibition to be held at Antwerp have already made some progress, some of the members of Committee having already been selected. Among those hailing from Germany we notice the celebrated names of Zeiss and Hartnack.

The *Deutsche Photographen Zeitung* has been subjecting Mr. Muybridge's exhibits in Berlin to some rather severe criticisms. It states that his "series photographs" are in no wise advanced beyond the standard of fifteen years ago, and that the projection and manipulation are extremely mediocre. A photograph of Queen Victoria in Trafalgar-square it characterises as a "cloud-picture in the fullest sense of the words." It would be interesting to know when Her Majesty was last visible in Trafalgar-square.

Our Editorial Table.

Colloquial French for Travellers.

By H. Swan. London: D. Nutt.

Non-acquaintance with the language of a country to which one may be paying a brief visit constitutes a serious drawback to the enjoyment of such a trip. For the Englishman who is about to go to, say, France or Belgium, but whose linguistic acquirements are confined to his mother tongue, there are several handbooks containing useful sentences arranged in parallel columns, but none of these give information as to the correct pronunciation of the foreign words. In *Colloquial French* Mr. Swan meets this difficulty by a third column, in which the pronunciation is not only given phonetically, but, by the judicious employment of a type of somewhat heavier character, the syllable that is to be emphasised is also indicated. These columns are prefaced by some admirable hints on French pronunciation and general advice to the intending tourist. The intensely practical character of this advice may be ascertained from the following:—

Always take your own soap, for none is supplied in the hotel rooms, and as the French towels are little larger than table napkins, it is well to take your own towels. Insect powder is a useful adjunct in some of the country inns, or a lump of camphor will answer the purpose. French tobacco and cigarettes are usually very bad, and

Englishmen will often prefer to take a supply of their own. The French matches are also atrocious; a large box of wax vestas will be found always useful.

The words and phrases are carefully selected as being the best for the occasion, and we can most easily conceive a traveller going through France and Belgium without trouble by their aid alone.

In the present (the third) edition a set of useful phrases specially adapted for bicyclists and photographers are introduced. Of the latter we give an example:—

These are photographic chemicals.	Ce sont des produits chimiques pour la photographie.	Se sohn dae pro-**duee** shee-**meek**—poorr la photograh-**feek.**
They are all my private property.	Ce sont des effets personnels.	Se sohn daez-ef**fae**—pairr-so-**nell.**

Light-tight Plate Bags.

Mr. W. Tylar, Birmingham, has sent a sample of bags or envelopes for packing exposed plates which he is manufacturing. The method of using them will be ascertained from the following:—"Two plates are placed face to face with a layer of chemically pure vegetable fibre between the films, and then enclosed in the yellow envelope, this is further protected by enclosure in the light-proof black envelope. A number of these can then be firmly bound together and packed for transit without risk or damage."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4648.—"Improvements in or connected with Hand or Detective Photographic Cameras." E. Underwood and T. A. Underwood.—*Dated March* 16, 1891.

No. 5007.—"Improvements in Photographic Changing Cases." R. Krügener.—*Dated March* 20, 1891.

No. 5011.—"Improvements in and relating to Photographic Apparatus." B. J. Edwards.—*Dated March* 20, 1891.

No. 5064.—"Improvements in Frames or Holders for Photographic Printing and for Photographs." F. Iles.—*Dated March* 21, 1891.

No. 5106.—"Improvements in Optical Lanterns and Dissolving View Apparatus." Complete specification. W. C. Hughes and H. Woodruff.—*Dated March* 21, 1891.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 1	Coventry and Midland	The Dispensary, Coventry.
„ 1	Edinburgh Photo. Society	Professional Hall, 20, George-street.
„ 1	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 2	Bolton Photographic Society	The Baths, Bridgman-street.
„ 2	Leeds	Leeds Mechanics' Institute.
„ 2	Dundee and East of Scotland	Lamb's Hotel, Dundee.
„ 2	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
„ 2	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 3	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
„ 3	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

March 24.—Technical meeting.—Mr. W. Bedford in the chair.

Messrs. G. Houghton & Son sent a circular relating to Daguerreotype issued by their firm in 1841, also two volumes called *Excursions Daguerriermes* published in the years 1841 and 1842, and containiug engravings of scenes made from Daguerreotypes.

The subject of the evening, *Hand Cameras*, was introduced by Mr. Chapman Jones describing his Memorandum camera, which was made for plates of half the quarter-plate size. These dimensions were sufficient for an oblong plate, which was generally the best form of picture that would be coutained in the circle of a lantern slide. It was furnished with a lens of four-inch focus, which could be fixed either for distant objects or for copying near ones. The weight was about thirty-five ounces, with one dozen plates. The finder he used was a loose one, and could be applied to the top of the camera when used in either direction.

Mr. L. Warnerke showed a small camera in which the plates were arranged in two tiers. The shutter was a mirror, which therefore served as finder. He also showed a French camera made entirely of metal, and very light. The front of the camera was hemispherical, and the shutter of like form fitting into it, so that it was moved by a pin fixed at the axis of the sphere. Another camera that he showed was of German make, and was furnished with a roller slide. The indicator worked in a spiral coil so as to allow equal lengths of the sensitive tissue to be unrolled, whatever the amount on the spool. He thought the whole arrangement very simple and effective.

Messrs. Mawson & Swan showed Loman's Reflex camera, iu which the chief novelty is stated to be the method of focussing, which was effected by a mirror in front of the lens projecting an image on to ground glass on the top of the camera.

The Eastman Company sent a variety of Kodaks of various sizes, with lenses from two and five-sixteenths up to eight and a half inches focus.

Mr. Warnerke inquired whether these cameras could not be worked pneumatically.

It was replied that they were not so arranged, but doubtless could be if required.

The Automatic hand camera was shown by Messrs. G. Houghton & Son. The camera was furnished with a Thornton-Pickard shutter, and had guides for viewing the subject in both positions, vertical and horizontal. The special novelty consisted in the manner of changing the plate. The plates were in sheaths, and as each was exposed it was, by suitable contrivances, made to fall down into a horizontal position in the base of the camera, and passed through a narrow aperture under the charge of plates. This charge being drawn temporarily forward, the plate was returned to the back of the set.

Mr. W. E. Debenham said that the arrangement by this camera had got over the difficulty of shifting the plate from the front to the back without materially iucreasing the depth of the camera. Generally, cameras of this character required to be about double the depth of those used with slides or bags.

The Chairman assented, and remarked that the only additional depth was that of the small well (about three-quarters of an inch).

Messrs. Robinson & Sons showed the Luzo camera and photographs of its work in various sizes.

Messrs. Griffin & Sons showed a Dines's camera. In this apparatus a dozen plates are contained horizontally in a holder and the back of the camera. Any one of these, as required, can be brought through a slip and adjusted to a vertical position, and may be returned to its own or any other groove as required. The back, with its dozen plates, can also be replaced by another charge in full daylight.

Messrs. Griffiths showed the Zodiac camera.

Mr. E. W. Parfitt showed the Quadrant camera. Each plate was contained in a sheath, and space was diminished as much as possible.

Messrs. Marion showed the Radial camera, furnished with a Voigtländer lens said to possess great depth of focus. The radial grooves for holding the plate were produced by electrical deposit.

Messrs. Adams exhibited their Ideal hand camera. A point particularly noted was that there were no projecting knobs.

Mr. Cusworth showed a hand camera called the Photographic Repeater. In place of a sheath, each plate was held to a thin wooden board by elastic bands over the ends.

Messrs. Parker & Co. showed their Companion camera, for which they claimed great simplicity in the manner of moving the plates.

Mr. Shew wished to draw particular attention to the new method which he had adopted for moving the lens in his hand camera. An arm projected from a flange fitting, to which any lens might be screwed, and by moving this arm in contact with the front board to regulated distances various planes could be focussed.

Mr. T. Samuel showed his hand camera, a notable point in which was the arrangement for raising the lens when used in either direction, so that architectural subjects need not be thrown out of the perpendicular.

Mr. Warnerke referred to Professor Lippmann's recent experiment, and showed some negatives produced by the dusting-on process which gave iridescent films. He found that such films could be produced at will by rubbing graphite on to glass or vulcanite and coated with collodion. He also showed a set of strips of coloured glass with which he had printed on albumenised paper through the back, the front being in coutact with mercury. There was to some extent a reproduction of the colours of the original glasses, both by reflected and transmitted light, but these colours disappeared on fixation.

Mr. Debenham remarked that this experiment was more on the lines of Becquerel's work than of Lippmann's.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 19,—Mr. P. Everitt in the chair.

A letter from the Secretary of the Photographic Society of Great Britain was read, inviting the members of the London and Provincial Photographic Association to inspect the exhibition of British and foreign collotypic prints now on view at 50, Great Russell-street. The exhibition remains open till April 14.

A circular relating to the proposed federation of photographic societies was received, inviting the Association to send two delegates to a meeting held on Monday, the 23rd. On the motion of Mr. A. Cowan, the Hon. Secretary and Mr. T. E. Freshwater were appointed delegates.

A volume presented by the Photographic Club, containing the proceedings of that Club and of the "Brittlebank" meetings, which led to its formation, was received and acknowledged; Thomas's *Modern Practice of Photography* (*Colledion*) was also received.

The Easter Monday outing of the Photographic Club at Leigh, near Southend, was mentioned, and some of the members expressed their intention of joining in it.

Mr. J. Howson then entered upon the subject of the evening—*Printing by Development upon Chloride* (*Alpha*) *Paper and Plates.* He opened by saying that Alpha paper being exceedingly slow and requiring long exposure, he had brought ready exposed prints, and would proceed to develop, fix, and tone them whilst prepared to answer questions relating to the subject. The great claim for the paper was the variety of colours that could be produced upon it, so as to enable the photographer to choose a colour appropriate to the particular subject in hand. Referring to a print of a misty marine subject which was of a deep brown colour, he said that he did not think that a print in black and white would give the same idea of haze as was there presented. The colour could be varied iu two ways—by length of exposure and by toning. Broadly speaking, the louger the exposure the warmer the colour. The development of the prints (which was now shown) occupied from one and a quarter to three minutes, the less exposed prints taking the longer time and coming of a colder colour. Where prints were not widely different in exposure and development

they could be brought very nearly alike by toning. Examples of this kind were shown in which a plate had been cut in various stages of development, coming out from nearly red to dark brown. One such set, being toned considerably, showed the various portions very nearly alike. The combined toning and fixing bath which was used gave prints, according to the time of immersion, of warm brown, photographic purple, black, and, finally, bluish-green, which last was, he said, a capital imitation of moonlight, and suitable for subjects of that character. To ensure a blue colour, the prints should be fixed in hypo and toned in sulphocyanide and gold only. The developer as given in the formula was stated to be exceedingly strong for a chloride film, and it was customary to modify it by using a mixture of equal parts of fresh developer to one that had been previously used.

The CHAIRMAN inquired whether, in starting with fresh solutions, would not the addition of a little bromide be equal to the use of an old developer.

Mr. HOWSON thought that it would be exactly the same. The prints, after being developed, were immersed in a solution of sulphuric acid, one to 160 of water, after which they were washed to remove the acid, and then fixed in a bath containing hyposulphite, sulphocyanide, acetate of soda, and gold. The prints must not be left for more than about half a minute in the acid bath, otherwise they become reduced. After being placed in the acid water, the rest of the process might be carried on in full gaslight, or even in diffused daylight.

Mr. R. P. DRAGE inquired whether hydroquinone could not be used for development, and so the acid and washing before fixing be omitted.

Mr. HOWSON replied that hydroquinone was an excellent developer, and the acid and washing were not required when using it. He observed that somewhat less exposure should be given when it was intended to develop with hydroquinone, as if two prints that had been equally exposed were developed, the one with ferrous oxalate and the other with hydroquinone, the latter would be the warmer in tone.

Mr. DRAGE had found that eikonogen developer which had been used for negatives would act very well on Alpha paper.

On the question of the time of exposure necessary, Mr. HOWSON said that two minutes at a distance of ten inches from an ordinary gas burner would commonly suffice. With a dense negative ten minutes or more might be required.

The CHAIRMAN asked whether there had not been complaints of spots on Alpha paper due to the emulsion.

Mr. HOWSON said that spots were not due to the emulsion but to age. The length of time that the paper would keep good no doubt depended upon the atmosphere in which it was kept—damp and gas fumes would rapidly spoil it.

Mr. W. E. DEBENHAM asked what effect acetate of soda had upon the toning bath when sulphocyanide and hyposulphite of soda were present in excess.

Mr. HOWSON said that the bath kept better. The bath was kept in order by replenishing from a stock solution containing double the quantity of gold, and half the quantity of water contained in the normal solution.

The CHAIRMAN inquired whether greater detail was obtained by toning.

Mr. HOWSON replied in the negative, but added that mealiness did not come on even if the print were kept in the solution for twenty-four hours.

Mr. A. COWAN inquired how development with hydroquinone was carried on in cold weather. Dr. Miethe had said that hydroquinone lost developing power entirely at 41°.

Mr. HOWSON had not observed this.

The CHAIRMAN remarked that he had recently seen some prints in the city which were put forth as photographs in colours, they being mechanically printed in tints, and it was generally considered that "photographs in colour" was not a fair way of describing them.

Mr. F. Bromley Smith was elected a member of the Association.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held on the 18th inst.,—Mr. W. Bedford, Chairman.

Two grants considered and assistance granted.

The following were elected as subscribers:—Messrs. Hargreaves, Matthews, and Kerr, and Misses Howe, Haigh, and Clarke.

CAMERA CLUB.

THE Camera Club commenced photographic meetings in the large room of their new premises on Mouday, March 16, with a lantern exhibition.

Sir GEORGE R. PRESCOTT presided, and opened the proceedings with a few remarks on the state of the premises and the progress of the Club.

A large number of slides were passed through the lautern, the pictures being the work of Messrs. Wellington, Cembrano, Stevens, Sands, Barton, and Chang.

On Thursday, March 19, a paper on *English Church Architecture* was read by the Rev. T. Perkins, M.A. Major J. F. Nott was in the chair.

The HON. SECRETARY drew attention to a notice from the Meteorological Society, and handed round a trimming board devised specially to ensure certainty in securiug parallelism of the horizon with the top and bottom edge of the print trimmed.

Mr. PERKINS in his lecture dealt in a most interesting manner with his subject, illustrating each point with lantern pictures on the screen. He showed by coloured maps the geographical distribution in the country of certain special architectural features, and described and explained the peculiarities of various spires, towers, pillars, doorways, and window tracery. It seemed to him that we could not now build a beautiful dwelling-house or church, and he condemned the work of the restorer, especially referring to Lord Grimthorpe's plans at St. Albans. He suggested a scheme for the more complete photographing, by members of the Club, of English church architecture in different parts of the country, the work to be directed by a competent head.

The continuation and completion of the lecture had to be adjourned to Monday, March 23.

The subject on Thursday, April 2, will be *Norway as a Photographic Field*, by Mr. H. Sturmey.

HOLBORN CAMERA CLUB.

THE above Club had a very successful gathering on Friday last, the 20th, when the American loan set of lantern slides were thrown on the screen. About fifty members and friends were present, and all seemed to enjoy the treat provided for them. Then followed the prize slides in the lantern slide competition. After several members had had a few passed through the lantern, the whole company adjourned to the room (which had been kindly placed at the disposal of the Committee by Mr. W. Smeed) where the prizes were displayed. Mr. S. T. Chang, in the unavoidable absence of the President, distributed the prizes to the successful competitors. "For the most numerous and meritorious set of pictures."—First prize, a very artistic statuette of an ancient warrior, won by Mr. Fred Brocas. Second prize, a Thornton-Pickard shutter, won by Miss Lucy Hare. Third prize, a Watkins exposure meter, won by Mr. Golding. "For the six best quarter-plate pictures."—First prize, a hand bag, won by Mr. Osborne. Second prize, a pneumatic shutter, won by Mr. Phillips. "For the best enlargement," a print washer, won by Mr. Smith. "Ladies' Prize," a Thornton-Pickard shutter, won by Mrs. Smith. "Lantern Slides."—Third prize, a photographic album, won Mr. Bayston. Second prize, a Gladstone bag, won by Mr. Beckford. First prize, an Optimus lantern with five-inch condensers, won by Mr. S. T. Chang. This gentleman, in a very neat speech, presented his prize to the Club, remarking that his idea in entering the competition was only to benefit the Holborn Camera Club. Mr. Brocas, in accepting on behalf of the Club the lautern, said that the members were determined that Mr. Chang should not go away empty-handed, and they had combined and bought a small morocco letter case which he hoped that Mr. Chang would accept, and that he would always remember, whether he was here or in China, the Holborn Camera Club. Several members contributed to the further enjoyment of those present by some songs and recitations, and all finished up by singing "Auld Lang Syne."

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 17,—Mr. Bishop in the chair.

This being the annual exhibition of members' pictures and display of lantern slides, the meeting was held in the large Wellington Hall. The hall had been tastefully arranged by a small sub-committee, and a large number of the friends of the members attended by invitation ticket. There was not such a large display of exhibits as had been shown in previous years, owing to the fact that many of the members were exhibiting elsewhere; but many of the pictures that were shown had been very carefully prepared. The pictures were of all sizes, from the quarter-plate hand-camera pictures up to the very large-sized and handsomely framed enlargements, and the various printing processes were well illustrated, showing how any process, if carefully handled, lends itself to picture making. Mr. Grover presided at the lantern, and the pictures were projected on to a screen kindly lent and erected by Mr. Bishop. There were two exhibitions of slides during the evening, and these had been carefully selected by the sub-committee. During the evening a very good programme of music and recitations was gone through, the principal performers being Mr. Bishop, jun., Mr. Coventon (flute solo), Mr. Griffiths (recitation). Mr. E. Clarke presided at the pianoforte. The Secretary was unavoidably kept away from the meeting by domestic trouble, but owing to the efforts of Messrs. Coventon, Grover, Bishop, and the other members of the Council, the evening was an enjoyable one, and the guests of the Society went away well pleased with their entertainment.

It is hoped there will be a full attendance at the meeting on April 7, as Mr. A. P. Wire, the Hon. Librarian of the Essex Field Club will then give his popular lecture on *Visions of the Past*—historical incidents connected with East Londou and South-West Essex, illustrated by views shown by the optical lantern, many being copies of old prints.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MARCH 20,—The President (Mr. W. A. Brown) in the chair.

Letters and papers from Mr. Biden, *re* the federation scheme, were read. It was resolved to send delegates to the meetiug to be held on the 23rd inst., with discretionary powers.

Mr. C. WHITING then read a paper on *Lantern Slide Making by the Wet Collodion Process*. The paper was followed by a practical demonstration, one exposure being made in the camera and two by contact.

The PRESIDENT, iu the name of the Society, presented the lately retired Hon. Secretary (Mr. John A. Hodges) with a lens (by Taylor & Hobson, with Iris diaphragm), with a suitable inscription. He made some flatteriug remarks on Mr. Hodges' past services to the Society, and Mr. Hodges warmly thanked the Society for the testimonial.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 20.—Mr. GAMBIER BOLTON, F.Z.S., delivered his lecture on *Animal Photography*, illustrated by about oue huudred slides, which formed one of the most pleasant and interestiug evenings the members and friends had spent. The slides were described by Mr. Bolton in a lucid manner.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 20.—Mr. Eunis presided.

The subject of *Development* was introduced by Mr. ARDASEER, who touched upon the theory of the actiou of light upon the sensitised surface and the development of the latent image; noticed the different actiou which takes place in the case of wet and dry plates; explained the functious of the various ingredients employed iu development; and enlarged upon the advantages of slow development, of redevelopmeut in certain cases, and of the judicious use of certaiu dodges, such as the use of the brush, inteutional fogging, iuteutional stainiug, and others.

Mr. CEMBRANO mentioned that for uuder-exposed plates he had found re-

development with quinol, after eikonogen, advantageous, the latter giving detail, the former density.

Several other members contributed to the discussion.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

March 21.—Annual dinner.—Mr. J. Humphries, F.S.A. (President), in the chair.

After the usual toasts, the President presented to Mr. G. R. Martin, the late secretary, a very handsome microscope, suitable for micro-photography, the gift of the members, and added to it, as a mark of his personal esteem, a high-power objective to complete the instrument. Mr. Martin made suitable acknowledgment.

The following certificates were then awarded for work shown at the late exhibition:—"Silver prints," 1st, J. C. S. Mummery; 2nd, W. T. Goodhew. "Platinum and bromide," 1st, F. W. Cox; 2nd, W. T. Goodhew. "Genre," 1st and 2nd, W. T. Goodhew. "Portraiture," 1st, E. T. Hiscock; 2nd, F. Cherry. "Enlargements," 1st, C. Beadle; 2nd, W. Taylor. "Lantern slides," 1st, W. Taylor; 2nd, E. T. Hiscock.

On March 23, Mr. H. Smith in the chair, a lantern slide exhibition was held. To the audience it seemed as if the members had each and all reserved their choicest work, and had vied with each other to make this, the last lantern slide exhibition of the season, a marked success.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

March 20.—Lantern evening.—Mr. Edward Lovett (President), in the chair.

Two hundred slides were put through the lantern, the work of members.

J. A. Carter and Mr. Oakley also showed some photo-micrographs of rock sections taken by polarised light.

The next ordinary meeting will take place in the old School of Art room on April 3, when Mr. A. R. Dresser will read a paper entitled *The After Part of Hand-camera Negatives* (illustrated).

SYDENHAM AMATEUR CAMERA CLUB.

March 17,—The President (Mr. C. D. Budd) in the chair.

Mr. T. W. Rumble read a paper on *Developers and Developing*, in which the advantages and disadvantages of pyro, quinol, and eikonogen respectively were compared, and the balance ultimately struck in favour of pyro. Mr. Rumble closed his remarks by addressing himself especially to those members not far advanced in photography, and, after warning them against running from one system to another, strongly advised them to thoroughly master one developer before attempting another.

EALING PHOTOGRAPHIC SOCIETY.

March 19,—The President in the chair.

Mr. F. W. Hart, F.C.S., gave a demonstration of the method of eliminating hypo from silver prints or plates. Mr. Hart also showed a new plate washer.

The next meeting will take place on April 2, when Mr. Howson will give a demonstration on the working of Alpha plates and paper.

ENFIELD CAMERA CLUB.

March 18.—Dr. F. Cresswell showed the capabilities of kallitype to a large and appreciative number of members. The demonstration, which was a very exhaustive one, some dozens of prints being developed, was preceded by a full explanation of the principles on which kallitype is based, and it was evident that the demonstrator not only had his subject thoroughly at his fingers' ends, but had been at considerable trouble in giving the Club the benefit of his knowledge at a notice of only three days. Previous to Dr. Cresswell's demonstration four new members were elected, and it was resolved that two delegates from the Club should attend the adjourned meeting of the proposed federation on the 23rd inst.

OXFORD PHOTOGRAPHIC SOCIETY.

March 17,—The President in the chair.

An exhibition of apparatus took place.

Mr. A. F. Kerry, M.A., will give a lecture on *Bromide and Kallitype Paper Printing* on April 7.

SOCIETY FOR THE PROMOTION OF PHOTOGRAPHY IN BERLIN.

March 6,—Professor Vogel in the chair.

Lippmann's colours formed the principal subject of discussion, Professor Vogel communicating some of the data which had been furnished to him by the discoverer himself. Dr. Vogel pointed out that Professor Lippmann's chief merit consisted in his having *fixed* the colours, but that so far a real photograph in colours, *i.e.*, a direct reproduction of pigments and mixed colours, appeared as far off as ever. Dr. Vogel further drew attention to the services of Dr. Zenker, who appears to have practically anticipated Lippmann as long ago as 1868, and to the researches of Dr. Wiener, of Strasburg.

Herr Gaillard inquired if the mercury did not exercise a chemical action upon the emulsion with which it was represented as being in contact.

To this the Chairman replied that he considered the extreme dilution of the emulsions used by Lippmann probably prevented this to any noticeable degree.

Dr. E. Vogel then exhibited a number of prints on the chloride of silver gelatine opal glass of Perutz, which were distinguished by exceptional softness and delicacy of tone. Attention was drawn to the difficulty of ascertaining when the glass prints were sufficiently printed, in regard to which

Dr. Hesekiel stated that he was bringing out a copying frame which would enable this difficulty to be overcome.

Herr Halerland inquired why it was customary to employ ferrocyanide in toning these plates, to which

Dr. Vogel, jun., replied that the presence of this substance enabled the positives to keep the tone they received in the tone fixing bath, and that if it were not used the toning would have to be continued longer, which would give bluer tones.

Herr Klepsch then exhibited a large collection of views of the forest of the Spree which he had taken with eosine-silver films by means of a new dark slide specially constructed by Herr Stegemann for films. The peculiarity of the slide is that the films can be inserted from above. The changing appears to be effected mainly by hand through a sleeve. The slide costs about 27*s.*, and the sleeve 7*s.* The specimens exhibited showed that the sharpness was not in the least effected by the glass plate against which the films were pressed.

The proceedings terminated with an account by Herr Christmann of the way in which M. Janssen, the Parisian astronomer, ascended Mont Blanc for the purpose of making spectroscopic observations. A frightful snowstorm kept the intrepid astronomer a prisoner for five days in a wretched shelter-hut half way up the mountain side, notwithstanding which M. Janssen finally, and in spite of his lame leg, reached the top and carried out his observations. The result of them was to show that oxygen is *not* present in the atmosphere of the sun.

Correspondence

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

MR. VARLEY'S DISCOVERY.

To the Editor.

Sir,—The scanty attention bestowed upon the discovery by Mr. F. Varley, announced by Professor Meldola at the Society of Arts last week, seems surprising. This discover—assuming the statements made by its sponsors to be true—is certainly the most important that has for many years been made in photography.

It was stated that the discoverer, Mr. F. Varley, had succeeded in so far exalting the sensitiveness of iron salts that they may now take rank with silver emulsion, and in proof of this statement a piece of paper coated with the new preparation was exposed for a second or so to the light of a gas flame, and the image subsequently developed and shown to the audience.

This extraordinary sensitiveness of an iron salt suggests that its use need not be confined to printing purposes, but may be applied to the camera, and if already sensitiveness equal to that of silver compounds has been reached, there should be grounds for hope that with further experiments, such as will doubtless be made in all scientific photographic laboratories as soon as the details are published, the rapidity of our present camera exposures may be far exceeded.

The most remarkable thing, perhaps, about this discovery, from a scientific point of view, is the manner in which one metal has been made to take on so many of the characteristics of another metal belonging to quite another group. The print exhibited was said to be developed with ferrous oxalate, and to require immersion in hypo to fix it, otherwise it would darken all over. Here we have the metal iron simulating in behaviour silver, not only in sensitiveness, but in amenability to reduction-development by an iron salt, and in the removal of unused sensitive material by hypo. Such a simulation seems to be a nearer approach to the dream of the alchemists, the transmutation of metals, than any previous scientific discovery.

There can be no mistake as to the claim made for this wonderful invention. Professor Meldola said that he had been assured that there was no silver employed, and Mr. Varley stated that the preparation was more than one hundred times cheaper than a silver one. Professor Meldola therefore probably felt excused by the extraordinary importance of the discovery for the proceeding—which is suggested by a paragraph in last week's British Journal of Photography to be an unusual one—of introducing a process that, for the moment, is a secret one, but promises to be made public through the medium of the Patent Office.—I am, yours, &c.,

Expectant.

P.S.—Is it possible that any doubt can be entertained of the genuineness of the facts asserted to account for the small notice bestowed upon such a wonderful discovery? or is it only the scientific habit to disregard statements which, while details are withheld, can neither be confirmed nor refuted?

TONE INFLUENCED BY DEVELOPMENT.

To the Editor.

Sir,—In your advertisements, and in those of other photographic journals, I have noticed during the past month or so the introduction of a new plate, whose chief merit is that it develops with great rapidity. I have nothing to say of this plate, not yet having tried it, but a word to those amateurs or professionals who do not know the danger of short development may be of use.

As a matter of fact, the chief reason why so many photographs (true in most other respects) are false and bad in "tone" is that the maker of the negative did not like the trouble of a very slow developer. The brain, the eye, and the hand of man are not active enough to make the best of a negative if it takes less than eight or ten minutes in the developer to bring it to the needful density; indeed, with the sizes above 12 × 10 inches the time needed to successfully develop them is from twenty to thirty minutes, and it is not possible to do it in less and get every time what you see in your subject while photographing it.

Many will say that this is right enough for a beginner, but does not apply to the professional of long experience. They are in error. It applies to every one who cares anything for the quality of his work, and as a professional photographer I am not ashamed to say that I do not find myself able to work in less time than is above indicated, except on very special occasions.

Some photographers develop in just the same way that they tone, using the same solution over and over again until used up. I have in my mind a firm who develop this way, and of the results nothing need be said, except that they do now and then get a picture true in tone, &c. —perhaps once a month.

What painter, engraver, or artist of any kind would think of setting out his conception in a few minutes, even if it were possible? And photographers, as a rule, are not greater masters of art than these.

I admire Dr. Emerson's attempt to meet this and other difficulties and errors in the books he has written on photography, and congratulate him on his success in doing so. By showing us his ideas and his work, and upholding both as naturalistic, then renouncing all, he has not left us just where we first stood, but far nearer to the truth, for his words and actions have set men thinking, have set men trying, and that at least is much in the cause of naturalism.—I am, yours, &c.,

Bath, March 21, 1891. ERNEST LAMBERT.

UTILITY OF HAND CAMERAS.

To the EDITOR.

SIR,—I can only suppose that Mr. Chesterman's letter in your last issue was so purposely offensive as to prevent the likelihood of its getting a reply. So far as I am concerned it has succeeded perfectly. I would ask such of your readers as are interested in the above subject to read Mr. Bolton's useful article on p. 163; your "Editorial Notes" on p. 161; Mr. Chesterman's *Hints to Beginners* on p. 149; my letter on p. 174; and lastly, the effusion on p. 190; and with one bit of advice I leave the matter to their good taste and discrimination. In choosing a hand camera, do not do so haphazard, as their good qualities vary as much as apparently do ideas of "the courtesies [*sic*] of journalism."—I am, yours, &c., PRESIDENT.

Burcott House, Banbury-road, Oxford.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

To the EDITOR.

SIR,—A word in reply to your correspondent "An Exhibitor." The numbers in Class 9 were printer's errors, now corrected in second edition. With reference to the awards: the almost universal opinion has been that the awards have given general satisfaction; at all events Clause 8 gave judges full discretion both as to withholding and awarding extra medals. It would be somewhat unusual to arrange a class where each exhibitor could be allowed to judge his own work.—I am, yours, &c.,

March 24, 1891. THOMAS S. MAYNE, *Hon. Sec.*

A BROMIDE OF COPPER INTENSIFIER.

To the EDITOR.

SIR,—In your "Foreign Notes and News" last week, your translator, in mentioning "R. S. Botonne's" formula for the above, given in the *Archiv*, does not "quite understand how the sulphate of potash is precipitated, as it is under ordinary circumstances a soluble salt." If he will try the formula, using *proper proportions* of potassium bromide, cupric sulphate, and water, he will find the greater portion of the potassic sulphate is thrown down, because there is not sufficient water to hold it in solution. But looking at the formula as it is given, I personally do not quite understand what is meant by a "pint" of bromide of potassium or of sulphate of copper.—I am, yours, &c. BROMIDE.

[The "pint" of bromide, &c., is merely a misprint for *part.*—ED.]

DROP SHUTTER EXPOSURES.

To the EDITOR.

SIR,—I am at a loss to understand Mr. Edward J. Smith as to exposure with a drop shutter. He says with a given lens and stop *f*·22·6, the exposure will be one-sixteenth of a second. Now, I have always supposed that the stop used in the lens did not in any way alter the length of time during which a shutter allowed light to pass through the lens.

Then, again, a simple drop may vary considerably if the shutter is not vertical in both directions.

I have found that with the lens he mentions, Ross 8 × 5, with the opening in the drop the same diameter as the lens, and falling one-quarter of an inch before it begins to open, that the exposure is nearer one-tenth than one-sixteenth of a second.—I am, yours, &c., H. G. M. CONYBEARE.

The Hut, Ingatestone, March 23, 1891.

THE LIVERPOOL EXHIBITION.

To the EDITOR.

SIR,—Pray allow me to make a correction.

In this week's issue of your paper, in regard to my exhibit at the Liverpool Exhibition, you state that "you have before mentioned, when shown at Pall Mall," these four life-sized heads. These portraits were, however, taken within one week of the entry day of the Liverpool Exhibition, and, consequently, could not have been shown at Pall Mall. Two of the sitters had been previously photographed and shown by me, hence, perhaps, your mistake.—I am, yours, &c,, W. J. BYRNE.

Hill-street, Richmond, Surrey, March 21, 1891.

NATIONAL PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—Arrangements are being made with a view to facilitate the transmission of Liverpool exhibits to us by sending a representative to sort and overlook the pictures entered here, and to see to their speedy despatch. We have already the promise of a great number of exhibits from Liverpool, including the wonderful flashlight pictures by the Countess Loredana da Porto Bonin.—I am, yours, &c. S. G. BUCHANAN WOLLASTON.

Crystal Palace Company, Crystal Palace, S.E., March 24, 1891.

THE NEW YORK MAY EXHIBITION.

To the EDITOR.

SIR,—It will be of interest, perhaps, to all amateurs and other photographers to know that arrangements are now in progress for a very large, select, and important exhibition of photographs, including specimens of the best foreign work, to be held in New York, at the Fifth-avenue Art Galleries, between Thirty-fourth and Thirty-fifth-streets, May 25 to June 6, under the auspices of the Society of Amateur Photographers of New York.

It will be the fourth of the joint series of exhibitions undertaken with the aid of the Photographic Society of Philadelphia and the Boston Camera Club.

The prospectus and entry forms have already been sent out, and the judges selected are Thomas Moran, Will H. Low, and Edward Bierstadt, men well known in the respective branches of art which they represent.

Medals are to be awarded, instead of diplomas, the number being limited to twenty-five. Exhibitions of slides will be held four nights during each week, and in a separate room there will be an exhibit of new and novel apparatus.

Foreign exhibitors may send pictures unmounted, which will be mounted and framed by the Committee.

Exhibits should be sent to the Galleries by May 11 to ensure attention. The Committee prefers that the very choicest work be sent rather than a large quantity of ordinary pictures. Exhibits are invited from all photographers, and when received will be carefully attended to.

Entry forms will be sent on application, and all correspondence should be addressed to—Yours, &c.,

F. C. BEACH, *Chairman of Committee of Arrangements.*

113, *West Thirty-eighth-street, New York.*

Exchange Column.

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

Wanted, whole-plate rapid rectilinear (Swift preferred); will give in exchange Lancaster's half-plate Instantograph with lens, drop shutter, four double backs, stand, and case.—Address, C. H. HELFER, James-street, Bath.

Wanted, a modern half-plate set with three dark slides; will give in exchange a Ross' 10×8 orthographic lens and one or two boxes of Mouckhoven's dry plates.—Address, J. P. TONKIN, 61, Beauchamp-road, Clapham Junction, S.W.

Will give in exchange 10×8 rapid rectilinear, diameter of lenses two and a quarter inches, and five-inch focus wide-angle rapid rectilinear, for 10×8 Steinheil or Swift's Paragon.—Address, ALEXANDER WOOD & SON, 6, St. Bernard's-row, Stockbridge, Edinburgh.

Three backgrounds in flatted oils on linen and roller, new and perfect, eight feet by seven feet four inches (two garden scenes, one seascape), in exchange for good violin or half-plate studio camera. Photographs forwarded.—Address, W. J. HARE, Windsor Studio, Sutton, Surrey.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

T. J. STEVENS.—Try at the tailors' trimming warehouses.

TROUBLED.—Any analytical chemist will test the mounts for you.

A. G.—There is no accounting for the manner in which agents do business.

W. C. SELLE.—The matter has been rectified by the publication of Mr. Byrne's letter.

J. MUNNS.—The house mentioned is not on the "black list." You may safely entrust them with specimens.

A COOPER & Co.—Having carefully examined the spots on the negatives, we conclude that they are caused by air bubbles, by which the developer has been prevented from acting.

R. STEWART (Elgin, N.B., and Torquay) says if the correspondent who recently wrote about silver residues will communicate with him, he will give information relative to the subject.

W. COLYER.—The pictures are very interesting, but we think they have very little commercial value in this country. Write to Messrs. Frith & Co., Reigate, or Poulton & Son, Lee.

W. R. C.—Good starch is quite equal to arrowroot for mounting photographs. There would be no advantage in employing the more expensive article, and, in practice, the starch is easier to use.

JAS. WILLIAMS (Willesden Paper Works) writes, *re* "Countryman's" letter, that he has met with difficulties in the manufacture of the paper which he has now overcome. He hopes shortly to have it in the market.

E. PENFOLD.—The lens is a whole-plate portrait lens of Parisian manufacture. It seems good; but we should advise you to try it before purchasing. A lens of this class is worth much or little, according to what it will do.

H. B.—1. The negative will not spoil.—2. Bleached collodion positives retain their purity for a great number of years.—3. An image bleached as mentioned will suffer on exposure to light.—4. Try the reapplication of a bleaching agent.

OPERATOR.—If any wages are due to you sue the employer in the County Court. If you were paid weekly it is of no consequencce there being no written agreement. It is not usual to give receipts when wages are paid weekly.

D. ALLEN.—To print on silk or other fabric, immerse it in—water, one ounce; gelatine, five grains; chloride of sodium, five grains. Hang it up to dry. Then float for half a minute on a fifty-grain solution of nitrate of silver. Dry, print, tone, and fix as usual.

MEDIUM writes: "Could you kindly give me a formula for a good spotting medium—one that will not show dull after drying? I have been using Indian ink and sepia thinned down with water, which shows very plainly when dry."—The addition of a little gum-water will remedy the evil.

R. COMBER.—The cause of the mealiness is that the prints are much over-toned. It must be borne in mind that many papers, particularly ready sensitised, will not bear toning beyond a red-brown stage without becoming mealy. Tone less, and be content with the tone, or obtain other paper.

C. O. says: "After thinning some enamelling collodion with methylated spirit I find that it no longer dries transparent, but becomes opaque, like ground glass. What is the cause, and how can I set it right?"—The spirit used must have been "finish," which contains resin in solution, and not pure spirit. There is no remedy.

O. M. M. writes: "Will you kindly let me know what I can do with some silver washing to throw down the chloride? I have used common salt and hydrochloric acid, and still it won't clear, although it is more than a week since I left it to settle."—Add a little nitric acid and give a vigorous stirring. The chloride will, no doubt, then quickly subside.

BLACK LIST.—The Limerick firm recently complained about with regard to the non-return of specimens write: "We have just opened another place, and we got samples from different people which in moving have got mixed. But if your correspondents will send us particulars, or send us an invoice of value, we shall at once return the photographs or their value. We are sorry for any misunderstanding through accident."

E. ROBINSON.—Crystoleum has been so long out of fashion that we are unable to indicate any dealers from whom the materials can be obtained. You might, however, try Barnard's, Oxford-street. The process is simplicity itself. A print is cemented with starch to a glass plate, preferably curved. The picture is then thinned by friction with sand paper. Render transparent with paraffin wax or varnish, and then apply oil colours at the back.

WILTS.—The spots are due to metallic particles in the paper. Many drawing papers are not suitable for photography, and clearly this is one of them. As the specks exist in the paper, there is no way of getting rid of them in preparing it. The best plan will be to obtain samples from different sources, and when a paper is found that answers the purpose secure sufficient to last some time. Whatman's papers are usually suitable, so are Hollingworth's.

TIMOTHY.—The fault in your lighting is not due to the material of the blinds, but the way they are used. The grey material now in use is as good as any of the others. Indeed, we should prefer it. We imagine you are using too much top, and not sufficient side, light. Front light should be very sparingly used, if at all. From the description we are not clear as to the form of studio. The developer or plates have nothing to do with the difficulty. Several formulæ for hydroquinone developer are given in the ALMANAC for the current year.

EAST END WORKER inquires: "Shall I be doing wrong in making a lantern slide from any of the maps of London published by various persons? I merely want it for personal use that I may be able to indicate upon it the area included in a lecture on the East End of London. Also is it illegal to make lantern slides from hymns in hymn-books, such as Sankey's?"—If the maps are copyright you will probably be doing wrong, but the publisher will doubtless give you permission to copy such portions as you require. This also applies to the hymns.

IGNORAMUS says: "1. I have an old engraving of this town in my possession, and as there are only a few of them to be got, I wish to get a photograph taken of it half-plate, and to enlarge it from that size. Will you kindly say how it can be done best? It appears to have been glued on to cardboard. How can I remove it without injuring it? 2. Could I be prosecuted if I put out a number of enlargements of it for sale? There is no copyright marked on it, or anything of that kind, except the following particulars—viz. 'Delt. N. Manhart, Impt.'—printed at bottom of engraving."—1. There is no necessity to remove the print from the cardboard. Simply take a negative of it in the camera in the ordinary way, and from that make the enlargement. 2. As the map is an old one, the probability is that the copyright has expired long ago. Of course, if a copyright still exists a penalty will be incurred.

J. BISSET writes: "As a student of photographic chemistry and a constant reader of your JOURNAL, I would be very much obliged to you if you would let me know if the chemistry of the following statement, which appeared in an article on *Intensification*, by Charles L. Mitchell, M.D., in your issue for March 13, is correct:—'The object of the salt (sodium chloride) is simply to dissolve out any mercuric chloride remaining in the film, and prevents the clear portions of the negative from becoming clogged up with any reduced mercury in the next operation,' the 'next operation' being the treating of the negative with the sodium sulphite solution. How can the sodium chloride dissolve out the mercuric chloride, since the mercuric chloride is already in solution? And how can the 'next operation' 'clog up the clear portions of the negative,' since sodium sulphite produces no precipitate with mercuric chloride?"—Our correspondent is correct in his chemistry, and has caught Dr. Mitchell napping.

LIVERPOOL CAMERA CLUB.—Under this designation a Club has been formed in Liverpool with the following officers:—*President:* Cecil F. Webb, B.A., L.D.S.—*Vice-President:* James Hawkins.—*Council:* R. C. Robbins, W. H. Glassey, F. W. S. Burslem, W. H. Jones, W. A. Brown.—*Hon. Secretary:* W. Tansley, 14, Wentworth-street, Liverpool. The ordinary meetings will be held on the second Wednesday in each month at eight p.m., at the Rooms, in the Liverpool College, Shaw-street. Subscription, five shillings per annum.

DR. EMERSON'S RENUNCIATION.—Whoever reads Dr. Emerson's *Renunciation* will do so with bewilderment and a desire to know what it all means. And as the author of this extraordinary production may be unknown to many of my readers here in India, let me tell them that it was written by the high priest of naturalistic photography, who wrote a book called by that title to illustrate his teachings. This is the book he has now publicly consigned to oblivion. It is worth reading for the insight it gives not only into the philosophy of the school he had set up, but also the character of its teacher. When it was first published, in 1889, the criticisms it contained caused much comment and controversy in the photographic world, because it set up new gods and spoke in boisterous tones. Since then the war of words it occasioned has raged with varying intensity. And now without warning, after apparently establishing its *raison d'être* with a section of photographers, its author suddenly shuts up his book and leaves his scholars to their own devices. This is ungracious surely. As for the teachings he now renounces, faulty as he acknowledges them to have been, they set the whole school of photographers a-thinking, and brought forward into prominence the art side of photography. In this, indeed, *Naturalistic Photography* has been distinctly helpful, and the good it has done will remain. But its author, as he now says, as many have all along known, taught that photography could do more than it was in it to do. He forgot or knew not that it could no more usurp the birthright of the artist-engraver than display the pigments of the painter. Had Dr. Emerson grasped the true ends and aims of photography much of his book and all his recantation need never have been written.—*Jour. Photo. Soc. India.*

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THE BRITISH
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PHOTOGRAPHIC ENAMELS.

When informing the world the other day of the interesting ct that an illustrious lady had recently given a commission r the reproduction of some of her photographs upon porcelain, was hardly correct of a morning contemporary to allude to e ceramic process as if it were a new one, although, perhaps, e error, under all the circumstances, was excusable. It is t far short of forty years since ceramic photography was first actised, and while it is not clear to whom the credit is due r having originally worked out the process, no doubt exists at M. Lafon de Camarsac, of Paris, employed it to a suc-ssful end at about the date just mentioned. In our last lume we had a short article upon the subject, and out of gard to the fact that much interest has lately been mani-sted therein by numerous correspondents and others, we will w make a few addenda to what was then said, in order to rnish an outline of the chief working details of the process. e take this course all the more readily because it is a very ng time indeed since the subject was fully dealt with in our ges.

Ceramic processes, as usually worked now, differ only in the ethods of producing the vitrifiable transparency, and from ong those that have been published from time to time we ect for mention four, as having features of interest for those our readers who may desire to experiment in the production this kind of picture. These are—The substitution process, which the silver image of a collodion transparency is re-ced by platinum, gold, or iridium, singly, or in combina-n; the powder process, in which a vitrifiable coloured bstance is brushed upon the moist image; the carbon pro-ss, which requires that, for the pigments ordinarily used, a rifiable powder shall be substituted; and, finally, the collo-pe process, which yields an impression in vitreous colours.

As nearly as we can gather, only the first two of these four ethods are practised to any extent nowadays, and we will erefore give an outline of each of them, since both processes e undoubtedly capable of rendering the highest quality of ult in competent hands.

The number of those who produce photographic enamels in s country is not only small now, but never at any time was ge, so that it was seldom any detailed particulars of the thods followed found their way into print, which may, in a ght degree, account for the apathy of English photographers vards the process. It is true that, in 1855, M. Lafon de marsac publicly communicated some details of various amelling processes of which he was the author, a translation the paper appearing in The Photographic Journal of otography of the same year, but it was more than hinted at the time that the method he so successfully worked himself differed materially from these. It was therefore left to the English photo-enamellers, or would-be photo-enamellers, to arrive at the working details of the various methods as best they could. A conspicuous exception to the common reticence subsequently preserved upon the subject was Mr. A. L. Henderson, whose reputation as a photo-enameller was, and is, deservedly great, and who, about eight years ago, demonstrated the enamelling process before the members of the London and Provincial Photographic Association. We believe that not only was this demonstration productive of a great deal of benefit to those who were fortunate enough to witness it (among whom we may mention the late Mr. James G. Tunny, himself a photo-enameller of marked ability), but that the publication of the accompanying lecture proved serviceable to many not present who were anxious to acquire something beyond a knowledge of theoretical photographic ceramics.

On the occasion in question Mr. Henderson described his own method, which, for want of a better name, he called a "mongrel" process, although it appeared to consist essentially of the displacement of the image of a collodion transparency by a compound of platinum and tin, the other operations remaining much like those of ordinary substitution processes. The precise formula is, we believe, employed in Germany to this day. Some of Mr. Henderson's ideas seem to us now to run counter to certain beliefs common among photo-enamellers. For instance, he regarded the presence of a small quantity of silver in the fired image as improving the tone, and, further, advised that the picture should not be glazed, or rather that the flux should be applied to the enamel first. With some Continental operators we believe that the utmost pains are taken to dissolve out the last trace of silver, either in the form of metal or haloid, from the film, and others make a feature of withholding the glaze from the tile until after the image has been fired. Mr. Henderson fired a picture before the Association, and illustrated the state of fusion the tile reached by pressing the blade of a knife into it. He also said that by placing a picture *in situ* and firing for a certain time, the image could be removed, leaving an intaglio impression, which might be inked and printed from. The lecture contained many other instructive and suggestive ideas.

The extra-photographic appliances required for enamelling begin and end with a muffle, which is indispensable. A muffle is simply a portable furnace attachable to the domestic gas supply, having a small kiln or oven towards its summit, in which the plaque is fired, free from contact with the gas and the products of combustion. The degree of heat required for firing is obtained in a few minutes; the muffle should be red

hot when the plaque is placed in it. The heat of a coal or coke fire—the latter for choice—could be utilised by having a form of box kiln with grooves for shelves to slide upon, such as was formerly used for this purpose, but the greatest care will be necessary to ensure the absolute exclusion of the smoke and so forth. On the whole, a gas muffle is safest for the purpose, and selected to accommodate enamels up to whole-plate size, does not, we believe, cost more than a few pounds. It is an article that, either in the hands of the amateur or professional, could be easily made to earn its keep.

The substitution process, as at present practised, consists of detaching a transparency from its support, converting the image into a vitrifiable substance, and then, after placing it in contact with a "soft" porcelain plaque, thrusting it into a small kiln heated to such an intensity as to destroy the film, while "burning in" the metallic image upon the fusible tile. It can thus be seen that we have here admirable scope for the reproduction of photographs of the highest degree of beauty and permanency, and there is, therefore, all the more wonder that photographic enamelling has hitherto been so poorly supported in this country as to make it advantageous to very few persons to engage in its commercial practice. It is also a source of surprise to us that many amateurs have not chosen this excellent method of perpetuating such of their pictures as may have deserved the honour. However, under royal initiative we may possibly be destined to witness a favourable movement on behalf of the process, which, let us here remark, is not one involving great or serious expense in the undertaking.

As a transparency in collodion must be made, it is necessary to copy from the negative in the camera by the wet process. The image should have the greatest abundance of detail obtainable, and should be tolerably, but not extremely, dense, with the lights perfectly without veil, and the shadows not inclined to heaviness. Indeed, the kind of picture required is that which looks best as an ordinary transparency, and to say so much, or rather so little, should give a photographer the best idea of the result to aim at. It need hardly be said that whatever defects occur in the picture will be remorselessly reproduced in the plaque. There are very skilful enamellers who are able to touch out blemishes from the unglazed enamel, but this is a degree of cleverness not easily acquired.

We surmise that it is needless for us to repeat in these columns detailed instructions for obtaining transparencies by the wet collodion process, and merely referring those of our readers who would be working it for the first time to what has previously appeared in the JOURNAL, as well as to the necessary formulæ which are to be found in the ALMANAC, we proceed to treat in detail of the matter in hand at the point where it breaks fresh ground. The transparency having been developed, fixed, and washed, the next operation is to detach the film from the glass. This may be easily done by soaking it in a solution of distilled water to which a few drops of sulphuric acid have been added, when, after gently raising the edges with a camel-hair brush, it will be found that the film will leave the glass if the plate be gradually lowered into another dish of water.

At this stage we take leave of the subject for the present.

PURITY OF MATERIALS AND SENSITIVENESS IN EMULSION WORK.

THE following remarks will be found to have reference chiefly to the sensitiveness of collodion emulsion, and are induced by the frequent observation on the part of workers of that beautiful process that they are unable, or at least find it difficult, to secure the same degree of rapidity in their preparations as in former days. It may be thought, perhaps, that such a suggestion is mainly the effect of imagination, the contrast between the relative sensitiveness of gelatine and collodion giving rise to an unjust comparison of the past and present sensitiveness obtained with the older form of emulsion. But we think there is ample evidence that such is not altogether the case.

Setting aside the fact that the allegation has been made by observers who are too careful to be led away by imagination, and who have sufficient data on which to fairly base such an opinion, we may say that we ourselves twelve or fifteen years ago found no difficulty in producing well exposed portraits in an ordinary room under circumstances and with exposures altogether different from those we find practicable now; it will be remembered, too, that the late Colonel Stuart Wortley produced results in direct competition with wet collodion that left the latter in second position, though it is true he was an exceptionally skilful manipulator.

Those who were familiar with the working of the more rapid forms of collodion emulsion of the late "seventies" will remember that though under favourable circumstances of light it was not difficult to produce a dry plate that was quite as rapid as ordinary wet collodion, yet when the conditions were inferior the comparison between the two processes was lost altogether. For instance, given an "open landscape" and bright sunshine at the best time of day the emulsion plate might possibly prove to be quite as rapid as the bath plate, but with a dull or evening light for interior work or dark foliage the same emulsion film failed to reach within anything like reasonable distance of the wet plate. The same difference of behaviour exists still between gelatine and collodion emulsion films, that is to say, the former appears to have a proportionately less advantage over the latter in a good light than in a bad one. So that it is impossible to base any arguments on such collateral performances, and all that can be done is to work from data of exposures actually made under conditions that are well established.

Thus, looking back at the period mentioned above, we have made portrait negatives in an ordinary and not over well-lighted room with exposures varying from eight to twenty seconds using a portrait lens of the ordinary rapidity, that is, *f*-4, or the present "U. S. No. 1." We have recently attempted a similar feat with an emulsion of the present day, but even allowing for the time of year cannot bring the results into comparison with the former ones. For outdoor work, too, it was no unusual thing to find the rapidity of a certain formula set down as "ten seconds with *f*-32," but under the best circumstances we have not found that possible for some years past when using collodion emulsion.

Assuming then that there is an actual falling off in the general rapidity of collodion dry plate films, it seems interesting to attempt to trace it to its cause. Looking at the vast improvement in the quality of most of our chief chemicals it would seem natural that the very reverse condition of affairs should exist. Compare the pyro of to-day, for instance, with that of a couple of decades back. Take the nitrate of silver now obtainable in any quantity at a price under three shillings an ounce, and it will compare favourably with the "triple recrystallised" formerly sold at prices varying from four and sixpence to seven and sixpence. Take even sulphate of iron, an article which it can scarcely be claimed has been improved in consequence of the special demands made for it by photo

graphers. A better article is now obtainable at any village oil shop than most of the dealers in photographic chemicals could supply a quarter of a century ago. We have indeed paid a "long price" for samples of "copperas" for developing purposes that the cheapest ink manufacturer of the present day would turn up his nose at.

While, however, the loss of sensitiveness cannot be set down to any falling off in the general quality of our materials in consequence of competition and reduced prices, it must be borne in mind that with the decline in the use of collodion the production of the special materials required also fell away, and comparatively little attention is now given to a practically unprofitable branch of the photographic trade. Take, for instance, the principal item, pyroxyline, even for wet collodion purposes how few actual makers now remain, while of the special quality requisite for emulsion work there is scarcely more than a single maker. Then, again, ether and alcohol received far greater attention in the days gone by for the simple reason that upon their proper condition the sensitiveness of wet collodion very greatly hinged. The ether, it was always directed, as well as the collodion after manufacture, must be kept in "a dark, cool, place, otherwise" they developed characteristics which caused them to act upon the haloid salts, liberating iodine and bromine, and thus causing insensitiveness. How much attention, we would ask, is paid at the present day to the selection of a suitable sample of ether beyond an examination of its specific gravity?

Moreover, in the past no one would have thought of employing anything but "pure," *i.e.*, non-methylated, solvents for the most rapid work, many, indeed, if not most, of the best operators refusing to use methylated solvents at all. Now the practice is all but universal for emulsion purposes, and though in the case of ether it possibly does not produce much harm, the same can scarcely be said with regard to alcohol or "spirit." The mere admixture of a small quantity of methyl with the ethyl alcohol does not necessarily imply a lowering of the character of the mixture for chemical purity, though it may lessen its attractions as a potable liquid, and so permit its sale at a low price without injuring the revenue returns. But this very fact of compounding a cheap alcohol for industrial purposes is to blame, no doubt, for much of the evil, simply because the worst samples of ethylic alcohol are selected by the methylator as being good enough for his purpose.

It is possible that the effect of methyl in emulsion collodion is not so injurious as it would be if introduced into the bath; but still it is noticeable enough when a really bad sample is obtained. In the heyday of collodion emulsion practice it was possible to obtain really admirable samples of "methylated alcohol," at a cost of two shillings or half a crown a pound, that were every whit as suitable for the purpose as the "pure" article at seven or eight shillings; but the excise "came down" on the trade and forbade the sale of anything different from the ordinary "methylated spirit." This latter article can be had at less than three shillings a gallon in quantity, and is retailed at from sixpence to eightpence a pint now, so that there is little inducement to study either its chemical purity or its specific gravity, so long as the latter comes within the requirements of the law.

There can be little doubt that it is upon the solvents employed that the loss of sensitiveness chiefly depends, though, of course, we must not overlook the equally important item, pyroxyline. The latter, however, effects the sensitiveness of the emulsion less than other qualities, while a sample of spirit may be obtained which, without being really bad on the sense that it is wholly unusable, has a sufficient influence to prevent the highest class of result being obtained. A "really bad" sample, that is, one that is so chemically impure that it forms compounds with the silver, resulting in fog, is of course soon unmasked; but there are others which are quite capable of being used in the production of beautifully clean images, even for lantern slides, when the films are comparatively slow, but which break down when a greater degree of rapidity is aimed at. In such cases the evil is seldom traced to its proper cause, but the result blamed to "unsuitable pyroxyline," "over-ripening," or any but the right source.

To illustrate what we mean let us look at the behaviour of different samples of methylated spirit in the presence of silver nitrate. If a quantity of the salt be dissolved in half its weight of boiling distilled water and added to a volume of spirit previously warmed to prevent the precipitation of the crystals, a mixture will be obtained which may remain perfectly colourless for a considerable time, if not indefinitely, so long as it is kept from the light. If it discolour badly at once the sample will be immediately rejected, but if it become only slightly yellow or opalescent it may pass muster for slow work. But let the alcoholic silver solution be raised to the boiling point in a glass flask, and a considerable discolouration will invariably ensue, ranging from the formation of a flocculent brownish-black precipitate, which separates from the liquid to a dense opacity that refuses to settle. If a trace of nitric or citric acid be present the insoluble precipitate is not formed, but the solution takes a more or less dark colour, remaining transparent. For this reason it is usual to acidify the silver solution when sensitising in order to keep the organic impurities in solution, and so removable from the film by washing. But the presence of the acid alone, except in company with a large excess of silver over that required to convert the bromides in the collodion, conduces in itself to insensitiveness, and here we have the first instance in which the methylated product behaves injuriously. Few, if any, samples of pure alcohol will stand the boiling with silver test unless specially purified, but the ordinary commercial spirit is invariably far worse.

It is, however, in the attempt to get great sensitiveness that the ill effect of inferior or impure spirit shows itself at its worst. It may be that when present in an emulsion containing an excess of soluble haloids it is practically innocuous, its impurities having been kept in a safe condition by the presence of a trace of acid when exposed to the action of free silver in dissolving. Here, we say, it is practically innocuous, because under the same circumstances, *i.e.*, in the presence of excess of bromide, the purest materials would give but a comparatively slow result. But let us introduce three or four grains of free silver into each ounce of emulsion, accompanied of course by a suitable proportion of restraining acid, no *immediate* harm is done, and if the emulsion is used or washed within a short period it will, perhaps, give tolerably clean results, and exhibit moderate sensitiveness. But leave it some days to "ripen," so as to get the highest rapidity possible, and the silver will find out the weak points of the combination, in spite of all the restraining acid that can be employed, without destroying the collodion.

We have before us as we write examples showing the truth of this theory. Two emulsions made from separate portions of the same spirit—the one as obtained, the other purified—were prepared under precisely the same conditions. With bromide in excess they showed no difference in behaviour. Up to about

eighteen hours after the addition of a considerable excess of silver they still showed no appreciable difference, but when next tried the unpurified sample had begun to show signs of deterioration; and whereas the other, at the end of five days, still gave a perfectly clean, though a softer and less vigorous image, the first had gone completely into the foggy stage. Necessarily, the one that will resist fog for the longest period has the greater chance of sensitiveness, and such proved to be the case in this instance.

The necessity for the special purification of at least some of the materials employed is, we think, beyond doubt, and, as for many purposes for which gelatine plates are scarcely suited a collodion emulsion of fair rapidity would be deemed by many more convenient than wet plates, we shall shortly describe the method of purification and further increase of sensitiveness.

A few weeks back, it will be remembered, we directed the attention of those likely to go touring with the camera in the neighbourhood of the Franco-German frontier to the stringency of the passport system. Since then it has been once more rumoured that the regulations have been modified. This, again, is contradicted, and it is further stated that in Alsace-Lorraine the passport regulations are enforced exactly as they have been ever since they were introduced in 1888. We therefore repeat the caution to English tourists, in case they have read of the rumoured relaxation, to provide themselves with properly attested passports before venturing in those districts with a camera. Further, when thus armed, it will be well to ascertain from the local authorities what may be photographed and what not. Any one detected taking a photograph in the vicinity of a fort, even if the fort is not included in the view, will certainly be arrested, and will consequently spend some portion of his holiday in "durance vile"—not an unknown experience with English photographers in foreign countries.

We have now entered the month of April, and, so far, we have had but little indication of spring, photographic weather. Trees and shrubs are as devoid of foliage as they were in mid-winter, though many of them, in some parts, show buds ready to burst forth on the advent of a more genial temperature. Although landscape photographs with the trees destitute of leaves are not very pleasing, still the camera need not be idle. Excellent studies of picturesque trees, with their gnarled trunks and contorted branches, may now be obtained, as the light is really good, which will be impossible when they are in full leaf. Photographs of this description are sometimes of great value to arboriculturists.

In early spring many subjects may be photographed that at other times would be impossible. Many old ruins are surrounded by trees which, when they are in full foliage, completely hide the building; hence wide-angle lenses often have to be pressed into service with an unsatisfactory result. It frequently happens, however, that such subjects can be made into good pictures by photographing them when the foliage is still young. Then the architecture will be seen, while the trees will not present the barren appearance in the picture they would if quite bare.

Capital cloud effects have presented themselves during the past week or two. A good stock of cloud negatives is invaluable to photographers, both professional and amateur, and no opportunity should be lost of securing good clouds when they present themselves. It is no unusual circumstance for an amateur to start out and then find that either the light or the wind is against the production of good pictures, consequently the plates are brought home unexposed, or are exposed in the forlorn hope of "getting something;" whereas, had attention been given to the clouds, good negatives of these might have been obtained for future use. This was the case with a friend of ours the other day, who, finding after getting into the country that the elements were against landscape work, turned his attention to the sky, and, as a result, added six more excellent negatives to his stock. A mistake amateurs often make in photographing clouds is that of taking them at too high an altitude while they have to be applied near the horizon of the picture. This is difficult to avoid in the neighbourhood of buildings, but is easily managed in the open.

It is surprising how quickly and completely a photographic process may become obsolete. It is scarcely a decade since the wet collodion process was the one in universal use, as it had been for the previous quarter of a century. Now, we venture to say, not one in ten of the present generation of photographers, if we include amateurs, know anything whatever of that process beyond the vague idea that it must have been a very messy and troublesome one. This is well exemplified at every modern society where the process has been demonstrated for lantern-slide making by the remarks overheard. Surprise is always expressed at seeing the collodion applied by pouring it on, and the development and fixing conducted while holding the plate between the fingers. Naturally, this seems a strange proceeding to those whose experience has been confined to developing and fixing in dishes. The rapidity with which the image makes its appearance usually brings forth the whispered exclamation "over-exposed!" Then, after the brief rinse with water when the picture is fixed in a few seconds and again washed, and then pronounced finished, one generally hears remarks such as "surprising!" "how curious!" &c. Who will prophesy as to the process that will supersede the present dry plates? Such a process may not be far off.

One of the most frequent questions we have to reply to in the "Correspondence Column" is how to obtain deep black or purple tones on albumenised paper. The majority of amateurs appear to think, notwithstanding that we have often pointed out the contrary, that the tone of the print is entirely dependent upon the composition of the toning bath, whereas it has very little, or anything, to do with the matter. The chief factor in obtaining black tones is the negative, and, next, the paper.

The new law of copyright introduced in the United States of America is one of the highest interest to English authors, and a good terse description of it from a legal point of view was very desirable. Such a description has been supplied in an excellent article in the current *Contemporary Review* by Sir Frederick Pollock, Bart., entitled "Anglo-American Copyright." Copyright is now attainable by those not resident in the States (a previous condition being residency) who shall deposit in the mail two copies of their books for the Librarian of Congress, such books having been printed from types set within the limit of the United States or from plates made therefrom. Sir Frederick's article should be read by all interested.

Photographers frequently require, in experimental work, to dry plates rapidly without the aid of heat or the use of alcohol when a properly constructed drying-box is not at hand. In such a case the following may be of service. A short time since we were assisting in some experiments in orthochromatising plates, when the above difficulty arose. There was no regular drying-box at command in which the plates could be placed, and there were no means of opening the dark-room door without admitting light, neither was there chloride of calcium in the house. At our suggestion, a couple of rough deal boxes—French butter boxes—were obtained from the nearest cheese monger and placed in front of the kitchen fire, together with several sheets of blotting paper, until they had become "bone dry"—thoroughly desiccated. One of these was taken into the dark room, and the plates, after preparation, placed therein with several sheets of the paper crumpled up. In an hour or so the other box, with more paper, was made to take the place of the first one, which was again placed in front of the fire, the boxes being changed every hour or so. In a few hours the plates were completely dried. The principle of this method of drying is that the wood of the box and the paper are so completely desiccated that they become greedy of moisture which they rapidly absorb from the plates. The hint here given may often prove of value where it is desired to dry plates or paper and regular appliances are not at hand.

We notice in the programme of the objects of the proposed federation of photographic societies that one of them is to be the obtaining

of a reduction of railway fares to amateur photographers. Now this is a subject that the West London Photographic Society have taken in hand and are prosecuting with energy, and to them must be accredited any advantage that may eventually be gained. They have invited the opinions and co-operation of all the other societies, and are pushing the matter forward vigorously. What more can be accomplished under the federation scheme? "Honour to whom honour is due." If success is achieved, the credit will be due to the West London Society, and to them alone.

THE HALOID SALTS OF COPPER AND THEIR USES.

MENTION has been made in the last two numbers of the JOURNAL of a method of intensification in which bromide of copper plays the chief part, and the revival of this old process recalls attention to the almost forgotten uses to which that salt and its congener—the chloride—may be usefully applied. The cause of the neglect that has been shown to the cupric haloids is, no doubt, to be traced to their comparative rarity, except in the great commercial centres, and the disinclination on the part of the majority of photographers to embark in any chemical operations or processes that happen to be a little outside their ordinary routine. Yet the trouble involved in the preparation of either of the salts mentioned in a state of sufficient purity for any photographic purposes is of the very slightest.

Briefly, it is confined to the mixture of one solution of cupric sulphate—a very cheap salt, and easily obtained anywhere under the name of "blue vitrol" or "blue stone"—and another of an alkaline bromide or chloride. Double decomposition ensues, the cupric haloid is formed, and being very soluble, remains in solution, while more or less of the alkaline sulphate is precipitated according to the degree of concentration of the solutions primarily employed. The formula given under "Foreign Notes and News," at page 186, is scarcely calculated to get rid of much, if any, of the useless, though harmless, bye-product, on account of the very large proportion of water used. Still it will make a workable if rather weak solution of cupric bromide suitable for any of the purposes for which that salt may be required.

The better method of procedure is to dissolve the separate salts in as small a quantity of water as possible, and if the water be boiling, or at any rate *hot*, so much the better, for so much more of the useless sulphate will be got rid of. Sulphate of copper, bromide of potassium, and chloride of sodium, the salts usually employed, are all very freely soluble, while the sulphates of potassium and sodium, especially the former, are far less soluble than the haloids in association with which they are formed, and they may consequently be separated with very little trouble. Sulphate of copper dissolves in about three and a half times its weight of water at the ordinary temperature, bromide of potassium in one and a half, and chloride of sodium in about two and three-quarters. The bromide and chloride of copper are not only exceedingly soluble but deliquescent, while sulphate of potash requires about ten parts of water at 60° Fahr. to dissolve it, the corresponding sodium salt being more freely soluble, both of them decreasing very rapidly in solubility as the temperature is reduced.

In making a solution of bromide or chloride of copper the following proportions and method may be adopted: Take one part—or, say, one ounce—of sulphate of copper and one ounce of bromide of potassium, or half an ounce of chloride of sodium. Dissolve the copper salt in two and a half or three ounces of hot water, applying heat, if necessary, until dissolved. Then throw in the crystals of the second salt and allow them to dissolve in the same water, which they will do quite as readily as if dissolved separately, and the decomposition will proceed simultaneously. The original blue solution of the cupric sulphate will change to a deep emerald green, and owing to the concentration of the solution the alkaline sulphate, especially the potassium salt, will be thrown down even while the liquid is hot, forming a dirty, muddy-looking mixture. However, allow it to cool thoroughly for some time, and to as low a temperature as may be convenient, when the solution of bromide or chloride may be drained away from the sediment, which will remain nearly white, while the liquor is of a deep, clear, green colour, deeper and less bright in the case of bromide than of chloride.

The proportions of sulphate of copper and of alkaline haloids given above are such as to leave the latter slightly in excess, so that the whole of the copper is converted into bromide or chloride. Under these circumstances, if the sediment be rinsed once or twice with ice-cold water, or with alcohol, the crystals will, or should be, perfectly white. The green solution will consist of nearly pure bromide or chloride of copper, with a very small quantity of alkaline sulphate and haloid, the proportion of sulphate being greater in the case of chloride of copper on account of the greater solubility of the sulphate of soda.

If a still purer product be required, or it be desired to prepare it for storage in the dry state, a different course may be adopted. Take the salts in the proportions already given, and having coarsely powdered them, separately mix them and work them well together in a small mortar or by other convenient means. The blue crystals of cupric sulphate contain five atoms of water of crystallisation, which are sufficient to set up the necessary decomposition, and in a short time the dry powder is converted into a dirty green paste, the colour of the sulphate, which almost disappears when powdered, giving place to that of the haloid. When the mixture has assumed the appearance of a perfectly smooth paste or cream, cover it up and let it stand for half an hour to ensure complete conversion, then pour on to it a small quantity of pretty strong alcohol—methylated spirit will do if it is "clean" and of the proper strength, but it is preferable to use pure alcohol of a definite strength, say sp. gr. ·805. The pasty mass may be gently dried first if preferred, but in any case the alcohol is well stirred up with it, until upon allowing it to stand it assumes a clear dark colour, and the crystalline sediment appears nearly white. Pour off the supernatant liquid, and repeat the operation with a smaller quantity of alcohol to secure the last traces of bromide. By this method of preparation the bromide is obtained practically free from sulphate, owing to the insolubility of the latter in strong alcohol. Methylated ether may be used instead of alcohol if the preparation is dried first, and will give an equally good if not better result, while it will be found cheaper than *pure* alcohol.

The alcoholic or ethereal solution thus obtained may be preserved in that condition, being made up to such a volume that a given quantity will represent a definite proportion of the salt, either calculated from the theoretical product or ascertained by quantitative analysis. The product obtainable from an ounce of cupric sulphate is nearly 400 grains of bromide and about 240 grains of the chloride, respectively. But for some purposes, especially in connexion with gelatine films, the presence of alcohol or ether in even minute quantities in the solution would be objectionable, so that it would be needful in such cases to crystallise, or, at any rate, dry the preparation. In the case of cupric chloride there is little difficulty in obtaining the salt in definite crystals, either hydrated or anhydrous, by the usual methods, the former being bright green with a tendency to blue, the latter yellowish brown, and such crystals are quite permanent if properly protected from the atmosphere. But the bromide is a more unstable salt and liable to decomposition if over-heated, though it may be dried and fused at a gentle heat. Like the chloride, it is obtained in the anhydrous as well as the hydrated state, the former being almost black and showing but little crystalline form, the latter, obtained by drying the aqueous solution over sulphuric acid, resembling crystals of iodine. If fused, the hydrated salt is converted into the anhydrous. Dissolved in water, it forms an emerald green solution, which darkens and becomes brown when heated. In alcohol or ether the solution is brown unless a very large proportion of water is present.

As the bromide of copper is exceedingly deliquescent and very liable to give off a portion of its bromine in the moist condition, it is, perhaps, better to keep it in solution; such, at least, has been my own experience. So after carefully drying and fusing the alcoholic solution, I should recommend it to be rapidly weighed and dissolved in distilled water to form a solution of known strength. The drying and fusion should be performed in a small porcelain capsule, and if the latter be weighed previously, it will be easy to ascertain the weight of the bromide after fusion without the trouble of scraping it out.

I have given the details of the method of preparing a tolerably pure sample of either salt, though for all practical purposes the simple mixture of solutions answers quite well. Chloride of copper is an article of commerce easily obtained, though at a considerably higher

cost than it can be prepared as described. Bromide, on the other hand—I speak of some years back—I have never been able to obtain without specially ordering it to be made, and then, of course, the price becomes a "fancy" one. It is truly a delicate salt to prepare in a state of absolute purity, and must necessarily command a price; but as extreme purity is not a necessity, the cheap "makeshift" is in every way superior.

Before passing off the salts themselves, I may offer a hint in regard to the keeping of the solutions. Both salts, especially the bromide, are liable, as I have said, to give off a portion of their halogen and pass into the state of sub-salt, or to become *cupreous*, and this change occurs of necessity when the solutions are brought to bear upon a silver image. This is shown by the formation of a sediment in the solution when it is used—white in the case of chloride, and brown or "dirty" in that of bromide. These sub-salts are soluble in an excess of their respective acids or their ammonia salts; therefore it is a good plan to use a considerable excess of the bromide of potassium or chloride of sodium in the simpler method of making the solution, or to add it to the final solution. If this be attended to, the solutions will keep in working condition for a much longer period.

With regard to the uses of the two salts, these are chiefly in connexion with intensification. The earliest intensifying method was published in these columns about fifteen years ago, and consisted in bleaching the image with chloride of copper, and redeveloping with alkaline pyro or its equivalent. This is better adapted to collodion films than gelatine, as the latter retain the different salts so tenaciously that it is extremely difficult to get clean images. A little later another method was introduced from America in which bromide of copper was the bleaching agent, to be followed as before with alkaline pyro, or where extraordinary density is required, with nitrate of silver. This last process is only suited to line work, as the extra density is too great for half-tone purposes; the difficulty of freeing the gelatine film of the copper salt prevails here too.

The latest process of intensification consists in following the bromide of copper with ammonia alone instead of alkaline pyro; this I have not tried, but from the colour of the sub-bromide of copper which would, no doubt, be formed, the behaviour of a bromide-bleached film would probably differ from another bleached with chloride. In the latter case, ammonia alone would *not* intensify.

For "clearing" lantern transparencies or developed paper prints, chloride of copper or the bromide in very weak solution and followed by hypo will be found useful, or for reducing harsh contrasts or over-printed proofs; indeed, under any circumstances where it is necessary to remove a portion of the silver image. Unpleasant tones in prints and transparencies may be improved or modified by bleaching with the copper salt and redeveloping; in fact, there is scarcely an end to the possible uses to which the copper haloids may be put.

I have said nothing of the iodide, because the cupric salt is unknown except in combination, and the sub-salt is insoluble.

W. B. Bolton.

THE LIVERPOOL EXHIBITION.*

Hand-camera work is well represented in Classes XXII., XXIII., and XXIV., and bountifully medalled, one silver and three bronze being awarded. Mr. John White's pictures deserve very great praise, *Going to the Fair* being a subject bristling with difficulty; photographed as successfully as though the models were trained to the work. Whoever before photographed a drove of pigs? Charles Lamb's driver, whose pathetic outcry—just as one street from his destination his one pig bolted—"He'll go up all manner of streets" might here learn a lesson. In *For Liverpool* we have a telling representation of cattle driven along the docks. Marine subjects turn up again with *éclat*, in these classes, Mr. J. M. Nicholson receiving a bronze medal for a set of most effective and picturesque studies; they are small, but contain far more of the elements that go to the making up a picture than is usually seen in this class of work. Notably is this so in the picture to the left at the top of the frame, and that in opposite bottom corner (they are not numbered). Mr. Dresser's very interesting breaking wave series would have been more impressive if they had contained some object to show their scale of magnitude.

In Class XXV. we have a set (silver medal) which contains one or two of the most attractive small pictures in the exhibition. We would specially point out the scene of *Boys Bathing*, with boys' figures half projecting from the water, and with such carefully arranged lighting that, while giving life and interest, they in no way detract from pictorial propriety. With this, and much superior to it, we would name the picture with sheep. In it we have sky, trees, foreground of pasture with sheep browsing, instinct with feeling, almost perfect in composition and design. The colour in which these are printed is a foxy tone, unusual, and not one that could be often repeated with advantage.

In the "Scientific" Class there is room for a wide range of ideas, and Mr. Cecil Shadbolt receives a bronze medal for his photographs taken from a balloon, this being a subject he has worked hard at, and he has successfully encountered its trials. Herr Paulussen well deserved recognition for the large-sized reproductions in heliogravure, which represent as high a class in this mode of reproduction as any yet attained. The chief fault to be found in these works is the slightly incomplete range of tones, the deepest shades not being so transparently deep as might be wished. The portraits from life at a first glance suggest the effect of etchings. Count von Stockert's photographs of flowers by ordinary and by orthochromatic plates are interesting, but such pictures do not possess the value that might easily be conferred upon them. Unless there is some way of showing how near the given result is to being correctly timed, there is nothing to indicate that one is not under, and the other over-exposed. The view of a church taken by a pinhole in a coin should be examined. It is a very fair photograph, and the pinhole-pierced metal is there, framed in the same mount as the view. It consists of a three-kreutzer piece, carefully bored, and the aperture bevelled and made dead black.

The ladies have been by no means forgotten by the judges, for they have awarded to them one silver and two bronze medals in Class XXVI., specially set apart for ladies' work. Miss L. W. Tomkinson's *Raby Mere* makes one long to be out in the crisp winter air and test our skates in the splendid expanse before us. The picture is typical of English outdoor brightness. In the dale at Bromboro' she has found a lovely spot, and done justice to it; but as to this and the *Stepping Stone* we are compelled to put the question, Why will photographers insist in giving us all there is in their negatives? There is much judgment and taste required in knowing what to omit and what retain. Miss Tomkinson should have omitted an inch and a half from the bottom of these pictures, and they would be vastly improved. Mrs. Hignett's photographs are very meritorious attempts at increasing the value of a picture by the conspicuous introduction of human life. A little more practice and she will be able to cause her figures to become more a part of the picture and less prominent than they here are. Mrs. Frances S. Clarke sends four very pretty photographs, and receives a bronze medal.

The President's prize, a bronze medal, for "beginners," goes to Mr. Vincent Fothergill, whom we believe to have been a boy when the rewarded negatives were taken, and he deserves credit for his work. There was no other competitor than the Manchester Photographic Society in the Challenge competition, and no medal was awarded, whether because of the absence of competitors or the works not being thought up to the mark we cannot say, but Manchester is not by any means well represented in this set of pictures. Miss Twist's *Cattle* are very, very good, but they need more to make an effective picture.

In the General Class, Mr. McMichael is awarded a silver medal for one of his Shakespearian studies, which is the least stagey of a large set of dramatic attempts; good in technical execution. Mr. Chas. Scolik receives a silver medal for a large set of technically excellent platinotypes, the pictorial value of which is very varied. A similar medal goes to two English studios—Mr. W. J. Byrne, of Richmond, and Mr. A. Vandyke, of Liverpool; to the former for a set of very pretty pictures containing portraits of children in Japanese costume, and the latter for a set of large panel pictures giving variety of pose, and generally up to a high level of professional portraiture.

The Champion Classes, two in number, went respectively, as we have before pointed out, to Mr. Shapoor N. Bhedwar for the pictures exhibited last year at Pall Mall, and before mentioned by us, and

* Concluded from page 201.

Mr. J. B. B. Wellington's *Eventide*. The latter picture, which we were glad to see hung afresh in a better position, attracted the attention of true artists beyond almost any other in the rooms. So harmonious and reposeful in feeling, well-designed, and composed a picture, executed by photographic methods, is rarely seen.

The Apparatus.

As might be anticipated, the local manufacturers and dealers predominate in the Liverpool Exhibition. The display, in every sense, is a fine as well as a very large one. In examining a large and complete series of Ross & Co.'s lenses, we were struck by the fact that they *could* be examined, for in the Pall Mall and Crystal Palace displays of apparatus mostly all the lenses were confined in locked glass cases, which precluded the possibility of any one being examined. Probably this is necessary to prevent any of them from being feloniously appropriated by some of the visitors; but, at any rate, very little knowledge is gained of their construction, so far as that can be ascertained by inspection. In the present instance, we, on the occasion of our visit, were not thus debarred, as the lenses of the eminent makers named, and which were on the stall of Mr. John J. Atkinson, were open to be looked at. We found them to embrace a complete series, from No. 1 to 12 inclusive, of portable symmetrical lenses, with apertures of *f*-16; an equally comprehensive series of the more rapid class, working at *f*-8; a third series of their new universal symmetricals of extra rapidity, with apertures of *f*-5·657, together with landscape, universal, and cabinet lenses. These, with their new stereoscopic and other cameras, make a fine show, which is worthy of the makers.

Mr. Atkinson's own collection of apparatus is very comprehensive, embracing cameras of all kinds, from hand varieties to studio and enlarging ones. Stands, lamps, lenses, shutters, and optical lanterns are also included among his exhibits.

W. Hume has an imposing show of his celebrated cantilever enlarging apparatus, with condensers up to nine inches in diameter.

Archer & Sons have, in addition to ordinary high-class optical, single, biunial, and triunial lanterns, some specially adapted for scientific projection, class demonstration, and educational purposes.

Sharp & Hitchmough's exhibits are also very comprehensive, and include cameras of the enlarging, hand, tourist, detective, and stereoscopic classes, lenses mounted in brass and aluminium, shutters, backgrounds, lamps, lanterns, camera fittings, with numerous other photographic requisites.

James Wood shows his improved washer (previously described in this Journal) in various sizes. Wood Brothers exhibit several lenses, cameras, Kodaks, lamps, and other things; while Wood (late Abraham) has an exhibition of Rayment's cameras in three sizes, Lancaster's camera sets, Swinden & Earp's detectives, Fallowfield's Facile, Kodaks, a large collection of Optimus Euryscopes, rapid rectilinear, portrait, wide-angle, and other lenses, together with graphoscopes, stereoscopes, and optical lanterns.

Miller's Adelphi hand cameras are shown by the maker.

The Birmingham Photographic Company have automatic plate rockers, printing frames, granitine dishes and lamps.

A. Watkins shows not only his exposure meter in two forms, but various examples of the application of the instrument.

The exhibit of James Thomson consists of Scotia and balancing cameras, rectilinear lenses, telescopic tripod stands, and camera bellows.

Of course it is obviously impossible to do more here than give an outline of the apparatus exhibited.

ON THINGS IN GENERAL.

The editorial remarks last week upon the damage done to photographs in transit through post are valuable if only through their calling attention to a real grievance. I know of a photographer, who had suffered this way and complained, being told there was no remedy whatever, but that it would be an excellent thing if he would, whenever damage occurred, make a formal complaint, as the officials had been spoken to by so many senders and receivers of damaged goods that if the whole extent of the injuries were brought in this practical way under the notice of headquarters some remedy might be found. It is thus likely that the editorial surmise that photographers may have had some hand in stirring the Postmaster-General into action is probably correct. Speaking of the unreasonable expectations of the receivers of the photographs, I can vouch for the accuracy of the following:—A client returned to a photographer a dozen pictures damaged (in the usual way), with an impertinent message about "bad packing," and said the pictures were returned just as received. He had, unfortunately for his reputation for veracity, omitted to remove the cover, and the various postmarks upon it showed, first, the receipt at the complainant's post-town; next, the despatch from there and receipt as a re-addressed parcel in Ireland; thirdly, a further despatch and receipt at the complainant's post-town! This "travelling" being pointed out produced only an abusive postcard. Moral: Insure all post packages at sitter's expense.

One of the most illogical letters I ever read is that by "An Exhibitor" on page 191 of this Journal. He sent a picture to the Liverpool Exhibition and did not get a medal. Seeing that about a quarter of a gross of medals were bestowed at the exhibition, this must have been a clear insult, for we learn from "An Exhibitor" himself that some one who ought to know told him his picture was a very good one. Then, again, he complains that two competitors exhibit two pictures each. Well, they didn't get a medal it appears, so it is difficult to see the hardship. But, as a matter of fact, "An Exhibitor's" letter is an impertinence, for he admits having exhibited his picture before (not at Pall Mall), and I read in the Journal that such previous exhibition disqualifies for a medal. If "An Exhibitor" is the producer of what is looked upon as one of the most technically imperfect prints in the exhibition, printed with all its imperfections, as, presumably, if properly reduced in size, it would not have satisfactorily harmonised with a stock mount, he would have been wise to have remained silent.

As to the Liverpool Exhibition itself, I hear nothing but praise—good pictures, good hanging, splendid light, most courteous treatment from the officials. If to this is added that what is perhaps the finest suite of exhibition rooms in the kingdom was loaned to the promoters of the exhibition, there can be no surprise at this being voted the finest thing of the kind ever seen. Such is what I hear on every side. The energy of the Secretary, Mr. Mayne, is marvellous. "He by sheer force of will compelled people to send pictures," is commonly said; and I believe it is true that he sent within an hour of the awards being made a telegram to every exhibitor in the county who had gained a medal.

Every honest photographer will cordially echo Mr. Debenham's protest against the use of the word "permanent" applied to bromide enlargements issued to the public, the photographer who only issued platinotpye and carbon prints as "permanent" being placed at a disadvantage by those who offered . . . bromides as permanent . . . It would, however, have been better not to use the strong terms he did in speaking of the latter. It cannot be held as absolutely proved that they are not permanent when carefully produced. The harm consists in the indiscriminate and positive use of the word "permanent" as applied to bromides. Personally, I do not believe for one moment that any of them are permanent, and I am very sure that a large quantity already in the hands of the public are disgracefully fugitive.

I noticed in the account of the Philadelphia Society's meeting that Mr. Carbutt had found it necessary to put his foot down upon a rich old crusted error—that the development should be continued till the image showed upon the back of the plate. This old belief takes a deal of killing. It may be confidently assumed to be a certainty that a plate which does not show the image at all on the back will give far better results than one which does show it.

Mr. Warnerke's ingenious collographic photography at home, if we may so speak of it, is very interesting, but when, as I read in these pages, that he states that "the quality of prints producible was not equal to, but better than, those with silver, or platinum, or with any other process," I felt he was asking for too great a surrender of prejudice, that is if he was speaking of artistic superiority.

I must conclude my jottings by referring to a correspondence about the new kind of Willesden paper that was described in these columns last summer. The method of production is an ingenious application of the Willesden principle, and promises well for photography, and the writer of the letter over the signature of "Countryman" does but betray his entire ignorance of what he writes about when he goes out of his way in the manner he does to attack the inventor. There is no reason to suppose that the inventor is a professional photographer, hence all remarks about the paper not being brought upon the market (within less than a year after his invention) are something more than superfluous. FREE LANCE.

THE FEDERATION SCHEME.

THAT photographic societies might gain some advantages by combination for mutual accommodation is a proposition the truth of which appears to be self-evident, but to bring about such a combination is not such an easy matter as at first consideration it would seem. The crux of the difficulty lies in the fact that societies, like individuals, are not equally advanced in knowledge, and, therefore, any scheme of combination based entirely upon mutual assistance, even if it could be brought into operation, is not likely to be long lived. It would very soon be discovered that the benefits of any such combination would be anything but mutual. There is, however, a very kindly disposition of photographers towards one another, and a desire to assist their less informed brethren, and if this feeling were taken as a basis on which to found an organization having for its purpose the development and advancement of society work, there is no doubt that the movement would be well supported and its success assured.

The want of such an organization being felt, it is natural to turn to the Photographic Society of Great Britain to take the lead in the matter, and there is some prospect that this Society, having been at last awakened to some sense of its duties, will at no distant time offer terms of affiliation to all the photographic societies in the country. It will be well, therefore, to await the Parent Society's proposal, and not to adopt any course which may prove to be a hindrance rather than a help to the end in view.

That Mr. L. M. Biden's scheme for the federation of the London societies is not a practical one is not fairly a matter of reproach to that gentleman. He has displayed considerable energy in bringing it to the notice of those interested, but it would puzzle a more experienced man than he is to formulate a scheme likely to be successful on the lines he has attempted to follow. That more was not done at the meetings over which he presided towards the consideration of the best method to bring about the end he had in view is probably due more to the attitude he assumed in the chair than to any other reason. It is certainly not conducive to the serious consideration of any subject before a meeting when the Chairman transgresses the ordinary rules of debate himself, and immediately rules "not of order" any speaker who ventures to express an opinion in any way at variance with his own. The proceedings at the latter meeting of the two were further complicated by the oracular reply made to the question:—Whether the Photographic Society of Great Britain would join the Federation in the event of its being formed? A representative of that Society, who at the outset stated that he was there only to watch the proceedings, and was not empowered to indicate the course that would be followed by the Society, in the course of a long speech, evidently left an impression on the meeting that the P.S.G.B. *might* join the Federation. That this will occur is extremely improbable, nor would it accord with the views of those who have been, for some time past, pressing the matter of the affiliation of all our societies to the Parent one. If the Parent Society offers terms of affiliation, it must be offered to all societies individually. If affiliation will do for all societies that which the Federation proposes to do for a few, the *raison d'être* of the Federation will cease, but if the Federation means to constitute itself as a separate society having functions of its own, which the perusal of the proposed rules would lead one to suppose it does mean, this fact should be made clear at once.

Apart from affiliation, there is no doubt that periodical meetings of those who take active part in the management of photographic societies, for the purpose of discussing matters connected with society management, might be made productive of good, but if this is the aim of the federation scheme of Mr. Biden, what on earth is the use of the elaborate machinery he proposes for the purpose of bringing it about? A President, two Vice-Presidents, a Secretary, a Treasurer, and fifteen members of Council, are surely not required to control the proceedings of a few gentlemen who meet from time to time to talk over matters of common interest. ALEXANDER MACKIE.

NEGATIVE MAKING.*

THE art of developing successfully consists in knowing—(1), the exact result required, the density and detail in the lighter and darker parts, the relative intensities of the lighter and darker details, the brilliancy or softness of the character of the negative as a whole; (2), the means of obtaining this result by suitable development; and (3), when this result has been produced, or during development, if it is attaining it.

It is not my intention, as I do not consider it within the scope of this paper, to speak of the relative merits of different developing reagents, but to consider rather the artistic capabilities of development, to take one standard form of developer, pyro and ammonia, and the modifications of which it is capable by varying the proportions of its constituents, and the advantages that may frequently be the result of such variation, as the principles that govern the modification of one developer apply equally to any other form. In passing, I may say that though I have at different times experimented carefully with various developers—pyro and potash, pyro and soda, hydroquinone and soda, and others—I have never in any case obtained results to surpass pyro and ammonia, and in the majority of instances far from equal.

The most practical method of working in developing is to make separate ten per cent. solutions of each of the ingredients of our developer—pyrogallol, bromide of potassium, and ammonia—then, knowing the number of grains or minims of each that it is desirable to use for the work in hand, it is very readily measured, ten minims of the ten per cent. solution equalling one grain of the reagent.

With the pyro some preservative should be mixed, either sulphite of soda or meta-bisulphite of potassium. I much prefer the latter, it seems to keep the pyro in perfect condition for a much longer time under the same conditions. I have found that after keeping a solution of pyro so preserved for months, no difference could be detected in its working and that of a second solution that had only been mixed a few minutes. One ounce is sufficient for an ounce of pyro, but in using it, a little more ammonia must be added to the developer than otherwise, as the meta-bisulphite of potassium is very strongly acid, one minim of ammonia to every four grains of pyro being the extra amount necessary.

For a large proportion of our negatives, those subjects having a moderate amount of contrast, of which a fairly brilliant but well-balanced and soft negative is required with full detail in the shadows, development may be fairly uniform. I should prefer to use two grains pyro, half a grain to two grains bromide, and one and a half to three minims of ammonia. As this is a basis from which I shall consider its action and modifications, I shall refer to it as a *normal developer*. In considering the effect of varying the amount of any one of these ingredients, I am assuming the other two to remain constant, but it must be remembered that its action is considerably modified by the relative proportions of the others present.

Pyrogallol.—Within moderate limits the quantity of pyro determines the density of the negative. While I have never found any advantage in increasing it beyond two grains per ounce, in some instances considerably less may be used, occasionally as little as a quarter of a grain, though unless the strength of the other ingredients were modified suitably, the only result would be thinness of image, all the intermediate tones having the same relation to each other as if the negative had been developed in the ordinary manner. There is no advantage in this, as with ordinary subjects and normal development there is no risk of over-density; and in those subjects which require special treatment the result obtained by varying *all* the constituents of the developer is not only infinitely superior, but also more varied, for this reason: in a normal developer the pyro should remain constant, viz., two grains per ounce.

Bromide.—Sufficient importance is rarely given to the value of varying the amount of bromide in a developer. The rule most frequently given, that the larger the proportion the greater the density of the negative, I cannot entirely support. I have found it to have far more effect on the gradation or balance of tone than on the general density as a whole. On making two identical exposures on a test subject to which I have alluded, viz., white flowers in a dark vase, and developing one with half a grain bromide to the ounce, and the other with two grains, the amount of pyro and ammonia being the same in each case, while both gave the same *amount* of detail in both high lights and shadows, and approximately the same density, in that developed with only half a grain bromide the shadow detail was much more pronounced, and the differences much stronger between all the darker tones, but the detail in the lighter parts was far better in that developed with two grains bromide, the gradation throughout the whole of the lighter work being decidedly more bri liant and sparkling, though the shadow detail in this was very inferior

*Continued from page 200.

to the other. This result is fully supported by my general work, for which reason I prefer to vary the proportion of bromide principally in consideration of whether the detail is desirable most in the high lights or shadows, remembering that if the shadow work is stronger, most of the tones throughout the picture will be slightly lighter than if the lighter gradation were the more pronounced.

Ammonia.—The principal effect of increasing the amount of ammonia is to accelerate, and the larger the proportion of ammonia to a given amount of pyro the quicker the development and the thinner the negative. For subjects requiring "normal" dovelopment, having decided the amounts of pyro and bromide, I prefer to commence with one or one and a half minims of ammonia to the ounce, and add more as required until sufficient density and detail are obtained.

The greatest differences of effect can be produced by varying the amounts of pyro, bromide, and ammonia together, especially in those subjects which possessing very great range of tone, will not, with any ordinary treatment, give a negative which expresses satisfactorily the gradations of the original, and also in many instances where a special artistic effect may be wished for quite different from that which a normal developer would produce. In photographing any subject with excessive contrast of light and shade, it will frequently be found quite impossible, no matter how prolonged an exposure may be given, to obtain by ordinary treatment a negative possessing detail of any printing value in either high lights or shadows, as all the lighter work would gain density so rapidly and out of all proportion to the rest of the picture.

In many such subjects the amount of light reflected by the brightest part of the shadow work is exceedingly small in comparison with the darkest part of the lighter work, so that it is self-evident that even if our plate reproduced perfectly the proportion of light reflected by each, the contrast would be so excessive that no print could be obtained that would convey anything like the same impression as the scene itself, as the eye, in wandering from one part to the other, would instinctively adjust itself to the brightness of each. It is useless to talk of the truth of photography. In all forms of pictorial representation an artist seeks to convey his own impression of a scene, not mechanically reproduce it.

HENRY W. BENNETT.

(To be continued.)

PICTORIAL COMPOSITION.*

"THE most untutored eye may perceive that their effect is very different, though there has been no change in the features of the scenes, excepting such as was necessary to show the force of what I have brought before the student. Examples 1 and 3 are pleasing, varied and spacious; 2 and 4 are bad because monotonous and flat, their comparative merits or defects are entirely owing to the composition.

"We may take another illustration from Example 2 and 3, Plate XI. In Example 2, the castle is placed so as to come immediately over the basket which the woman carries; and notwithstanding that the castle is faintly drawn and small in size in order to suggest the idea of distance, yet the contradiction given to it by faulty composition prevents it being entertained by the mind. The castle being immediately over the figure is suggestive rather of the flat surface of a *picture* than of the permeable space of *reality;* but if we hide the castle, we then lose the impression of flatness, and in its stead receive the idea that we could walk round the figure. Compare this with Example 3, where the castle is removed to the right; here we have the full expression of space, and if we hide the castle, far from receiving in this instance, as in the other, any additional idea of space, we lose it greatly by so doing. It must be observed that the principle of placing the objects in different lines is not gained from a study or imitation of nature, but from an investigation of impressions made by art. Both the examples are equally true imitations of nature, as well in the objects themselves as in their juxtaposition.

"To feel the force of this principle still more we must turn to Division A, of Example 1 of the same plate. All the figures, horses, and trees might be found in nature exactly as they are here placed; but when so found they are ill-adapted to pictorial representation, and so represented they impede the imagination in its efforts to realise the scene, in consequence of the following defects in their composition. The heads of the two horses in the foreground are exactly level with each other; the back of one slopes towards the right, the other equally to the left. The heads of the three figures are equidistant, and repeat the line of rising ground beyond them, and this again is repeated by the line of shadow behind the figures. The trees on the hill are exactly over the heads of the figures, and although they differ in intensity of colour, and in size as compared with the figures, they hardly appear more distant; indeed, if the space between them and the heads of the figures be for a moment hidden they will appear as if actually resting on them. The falcon, which has just taken flight after the heron, is represented at the moment when he is crossing the line of the hill, and the heron is perpendicularly over the head of the lady. Such an arrangement of objects, though aided in light, shade, and colour by the united efforts of the most distinguished painters the world ever saw, would yet fail to express space in the same degree as it is expressed in Division B of this example. In the latter, every error enumerated has been avoided, the flat surface is now lost sight of, and it is impossible to receive from this example that impression of flatness which we cannot escape in the other.

"The observations concerning the objects not being level with each other are not confined to their several heights; they equally apply to the inequality of their bases. And although here the differences of level cannot be so great, yet there must be a difference, since, however small, the idea of flatness is thus destroyed, and that of space suggested. Proof of this is found in Plate XI., especially in Example 4, where, because these facts have been observed with regard to the placing of the feet of the horses on the road, and the roots of the trees on the right, we are sensible of the expression of space."

Harding makes some important strictures on some of the old masters, especially Claude, who is unquestionably a great defaulter in points of composition; and in a footnote it should be remarked that Turner is mentioned as (at the time Harding writes) having produced works better calculated than any modern pictures to be of use to students and amateurs in art.

"Nature," says Harding, "has given to all objects specific forms, and although they may be found 'in sportive mood' occasionally to take each other's shapes, yet their difference in all other respects is so manifest that we can rarely confound them with the objects whose form they for a moment assume, and consequently the mind never loses a distinct conception of whatever distinguishes the one from the other. But how widely do circumstances differ when nature is represented by art! What are all objects then? What then are clouds, trees, rocks, mountains, figures, &c. &c.? Paint. Art in this respect makes all things alike, and is unable, except in the remotest degree, to imitate the nature of things, it is sameness all; and this defect would be fatal, and even insuperable, but for the power the artist has over his composition and the forms of his objects. So far, then, is the repetition of forms from being an advantage, that on the contrary their marked difference is his sheet anchor; for seeing that with him everything is reduced to paint, and that this of necessity tends to confuse the mind by presenting to it every variety of nature by the same material, he relies solely on his control over the variety and distinct differences of forms at once to impress the mind with clear and distinct ideas."

Harding, you will remark, says "Paint." If these precautions of composition are so vitally necessary where the artist has the advantages of polychrome to assist his effects, how much more are they demanded in dealing with black and white or monochrome, and how supremely necessary for the photographer to take every advantage of accidents of position, seeing he cannot shift anything, and be an absolute master of pictorial composition besides, to obtain the most desirable point of view, before he ventures to take his picture; and as this necessity grows upon him in his progress in art, how few are the pictures he finds really worth taking, and how eclectic he becomes. It will need all his determination and powers of mind not to be discouraged, as in the nature of things, with the practical limitations of photography. He must not be discouraged, however, and need not be, if he is content to exercise great patience, and profit by every scrap of study he can get outside the dark room, or that darker place, the gloomy valley of artistic suicide, where, casting all else to the winds, he throws himself on the bosom of nature.

I now show two views from Harding in confirmation of the disadvantages of repetition of line in landscape—Plate XIII., 1 and 2. His comments on these are, it is needless to say, relative to modifications in treatment by the painter (shown in Example 2). They, however, serve a useful purpose to the photographer if they demonstrate the dangers and pitfalls he is constantly having put in his way, and exercise his mental powers of how best to obviate these dangers in the field. Harding goes on to say, however, that "it requires all the vigilance of keen and long-tutored observation to detect the identity of line in things dissimilar which is perpetually insinuating itself unobserved into the different forms depicted by the painter, to

* Continued from page 202.

the consequent loss of the proper influence of every object wherever it happens to be, and sometimes to the production of results which are even ridiculous. P. H. NEWMAN.

(*To be continued.*)

Foreign Notes and News.

WE have to announce the death from concussion of the brain of Court-photographer Herr Ed. Risse, in his fifty-sixth year. Herr Risse was one of the older members of the Society for the Promotion of Photography in Berlin.

IT has been decided to afford a course of instruction in photography during the summer vacation in the laboratory of the Technical High School at Berlin, provided, we understand, that a sufficient number of candidates send in their names, which is, however, pretty sure to be the case.

DR. B. RIESENFELD has contributed to the *Photographische Mittheilungen* a paper of some value upon photographing the larynx. He deals with the difficulties involved, and criticises the experiments and recommendations of Dr. Wagner at some length. After many trials Dr. Riesenfeld has been led to abandon the employment of "blitz-pulver," with which he commenced his experiments, in favour of magnesium ribbon, regularly unwound from the coil by means of a clockwork mechanism. The lens employed by Dr. Riesenfeld, when he obtained his best results, was a Hermagis aplanate with a focus of 19 cm.

WE have frequently had occasion to call attention to the remarkable results obtained by Dr. Jeserich in the domain of judicial photography. The assistance Dr. Jeserich's skill has afforded in numerous criminal investigations, particularly in detecting forgeries, is nothing short of phenomenal, and we trust the enumeration of some cases of a different kind in which he has been instrumental in unravelling will prove of interest to our readers. One more instance. A wealthy peasant, recently deceased, leaving a lien on his property to the amount—according to the document produced—of 20,200 marks. His executors, however, knew very well that the deceased was only 1200 marks in debt. They betook themselves to Dr. Jeserich, who photographed and enlarged the suspected document, whereupon it appeared that the 1 had been converted into a 0 and a 2 stuck on in front of it.

A NEW method of burning-in colours on porcelain has recently been brought out by Herr Lüders, of Görlitz. A porphyry-glazing colour is mixed with gum-arabic and laid in a fairly thick layer on specially prepared paper. Twelve hours before using, this paper is drawn rapidly through a bath of ferrous oxalate and dried. It is then exposed to sunlight under a negative of the design with which it is desired to colour the porcelain. After exposure it is dipped in distilled water and laid on the porcelain. After a time the paper is stripped off, the design adhering to the porcelain, which is then transferred to the kiln and burnt.

IT appears that, as we learn from the proceedings of the Berlin Photographic Society, a company has for the last year been turning the Rhine into electricity. They have built a dam part of the way across the Rhinefall, by means of which they turn turbines which drive enormous dynamos which produce aluminium by electrolysis. Good! But how about improving the scenery? If this sort of thing goes on there will soon be few picturesque spots left in Europe to photograph, even with the ideal portable aluminium camera of the future. All the waterfalls will be *dammed* up to make aluminium. Dam!

SOME time ago in the Palatinate a man was suspected of having murdered a young girl. On the shoulder of the girl was discovered a hair which was supposed to have fallen out of the beard of her murderer. Dr. Jeserich produced a photographic enlargement of this hair, magnifying it some 1600 times, from which it became apparent that the hair in question belonged originally to an elderly, short, yellow-haired dog. It was subsequently discovered that the murder was in reality committed by a man owning a dog of this description, and the individual previously suspected was set at liberty. In another instance a struggle took place between the murderer and his victim, who was a woman. Certain hairs were found in the hand of the woman, and these were placed before Dr. Jeserich. His photographic examination showed that they had hardly any roots, and Dr. Jeserich gave it as his opinion that the head from which they had been culled must have been partially bald—a conclusion which led to the ultimate apprehension of the murderer.

In another case part of the evidence against the accused was based upon the occurrence of blood stains on his clothes. These he accounted for by stating that he had recently slaughtered a goat, which was a fact. The photographic examination of the stains, however, proved the presence of *human* blood as well as goat's blood—a fact recognised by the difference in size and number of the corpuscles.

CAMERA CLUB CONFERENCE.

PROGRAMME.

Tuesday, April 7th.—Conference at the Society of Arts, 18, John-street, Adelphi, to be opened by the President at 2 p.m. Papers to be read from 2 p.m. to 5.30 p.m. in the theatre:—

1. Captain W. de W. Abney, R.E., C.B., D.C.L., F.R.S., Presidential Address.
2. Mr. Lyonel Clark, C.E., "The Use of Uncorrected Lenses."
3. Mr. Joseph Pennell, "Photography as a Hindrance and a Help to Art."
4. Rev. F. C. Lambert, M.A., "Note on the Physiological Aspect of some Problems in Art."

At 8 p.m.—Exhibition of lantern slides in the theatre.

Wednesday, April 8th, 2 p.m.—Renewal of Conference in the Theatre, Society of Arts. Papers to be read from 2 p.m. to 5.30 p.m.:—

1. Major J. F. Nott, "Photography and Illustrated Journalism."
2. Mr. C. V. Boys, "An Application of Photography."
3. Sir H. T. Wood. (Subject will be announced later.)
4. Professor Minchin, "A Review of Photo-Electricity."

7.30 p.m.—Annual Club Dinner for members and friends at the Criterion Restaurant.

The Annual Exhibition of Photographs by members will be on view in the Club House Meeting Room, Charing-cross-road, from 10 a.m. to 4 p.m. Admission by card from any member of the Club, or by ticket from the Hon. Sec. The exhibition will be open under these conditions for about six weeks from Tuesday, April 7.

All photographers are cordially invited to the Conference. The meetings at the Society of Arts are open to ladies. G. DAVISON, *Hon. Sec.*

Camera Club, Charing-cross-road, London, W.C.

RECENT PATENTS.

APPLICATIONS FOR PATENTS

No. 5141.—"Improvements in Photographic Dark Slides." W. TYLAR.—*Dated March* 23, 1891.

No. 5218.—"Improvements in Photographic Cameras." G. P. SPOONER.—*Dated March* 24, 1891.

No. 5284.—"Improvements in Photographic Change-boxes for Flexible Films." H. HODGETTS and W. W. BEASLEY.—*Dated March* 25, 1891.

No. 5292.—"An Improved Method of Registering the Discs or Pictures thrown upon the Screen by Dissolving-view Magic Lanterns." W. J. ARCHER.—*Dated March* 25, 1891.

No. 5298.—"Application of Talc or Mica as a Substitute for Glass, Celluloid, Paper Films, and other things now in use for Photographic Purposes, Dry Plates, Transparencies, and Lantern Slides." T. D. ASHPLANT.—*Dated March* 25, 1891.

No. 5361.—"Improvements in Photographic Cameras." J. BRADLEY.—*Dated March* 26, 1891.

No. 5385.—"Improvements in Hand or Detective Photographic Cameras." E. H. JAQUES.—*Dated March* 26, 1891.

PATENTS COMPLETED.

IMPROVEMENTS IN WALKING-STICK CAMERA TRIPODS.

No. 2034. ARCHIBALD GRIFFIN RIDER, 11, Jewry-street, Winchester, Hants. *February* 28, 1891.

THIS invention relates to that class of tripod camera stand which is made the form of a walking-stick for convenience in taking about.

It is composed of preferably three sections or legs, in or upon each of which slides an extension piece, preferably at the top end, in which case the extension pieces are jointed together, so as to allow of the legs being extended to secure a firm basis. The plate to which the legs or extension pieces are jointed may be provided with a screwed or other pin, upon which the camera may

screw direct, or upon which a suitable plate may be screwed for the camera to rest upon.

Any convenient form of sliding arrangement may be provided for the extensions, but I prefer to form a suitable slot in the leg and shape the extension to the proper curve on the outside, so as to complete the circle of the walking-stick, while its inner face is cut at the proper angles, so that when close together the inner faces of the three extensions may fit as required. When the extension passes entirely through the substance of the leg, I prefer to bind the latter with one or more bands, preferably of brass, so as to keep it sufficiently strong, and any suitable form of stop may be provided to prevent the extensions from pulling out altogether, or to retain them in their closed-up position. Such a stop may either be a positive stop, as a projection provided upon the extension, or it may be effected by having the inner end of the extension too large to pass the band already mentioned.

The cap, which closes all in at the top and forms an ornamental head or handle to the stick, I prefer to form hollow, so as to slip over the joint plate and arrange it to screw on to the screwed pin previously mentioned.

At the bottom end any suitable form of ferrule may be provided to hold the ends together and protect them, and this may be secured by any suitable form of stop, or, if desired, may be formed in sections; and I prefer to slip a metal ring up the stick, which, being preferably tapered, will provide a bearing for the ring in the proper place.

Improvements in and connected with Photographic Studios and Appliances for Lighting in connexion therewith.

No. 3718. Richard William Thomas, 121, Cheapside, London.—*February* 28, 1891.

My improved portable artificial light studio is composed of adjustable rods carrying white canvas, or other sides or walls, and when erected such sides or walls are fixed at desired angles, whereby the artificial flash or other light is thrown on to the wall or side immediately facing the lamp, and thence reflected on to the other walls or sides of the studio, whereby the sitter is reproduced in the photograph without shadows or similar defects usual in taking artificial light photographs.

I employ a number of metal upright rods (usually five) fitted with necessary feet or stands and capable of extension to desired height. The top of each upright rod is formed to receive the ends of other rods of similar thickness and of the desired length, which extend from one upright rod to another, so that when fixed they form the framework of the studio. The lengths of these rods are so arranged that the front or entrance of the studio is narrower than the sides and back, the back and sides being arranged at suitable angles.

Suspended from the top rods to the whole of one side and part of the other side are stretched sheets of canvas or other white material, a suitable background being provided for the back.

The entrance to the studio is supplied with looped curtains or other suitable arrangement. At the back of the said stretched sheets I suspend from the said upper rods curtains of any dark material, for the purpose of resisting the penetration of light.

At one side of the studio, near the entrance, I erect a lamp for burning methylated spirit or similar liquid—this lamp being erected upon an adjustable stand for the purpose of regulating the height desired.

This lamp is placed at that portion of the side of the studio which is not supplied with the stretched sheeting, and it is surrounded at the back by a similar curtain or material with which I enclose the sheeting round the studio, the space being provided for the lamp by means of another upright rod with necessary top adjustments.

Suspended from the upper rod in front of the lamp I place muslin or similar material as a continuation of the sheeting at that point. The lamp itself is supplied with a cavity for holding the magnesium powder or other substance used for producing the flash or other light, similar to lamps now in use for that purpose. Connected with this cavity is a tube extending to any desired place, and the end of this tube is attached to an air-pump or bellows or similar contrivance for the storage of air, so arranged that the operator can by hand or otherwise regulate the pressure of the air through the tube, and by this means slowly force the magnesium powder into the flame of the lamp, securing a longer duration of light than obtained by the ordinary artificial flash process, or he can, by quicker pressure, by the same means obtain an instantaneous flash.

By means of the arrangement of angles I employ for the erection of my said studio, the light strikes the sheeting immediately facing the lamp and thence to the background and across to the opposite side of the studio, the sitter being surrounded by light without seeing the lamp or having the inconvenience of the flash direct upon him. The casing of the lamp is so arranged as to carry off, in any desired direction, the smoke and heat necessarily arising from the use of the magnesium powder or similar material.

The use of the said stretched sheeting at the proper angles, and the position in which I place the lamp for artificial light photography, enables photographs to be taken by electric or other artificial light with much shorter exposure than by the ordinary artificial means, in consequence of the intensification of the light by the reflections produced from one side of my improved studio to the other.

Improvements in Cameras for Photographing Objects in Motion.

No. 4704. Frederick Henry Varley, Newington-green-road.—*February* 28, 1891.

This invention relates to certain improvements in or applicable to cameras used for photographing objects in motion, such cameras being adapted to be used, among other purposes, for obtaining good negatives sufficiently near each other in time to convey the idea of life and motion when successive positives from them are projected at the same speed upon a screen by means of a suitable lantern.

Main features of the invention consist in the employment in such cameras,—Of a delivering spool and a winding-on drum so geared or connected together as to normally exert a balanced pull, in opposite directions, upon a sensitised film wound thereon, so as to cause such film to be, at all times, kept stretched and taut, and free from vibration at the moment of exposure; of an adjustable displacement roller co-acting with such spool and drum (and arranged preferably adjacent to the latter), inoperative at the moment of exposure, and gradually operating during the whole of the time between successive exposures, for, at each actuation, advancing the film from the spool towards the drum the exact length required for the next negative, the winding up of a like length of the already exposed portion of film being automatically effected by the winding-on drum simultaneously with the return movement of the film-feeding device; and of gripping pawls or the like co-acting with the aforesaid devices for preventing, during such feeding operations and at other times, the spool from drawing the film back and the drum from turning back.

The invention also has reference to improved means of facilitating the registering of successive negatives and of positives obtained therefrom.

He claims (for photographing objects in motion):—1. The employment, in combination, of a delivering spool and a winding-on drum so geared or connected together as to normally exert a balanced pull, in opposite directions, upon a sensitised film wound thereon, so as to cause such film to be at all times kept stretched and taut and free from vibration at the moment of exposure, substantially as hereinbefore described. 2. The employment, in combination with such delivering spool and winding-on drum, of gripping pawls or like means operative in preventing the spool from drawing the film back, and the drum from turning back, substantially as hereinbefore described. 3. The employment, in combination with such delivering spool, winding-on drum and gripping pawls or the like, of an adjustable displacement roller or film-feeding device, inoperative at the moment of exposure and gradually operating during the whole of the time between successive exposures, in, at each operation, advancing the film from the spool towards the drum the exact length required for the next succeeding negative, and in returning to its inoperative position, the winding-up of a like length of the already exposed portion of film being automatically effected by the winding-on drum simultaneously with the return movement of the film-feeding device, substantially as hereinbefore described.

A New or Improved Apparatus for Ascertaining the Distance of any Object for Photographic Purposes.

No. 6239. Henry Mitchell Hastings, 54 Edith-road, West Kensington, Fulham, London, W.—*February* 28, 1891.

The special purpose of this apparatus is to ascertain correctly the exact distance of the object, so as to be able to adjust the lenses of cameras where the image cannot be viewed on the ground glass. I employ a lens of suitable focus fixed at one end of a telescopic body in such a way that the image of the object required is thrown on a disc of ground glass or other suitable material fixed within the telescopic body itself, such image being viewed through an adjustable focussing eyepiece placed at the opposite end of the telescopic body to that carrying the lens which throws the image. The focussing of this image to be obtained by rack and pinion, or other suitable means, such distance being registered on a scale attached.

As an alternate method, an apparatus may be made of the ordinary telescope, opera, or field-glass type provided with sufficient length of draw and with a scale showing the different distances. In this case the object is viewed direct, the intervention of the disc of ground glass not being necessary.

The claim is:—The herein-described telemeter or range finder, consisting of a telescope provided with a semi-transparent screen between the eyepiece lenses, an adjustable eye lens, and a scale indicating the various lengths of draw, corresponding to different distances of objects viewed, substantially as specified.

Improvements in Photographic Cameras.

No. 14,004. Charles Cope Gill, 5, Hornsey Rise, London, N., and James Gentry Evans, 70, Sunnyside-road, Hornsey Rise, London, N.—*February* 28, 1891.

Our invention relates to improvements in photographic cameras of the class known as detective, hand, or box cameras, and has for its chief object mechanism for storing and exposing the sensitised plates.

In carrying our invention into practice we form our box camera of two parts or receptacles hinged together. The front part is divided horizontally in two compartments by a centrally slotted partition. The upper compartment contains the bellows and lens, and has a flap or shutter at the back moved by a small handle projecting on the side of the front receptacle; this flap or shutter discloses or shuts off the light. The lower compartment is used for storing an additional number of plates or other requisites. The rear receptacle is closed in front by a double jointed dark slide, capable when withdrawn of being folded over the back of the said receptacle. The latter contains a sliding case formed of a lower enclosed compartment and of an upper and open part, whereat the exposure takes place. The lower or dark compartment is furnished at each side with an equal number of corresponding guides, between which the sensitised plates can move up and down. These plates are inserted between the inwardly curved and longitudinal edges of metallic plates, designed to protect them, at the back. To the end of the rear receptacle is hinged a bar passing through the end of the sliding case, and which when the said case is pushed back home into the receptacle it extends over its lower compartment and carries in that position the sensitised plates ready for exposure. When the sliding case is withdrawn from its receptacle the above bar is likewise drawn back from the dark compartment, when, by reversing the apparatus, the plates are dropped in the upper part of the case, and, by turning the latter back, the bar is moved over the dark compartment, so that when the apparatus is

brought back into its original position these plates rest, as above stated, upon the said bar, when the two parts of the apparatus being connected, the dark slide raised, and the flap or shutter open, the exposure of the foremost plate can take place.

When this is effected the sliding case is moved slightly forward, so as to drop the exposed plate between the front guides of the dark compartment below. The next plate can now be exposed, the above operation being repeated until all the plates have been exposed. The motion of the sliding case is effected by a rack and pinion, the latter being operated from the outside. A dial indicating the number of exposed plates is attached to the rear receptacle. The bellows and lens can be moved to and fro by a lever pivoted thereto, the pivot passing through the slot of the partition aforesaid, while the lever passes through another slot formed in the side of the apparatus, so as to be operated from the outside.

The apparatus is closed in front by a lid hinged centrally and carrying a finder inside. The camera may be carried in the hand or used on a stand.

As our improvements are capable of some modifications, without departing from the principle thereof, we do not restrict ourselves to material, dimensions, or to the precise form or placement of the several parts thereof.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 7	North London	Wellington Hall, Islington, N.
„ 7	Holmfirth	
„ 7	Sutton	Sutton Scientific Society's Rooms.
„ 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
„ 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 9	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 9	Birkenhead	Association Rooms, Price-street.
„ 9	Cheltenham	
„ 9	Manchester Photo. Society	36, George-street, Manchester.
„ 10	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 26,—Mr. T. E. Freshwater in the chair.

The reports of the delegates—Mr. R. P. Drage and Mr. T. E. Freshwater—who had attended the meeting called by Mr. L. M. Biden to consider the subject of a Federation of London and Suburban Photographic Societies was received. On the whole the report was of an unfavourable character, as nothing sufficiently definite had been proposed, and the direction of the meeting was rather adversely commented upon.

Mr. A. S. NEWMAN then read a paper on *High Speed Shutters*.

At the conclusion of the paper,

Mr. G. WATKINS inquired what were the means employed for estimating the speed of shutters.

Mr. NEWMAN replied that the plan he adopted was a little different from Wilson's. He had no difficulty in measuring up to the two-thousandth part of a second with not more than ten per cent. of inaccuracy. He then showed on the blackboard the method employed, which consisted in moving a strip of smoked glass on which a line was traced by a point attached to the moving part of the shutter. The rate of movement of the glass was ascertained by another point or bristle attached to a pendulum, so that the distance travelled by the glass during each swing of the pendulum gave a measure, a fractional part of which that could be measured off was equal to the space traversed by the point attached to the shutter. The form of shutter employed was also shown on the board, and the reasons for the various parts of the construction explained.

Mr. E. W. PARFETT inquired whether there was any means for varying the speed with this shutter, which he understood worked at the one two-hundredth of a second.

Mr. NEWMAN replied that there was not, but he had it in contemplation to arrange interchangeable springs of different power, so that various speeds could be obtained.

Mr. J. B. B. WELLINGTON remarked that a shutter with only one speed, and that a very high one, was useless for ordinary work.

Mr. PARFETT asked whether any one could tell him of a plate that would give a picture with such a quick shutter.

Mr. NEWMAN mentioned two makes that he had known to be employed. He had seen Mr. L. Medland developing some of the plates that had been exposed with great rapidity, and they came up fairly quickly, and not in the tedious way that he had expected.

Mr. PARFETT inquired whether any one could suggest simple means of timing shutters up to the one-hundredth of a second.

Mr. W. E. DEBENHAM mentioned the timing-fork arrangement recommended by Captain Abney and their Curator, Mr. A. Haddon.

It was given out that on April 9 there would be a lantern night, on the 16th a demonstration with the lantern polariscope by Mr. J. J. Briginshaw, and on the 23rd a demonstration and lecture on *Colour* by Mr. W. E. Debenham.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

MARCH 24,—Mr. A. S. Stevenson (Chairman) presided.

The Hon. Secretary, Mr. EDGAR G. LEE, read the eleventh annual report of the Council, who congratulated the members upon the exceedingly prosperous condition of the Association. The members now numbered upwards of 120. The principal event of the year was the photographic exhibition in the Central Exchange Art Gallery, which was in every respect an unqualified success. About 1200 frames were hung, representing the work of 110 exhibitors. So far as quality was concerned, it was admitted on all hands that the exhibition had never been surpassed. One practical result was an immediate, and, it was to be hoped, permanent large increase in the Association's membership. The main object of the exhibition was to give a stimulus to local photography, and to afford members and the public an opportunity of seeing the work of the best men of the day. The Council felt satisfied that this object had been carried out.

The financial statement, presented by Mr. J. W. ROBSON, showed that the Association commenced the year with a balance in hand of 2*l*. 13*s*. 3*d*. The subscriptions had amounted to 33*l*. 0*s*. 11*d*., the expenditure had been 30*l*. 10*s*. 6*d*., and there was a balance in hand at the end of the year of 5*l*. 13*s*. 9*d*.

The CHAIRMAN, in moving the adoption of the reports, congratulated the members upon the healthy condition of the Association. For this they were indebted to a great extent to the more active officials, and especially to Mr. Lee, their Secretary, and to Mr. Brown, who assisted him in promoting the photographic exhibition.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

MARCH 25,—Mr. T. Gilbert in the chair.

Lantern exhibition of 200 slides, the work of members.

Next meeting April 8, American slides.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MARCH 30,—Excursion to Rickmansworth.

The subjects chosen were Moor Park, the seat of Lord Ebury, whose magnificent trees and herds of deer were the admiration of all. The canal at Rickmansworth and adjacent rivers up to Harefield afforded lovely bits for the camera.

IPSWICH PHOTOGRAPHIC SOCIETY.

MARCH 25.—The meeting was devoted to an exhibition of lantern slides.

The Committee of this Society are now engaged in formulating a scheme for affording free instruction to any of the members desiring it. This should greatly increase the Society's popularity. The members now number about sixty.

SHEFFIELD CAMERA CLUB.

MARCH 25,—Mr. G. T. W. Newsholme, F.C.S. (President), in the chair.

A lecture was delivered entitled *Through North Devon with a Camera*, by Professor J. O. ARNOLD, F.C.S., illustrated by slides from negatives taken by himself. Starting from Liverpool to Swansea, thence to Ilfracombe, the tour was graphically described, and many places of interest connected with Kingsley's *Westward Ho!* and Blackmore's *Lorna Doone*, Bideford, Clovelly, Lynmouth, and the famed Doone Valley were portrayed.

BATH PHOTOGRAPHIC SOCIETY.

MARCH 25.—Ordinary meeting.—Mr. W. Pumphrey (President) in the chair.

Marion's "Radial" hand camera was explained by the Secretary. Negatives taken that afternoon by its means were on the table. Bain's "Crown" shutter was also exhibited.

Mr. C. Cloakley exhibited half-a-dozen printing frames he had constructed in various ways to secure certain advantages, among them being lightness, ease of manipulation, freedom from shifting the backs during examination, the backs built up of three boards glued up across the grain, dowels alternated at fixed points, &c.

Mr. A. G. Bristow showed the hand camera used by him to secure the pictures awarded a medal at the Liverpool Exhibition. It was a rectangular dark box, in which he had fitted an Eastman roll holder, a Wray lens, and a Caldwell shutter, the latter being released by a pneumatic ball outside the box. Mr. Bristow said vibration was much less marked when a hand camera was so fired than by pressing a spring lever or any such contrivance. A number of prints illustrating the value of the camera were exhibited, including those awarded the medal.

Mr. PUMPHREY then said that he had experimented very carefully with the Watkins exposure meter since the previous meeting, and considered it a most valuable instrument for any photographer to possess. It was difficult for any one, guided by their own judgment, to take, say, four entirely different classes of subjects, develop these in the same solution at the same time, and get satisfactory results, but by the exposure meter referred to he had that afternoon done so. [Several negatives illustrating this point were then handed round.] Mr. Pumphrey then went on to detail the factors to be considered, and the method of dealing with them in the exposure meter. He was convinced that the use of the meter would save many from committing error in timing their plates.

Mr. PERREN found the speed table was calculated too high. For instance, the number given for ordinary Ilford plates was thirteen, but in his hands the number twenty gave a better indication. This, however, was a detail. He thought the instrument sound in principle.

The CHAIRMAN remarked that in some cases—interiors, for instance—it was merely necessary to expose the plate and meter until the strip of paper darkened, but a definite aperture must first be determined upon.

Mr. WILKINS thought if it was only necessary to place the meter alongside the camera, then ordinary bromide paper might answer as well without the calculating rings.

Mr. W. MIDDLETON ASHMAN pointed out the desirability of preparing the test papers always exactly alike. Any deviation might alter the actinic value wonderfully, and thus lead to errors in the calculation.

The CHAIRMAN said the question of distance need not be considered if it was over twenty-four times the focal length of the lens.

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

MARCH 11,—The President (Mr. John G. Bullock) in the chair.

Dr. MITCHELL opened the subject announced for discussion, *Dark-room Illumination*, and exhibited a lantern which he used in his own dark room. The general objection to the illumination of a dark room by means of coloured light, particularly ruby light, was that in a short time it generally affected the retina very injuriously, and really produced a form of congestion. It acted very strongly on the eyes of individuals whose retina was a little more sensitive to the colours to which one is limited in the dark room. The light was generally thrown directly in the face of the operator, or very nearly so, so that while looking at the plate he received, more or less, the red rays in his face. To develop a plate an operator did not need the light in his face—he wanted it on his plate, hence, after some consideration, he had had constructed for his own use the lantern now exhibited in order to concentrate the rays solely upon the plate. The lantern was a square tin box, with the ruby glass inserted in the bottom. The intention was to suspend the lantern above the developing tray, all light thus being shut out directly from the eyes of the operator. The light was furnished from an Argand burner. The Doctor stated that he had worked for five or six hours at a stretch with this lantern without feeling any more effect than if he had been reading a book by ordinary lamplight.

For the purpose of overcoming the shadow caused by the lighting apparatus, the PRESIDENT stated that he had used a lantern similar to the one shown by Dr. Mitchell, arranged for the gas to come in from the rear. He used a large fishtail burner, placed parallel with the glass, and by that means avoided shadow.

Dr. MITCHELL suggested that the most perfect thing would be a ten or fifteen candle-power incandescent burner, which one could readily turn on or off as desired.

Mr. CARBUTT here exhibited his lantern, with which many of the members were familiar. It excellencies were made apparent by Mr. Carbutt. It had been in the market for eight years, and judging from the sales it must give satisfaction. He had made a few improvements from time to time as he found out the requirements. One was to have more holes in the bottom to give greater inlet of air. He next referred to the lamp he used while travelling last summer. It was constructed on the same principle as the one shown by Dr. Mitchell, but, in place of glass, ruby fabric was used. He found it very convenient, as he could buy a candle almost anywhere.

Dr. MITCHELL alluded to a subject which he thought pertinent to the discussion on dark-room illumination—*i.e.*, the degrees of light which are thought to be injurious to the plate. Some operators thought it was almost necessary to develop and handle plates in Cimmerian darkness, so to speak, and it was a strain on the eyeballs to catch any sign of the image on the plate. He must say he was an advocate for plenty of light. He had always used a great deal of light for changing plates, and in the dark room for all purposes, and he had never seen any injurious results. It might not do for orthochromatic plates, but with that exception he thought one or two thicknesses of yellow post-office paper, with a proper amount of care, would suffice for the most sensitive plate. A newspaper could be read by the light he had in his dark room, and it was much better to have plenty of light for all purposes. He developed right under the light, and had never had any fogged plates. There had been no changes made by the light, as he had repeatedly exposed part of a plate to the light, covering the rest, and the portion exposed showed no trace at all of the action of the light.

Mr. CHEYNEY said there was one fact relative to light which was not often taken into consideration, and that was the operator's distance from it. The lantern he had was very convenient for developing, but the rest of the room was too dark to lay one's hand on a bottle or anything that might be wanted. To obviate this, he had a lamp placed about eight feet distant, to which was affixed a ruby chimney. This he found he could burn with impunity and have lots of light. None of his plates had been fogged by it, and he always used as fast plates as he could get.

Mr. RAU described an apparatus made by him for use while travelling in the East. It consisted of a cylinder made by rolling several sheets of Carbutt's ruby paper on a stick. Whenever he desired to change his plates, he stood this cylinder over a light placed in a box lid, and though it lit up the whole room he never lost or fogged a plate. Of course, they did not then use as rapid plates as at the present time. The cylinder did not break, and the same sheets were used during the whole journey—six months probably. The light used was a candle, and the top of the cylinder was turned over.

Dr. MITCHELL said he had noticed in the British journals, almanacs, and year-books, by several different authorities, that it was quite possible to change plates by candle-light. He did not know whether it was a yarn or not, but it waa stated as a fact. The candle was placed in such a manner and so shaded that the direct light did not fall on the plates. It was stated that the actinic light was so small that it would have no injurious effect upon the plates.

Mr. IVES said he had changed plates in that way a hundred times, and he had had no trouble with the plates. Still, he did not think it safe to advise people generally to do this, but it could be done.

Mr. WILSON facetiously remarked that plates were very rarely fogged in the dark room any way. It was usually the fault of the plate.

Mr. IVES said it should be understood that most of the sensitive plates in the market were considerably sensitive to the true red rays of the spectrum. It was not a good idea to leave plates exposed to red rays for a great length of time. He knew, by experiment with some of the rapid commercial plates, that landscapes could be made by the action of the true red rays of the spectrum. With a rapid-working lens, and an exposure of about fifteen minutes, very perfect work could be done, and no rays acting except the true red rays. Such pictures he had made, therefore these plates should not be exposed to red light for an unnecessary length of time, otherwise it would be bound to produce some effect. With the orange light he knew that the picture could be made with a shorter exposure. Ordinary plates were least sensitive to the red, then to the orange or yellow; but sensitive enough to the true red rays of the spectrum to permit of a landscape being made with the exposure above noted.

The SECRETARY suggested that a shelf under the developing table was a very good way to cover up the plate. It was always there when wanted, and saved the trouble of hunting in the dark for covers, which could not be found when most wanted.

Mr. IVES used a hinged lid for this purpose, which he turned down over the developing dish when he desired to cover the plate. He found it very convenient.

Mr. EARLE showed an improved form of "diffuser" for flashlight exposure. It was the invention of Mr. Bridges, of Baltimore, and consisted of a base of tin about 12×18, at one end of which was hinged a tin reflector of same dimensions, and at the other a frame holding a thin sheet of white, translucent celluloid. The flashlamp, of any usual form, was placed in the middle of the baseboard, the light being reflected through the celluloid, which diffused it in a very perfect manner without materially lessening its actinic power. Everybody predicted that the celluloid would burn up at once, but a very careful test had been made, and they found that the material could even be waved through a gas flame without ignition. It would ignite only when held still in the flame. Considerable heat was necessary to start celluloid to burning. If a little common salt were added to the magnesium, it would give a yellow flame, and by the use of an orthochromatic plate very soft effects could be obtained.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

A MEETING of the above-mentioned Society was held in the Rooms of the Geographical Society, Nishikonyacho, Tokyo, on the evening of Friday, the 13th inst., Mr. Edmond R. Holmes in the chair. There was a large attendance.

A paper was read by Mr. T. ICHIOKA on a certain developer that had fallen into his hands. This developer was sold commercially in the form of a bright red solution needing nothing but dilution with water. It was exceedingly active, and could be used over and over again. It contained a large quantity of sulphite of soda and some caustic soda, but Mr. Ichioka did not know what was the actual developer.

Mr. C. D. WEST thought that the actual developer was probably hydroquinone. Either pyro or eikonogen would be detected by the colour, in spite of the fact that some dye, probably an aniline colour, had evidently been added to the solution to make it more difficult to guess what it might be made up of.

Mr. W. K. BURTON demonstrated the washing of eikonogen that had turned quite black. By the particular method of washing adopted the loss of eikonogen was a mere trifle.

Mr. B. MUNSTER showed some tubes of the new eikonogen developing powder. This powder was found to be quite white, and when dissolved in water gave a colourless solution. Mr. Munster said that it needed no addition of any kind, and was a most active developer.

A portfolio of prints that had been sent to the Society some time ago by Dr. H. P. Emerson, as examples of "naturalistic photography," were handed round for criticism.

Mr. K. OGAWA said that when he was in America he had taken every opportunity of studying reproductions of the work of the French artist, Millet, whose pictures he admired greatly. It was evident that Emerson was trying to imitate his work photographically, and although Emerson's work was far from faultless, it was, Mr. Ogawa considered, a great deal better than what was commonly turned out by photographers, who might study Emerson's work with advantage.

Mr. WEST said he thought the greater part of Emerson's work was too black and sooty to be natural.

Mr. J. MILNE recognised great artistic merit in Emerson's work, but, speaking not particularly of the specimens shown just now, but of Emerson's work in general, he could not see that it was necessary for a "naturalistic" effect to select for photography only such phenomenally hideous figures as were generally to be seen in Emerson's photographs. At least half of them would be arrested on suspicion only on account of their faces if they were seen by daylight. He proposed a vote of thanks to Dr. Emerson, which was carried unanimously.

Mr. I. ISAWA showed some excellent micro-photographs, and gave a short description of the means of producing them.

Mr. KAJIMA SEBI photographed the meeting by flashlight.

During the evening prints made from negatives exposed on the occasion of the flashlight at Kaga Yashiki by Messrs. Kajima, West, and Burton, were exhibited.

BERLIN PHOTOGRAPHIC SOCIETY.

MARCH 5,—Dr. Stolze in the chair.

A new flashlamp for "blitz-pulver," by Herr Ferdinand Schuler, was exhibited, in which the powder was ignited by the explosion of a detonating cap. The lamp was commended for the certainty of its action and the extreme rapidity of the flash. An attempt was then made to show off the Moh lamp, which was not successful, as the wretchedly constructed article fell all to pieces before it could be got into action.

Captain KISS then laid a large collection of aluminium and aluminium-bronze articles before the Society, which were lent by the Allzemeine Electricitäts Gesellschaft of Berlin. The collection comprised a variety of physical and surgical instruments, and also works of art, such as statuettes and statues, said to be very effective. Its application to the manufacture of photographic apparatus was illustrated by the presence of a tripod stand consisting of legs formed of aluminium tubes, and by a camera bound with aluminium, which contrasted very favourably by its lightness with one similarly fitted with silver. Captain Kiss informed the meeting that aluminium was now successfully brazed and soldered, which had formerly been one of the principal difficulties in working the metal. The price had recently sunk considerably, being now twelve and a half marks per kilo (about six shillings and threepence per pound), owiug to its being obtained by electrolysis much more cheaply than formerly by power supplied from the Rhine-fall.

Dr. HESEKIEL exhibited some excellent prints on rough Whatman paper, which is a chloride priuting-out paper, and, discussing his exhibits, took

occasion to treat the Society to an account of the principles recently propagated in England, and known to us as Naturalistic Photography, or Emersonism. His critique, it is superfluous to say, was unfavourable, and comprised most of the objections with which we are familiar.

Professor BRUNO MEYER also joined in the discussion, and attacked the practisers of out-of-focus photography and obscurantists generally with much vigour, comparing the desire to deprive photography of its distinctness to the mistaken taste that attempts to make porcelain look like majolica ware, or would impart to gold the appearance of lead.

The CHAIRMAN (Dr. Stolze) to some extent defended the out-of-focus photography as practised by Dr. von Lima, pointing out that where the details were indistinct they were often saved by the grain of the paper from inartistic effect.

Correspondence.

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

THE STORM IN THE NATURALISTIC CRATER.

To the EDITOR.

SIR,—When I wrote my book I did not write it for my own glorification but purely and simply with the intention of trying to help the photographic world to give the fullest expression to the very limited art that they practised. I was justified in thinking I might help them by the attention which my own photographs had received in the photographic world. I regretted the loss of several months' work which the preparation of the book cost me, but the spirit of the reformer was strong in me and it had to find expression. I have since learned that in art matters all attempts to bring others to think as you do are hurtful rather than useful. However, to return. I distinctly stated what claims I thought I had to originality. I claimed that I had attempted to reduce naturalistic teachings (which I said were as old as ancient Greece) to *scientific first principles* and *to apply those teachings to photography*. That was my claim. I still claim, and can prove as much, but I am not so greedy for a character for originality as those "who break new ground in the land of Constable" (G. Davison). The study of development and of new scientific discoveries (psychological and physical) obliged me to renounce my former views, and determined to pillory a mean creature, and to break a conspiracy I have long watched with amusement, a conspiracy of which I shall one day write the full history, if only as a study of character.

Amid all this turmoil arose a whisper that I had got some of my ideas from a certain book—a book devoid of science and scornful of photography—I refer to *Naturalistic Painting*. As a mere matter of dates my first writing on the subject came first; as a matter of incidental proof, I mentioned the receipt of a letter. Busybodies have now been round trying to make mischief, but they shall not succeed. Mr. Bate shall see the letter, and its author will explain the matter to me and to Mr. Bate, and the misunderstanding shall be removed. This is no public matter, but one that concerns us three only. My writings take precedence of those of Mr. Bate by date. The suggestion that Mr. Bate was in any way influenced by me I have publicly repudiated. Every day that I live and grow to see art matters more clearly, I deeply regret I was ever in any way identified with naturalism.—I am, yours, &c., P. H. EMERSON.

MR. F. H. VARLEY'S DISCOVERY.

To the EDITOR.

SIR,—Something in the nature of a protest seems to me to be required against the tone of your correspondent "Expectant," who, in his letter of last week, appears to suggest the possibility of doubting the reality of Mr. Varley's discovery.

The lecture into which Professor Meldola introduced the matter was not on photography in general, but on "Photographic Chemistry," and the principal ground on which it was introduced was the interest attached to the chemical change. The iron compound, modified by light, was stated to react on some second body to form the image; and it is quite absurd to suppose that the lecturer should have introduced the subject in this way without having made himself certain of the reality of the discovery. He also mentioned a patent which was not then completed; and the fact of this patent being incomplete was the reason he gave for not stating particulars of the new iron compound and its reaction on the second body. We may, therefore, hope shortly to have particulars from him, and perhaps in the meantime he will not object to give the number of the patent, so that those interested may be able to refer to the specification as soon as it is on view at the Patent Office.

From the scientific point of view the matter appears to be of exceptional interest. If the action of light consists in the reduction of a ferric salt to a ferrous salt, and this ferrous salt reacts on a second body, one would expect a general darkening on immersion in the ferrous oxalate developer.

Indeed, so remarkable is the simulation of the reactions of silver by the new iron compound that were the authority and reputation of the lecturer less we might almost suppose some mistake as to the materials used; but as things are, the mind is led to the experiments of Crookes and of Auer von Welsbach which tend towards the regarding of "element" as a shifting function rather than absolutely constant. Is it possible, as suggested by this discovery, that under the action of light and other forces a kind of simulated silver is actually formed? From this point of view it might be of interest to analytically examine one of the prints. Who knows but what such a course might lead to one of the greatest chemical and physical discoveries of the time?—I am, yours, &c.,

BACILLUS FERRATUS.

To the EDITOR.

SIR,—It is a curious illustration of the difficulty that sometimes besets historians that there should already be a question as to the personality of the discoverer of the extremely sensitive iron compound announced by Mr. Meldola and Mr. Varley as the discovery of the latter.

In view of the enormous importance which it has been suggested may attach to this invention—assuming the statements made at its introduction to be accurate—it is desirable to notice that in another journal the origination of the process is credited not to Mr. Varley, but to Mr. Friese Greene. As the name of the former experimentalist was the only one mentioned by Mr. Meldola, and as the *Journal of the Society of Arts* and other papers naturally mention Mr. Varley alone as the discoverer, perhaps this gentleman would like specifically to either claim or disclaim the origination, and if disclaiming, to explain why it was allowed to go forth to the world as his.

In the interest of historical accuracy it is desirable to settle such a point as this as early as may be. W. E. DEBENHAM.

PORTRAITURE BY GASLIGHT.

To the EDITOR.

SIR,—I have read your article on *Portraiture by Common Gaslight* with interest, and am much pleased to find that the efforts of my Company in that direction have proved to photographers its practicability. The pictures made by Mr. Laws, of Newcastle, of which you speak, were produced by the aid of William Sugg's London argand, of course with wet plates. Later, in December, 1888, we introduced our "Cromartie" photographic light, and for the first time produced good gaslight pictures. These experiments were carried out by Mr. Richard Brown, of Liverpool, in the presence of Mr. Norman Tate, F.C.S., and other scientists. I enclose copies of photographs made in ten seconds, after eight o'clock p.m. in December, 1888, in the presence of responsible persons, and carefully timed. No apparatus beyond the camera and lamps was used, and I think the elaborate portable theatre you describe distinctly useless as abolishing the absolute simplicity of gas-photography.

The use of fishtail burners in connexion with such a cumbersome apparatus is, of course, very old, but the production of a good negative in ten seconds by this combination is at once novel and startling, by reason of its apparent (until now) impossibility. The idea that this short exposure can be shortened still more by using bigger burners is, I think, very doubtful. After many experiments with gas burners of all known descriptions used in air and in pure oxygen, with gas carburetted with various substances and consumed in many ways, I came to the conclusion that the rule that practicability of shortness of exposure depended upon the rapidity of vibration, and not upon an augmented photometrical value, was strictly correct. An interesting fact noted was that plates most rapid by daylight were not so by gaslight, a comparatively slow plate being best. It is all a matter of chemistry; perhaps Mr. Atkinson has discovered a new sensitive film which is specially suited to fishtail burners. In any case it is worthy of attention that the type of gas burner now being chased from our houses as the cause of bad and flickering lights should find its last days its best days, its last expiring flicker being entered by Mr. Atkinson as a competitor against the rays of Sol himself.—I am, yours, &c., J. FRED SIMMANCE,

Manager, William Sugg & Company, Limited.

Liverpool, March 31, 1891.

[The specimens sent are excellent.—ED.]

UTILITY OF HAND CAMERAS.

To the EDITOR.

SIR,—It would be an insult to your readers to suggest that they do not fully grasp the *real* reason why "President" declines to reply to the plain questions contained in my former "effusion." To slink out of the ring on the ground that the fist of the man you have challenged comes too straight from his shoulder can only be understood as an admission of defeat.

In quitting the subject I advise this impetuous gentleman to reflect well before he next essays the *rôle* of censor in print. The pen is really too dangerous a weapon to be played with. There are persons of whom it is said that they invade places which even the inhabitants of a better world fear to penetrate. Yet, when these same individuals receive the castigation thus directly courted, with what refreshing surprise do they

discover that the rod is not altogether painless, but that it is now and then actually—nay, "purposely"—"offensive!"—I am, yours, &c.,

Oxford, March 31, 1891. R. E. CHESTERMAN, D.Sc.

FEDERATION.

To the EDITOR.

SIR,—I notice in the report of the meeting *re* the proposed Federation Scheme, held on the 23rd March last, that my name is mentioned as having been elected a member of the Committee. As this was done without my knowledge or consent, and not having been present at any of the meetings, I must protest against this irregular proceeding, and decline to recognise the appointment. Moreover, the greatly increased duties caused by the rapid growth of the South London Photographic Society occupying all my spare time and attention, I do not feel justified in accepting any further responsibilities.—I am, yours, &c.,

F. W. EDWARDS.

87, *Bellenden-road, Peckham-rye, S.E., March* 28, 1891.

DROP-SHUTTER EXPOSURES.

To the EDITOR.

SIR,—If Mr. H. G. M. Conybeare will turn again to Mr. Nelson's letter in your issue of March 13, page 174, he will see that the exposure given with a drop shutter must vary with the stop used, and that the theory that, using the same shutter, we obtain half the exposure by inserting the next smaller stop, as supplied under the "uniform system of the Photographic Society of Great Britain," is an error. With hand exposures of an appreciable length we do, for all practical purposes, because the infinitesimal time required to remove and replace the cap bears so small a proportion to the actual exposure; but with drop and other rapid shutters the conditions are changed, and the diaphragm becomes an important factor in determining the *duration* of the exposure.

Mr. Nelson gives the formula, and adds, "The duration of the exposure is the time the shutter takes to fall to end the exposure, less the time the shutter takes to fall to begin the exposure;" hence, if the shutter always falls from the same point, it must fall a less distance to close a small opening than a large, and, on the other hand, it falls a greater distance and attains a greater speed before opening it; therefore we burn the candle, as it were, at both ends. This will be clearer if we take two extreme examples, viz., full aperture and stop *f*·64. I will take Mr. Conybeare's own measurements, though they differ materially from mine, my shutter opening being 1·7 in., while his is the same as the full aperture of the lens, viz., 1·25.

In Mr. Conybeare's instance of full aperture the total effective fall (the actual fall does not matter) is:—

The fall before opening	+	Lens aperture	+	Shutter aperture	=	Total
·25	+	1·25	+	1·25	=	2·75

$$\sqrt{\frac{2\cdot75}{193}} = \sqrt{\cdot014248} = \cdot11936$$

less fall before opening—

$$\sqrt{\frac{\cdot25}{193}} = \sqrt{\cdot001295} = \frac{\cdot03598}{\cdot08338}$$ second exposure.

Now take *f*·64 = ·14 of an inch.

Fall before opening is:—

Fall before opening full aperture,		·250
+ ½ full aperture	= 1·25 ÷ 2 =	·625
− ½ *f*·64	= ·14 ÷ 2 =	·070
		·555

·805 of an inch.

Thus we have—

Fall before opening	+	Lens aperture	+	Shutter aperture	=	Total
·805	+	·14	+	1·25	=	2.195

$$\sqrt{\frac{2\cdot195}{193}} = \sqrt{\cdot011373} = \cdot10664$$

less fall before opening—

$$\sqrt{\frac{\cdot805}{193}} = \sqrt{\cdot004171} = \frac{\cdot06458}{\cdot04206}$$ second exposure.

or practically half the time of full aperture.

But though the time from the first opening to the final closing is only about half with *f*·64 of what it is with full aperture, we must not lose sight of the fact that with the full aperture the instant it is fully open that same instant it begins to close, whereas with *f*·64 out of a total exposure of ·04206, the aperture is *fully* open for no less a time than ·0386. This shows that to have the opening in the drop the same size as the aperture of the lens is the very worst form of drop shutter that can be made, unless extreme rapidity is required. Should Mr. Conybeare on re-measuring his shutter find the opening in the *drop*, not the fixed part, to be 1·7 inch, he will have almost the exact exposure he supposed, viz., ·093 instead of ·1.

Placing a drop shutter in any position other than vertical amounts to nothing more than shortening the drop and increasing the friction, and no calculation will give the exposure. All calculations of this kind are based only upon the acceleration of gravity (32·2 feet per second) and ignore friction, which, in a properly constructed shutter working vertically, is very trifling. I have one I have calculated to ·042 and tested to ·044 of a second.

I have recently constructed a drop shutter that will give known variations of exposure with the same diaphragm, or the same duration of exposure whichever stop is used, thus giving to each stop its true value, a description of which I hope to give shortly.—I am, yours, &c.,

Park Royd, Halifax, March 30, 1891. EDWARD J. SMITH.

PHOTOGRAPHIC EXCURSION TO GRASSE.

To the EDITOR.

SIR,—Mr. A. L. Henderson, whom we will call the "Professor," picked up your humble servant, the "Amateur," at Nice, by an early train from Monaco, changing at Cannes and arriving at Grasse station about half-past ten in the morning, when we proceeded by carriage to the town, which towers above the station a good half mile. After winding through, as it were, a staircase road, we arrived at the High Street, or, as is called, *Le Jeu de Ballon*, no doubt named from a French game of ball formerly played there. We then finished our journey on foot to the Grand Hotel, the present residence of Her Majesty the Queen, and interviewed the amiable proprietor, who, by the way, is an amateur. The Queen's rooms not then being ready, we decided to take views from the windows. I noticed the Professor was using a very small stop; amateurs must follow professors, so, looking for my stops, I found the set I had brought with me were unfortunately for whole-plate lenses, but I overcame the difficulty with an extra-rapid time shutter. My next trouble was a dark cloth, but that was speedily replaced by a light dustcoat. The objective was a rapid rectilinear, and I was working with 9 × 12 Lumière extra rapid plates. A sharp image was focussed of the panorama of the old town on the left, with its rustic perfume factories and tall chimneys, with a background of the sea-coast of Cannes and the surrounding Maritime Alps; the dark slide was afterwards put in, a sharp released pressure on the ball, and the thing so far was done. The Professor was good enough to suggest I had forgotten the opening for the stops—and the sun, as water to the amateur plumber, was sure to creep in where there was the slightest chance; that had to be mastered by turning the slit downwards and tying my handkerchief over it. Then a No. 2 panoramic view was taken as before.

Having enough of the inside, I went and had a turn in the garden to take an exterior view of the hotel, which, being on rising ground, and not having a swingback camera, I had to lower down myself and camera to such an extent that the whole thing came to the ground. The Amateur and camera were well telescoped together on the lower staircase of the lawn; but, after all, I secured a view of the exterior. In the meantime the Professor, by an old dodge of his, had secured a snap shot of a young Scotch lad and lassie with their nets catching butterflies on the lawn. The next thing on the *tapis* was the English church, about a thousand yards from the hotel on the high road—a small, neat and not gaudy little building, as my negative turned it out to be. The morning's excitement having cooled down a bit, and the luncheon hour near at hand, perhaps had something to do with the success of this picture.

The Professor must, of course, take an interior; but the church being closed and no other information on the door than the Lord's Prayer in French on the left, and hours of service on the right, and no vicar's, curate's, or even the sexton's address to be seen, the interior was left for another visit, and after a snap shot taken on the road, a visit was paid to the royal stables, *en passant*, to see that infallible white donkey so much spoken of in the papers; but it reminded me of that green cloth of the Principality, it turned up the *reverse*, and that donkey was black; so some one's on the wrong colour again, or perhaps mixed over the *plus* and *minus*, as, negatively speaking, that black donkey is a white one.

After bidding all the Queen's horses and all the Queen's men that were there adieu, we stumped along down the road to Muraour's Hotel, and did justice, with a photographic appetite, to a *bon déjeûner*, and after a chat (subject, of course, photography), we found we had missed the 2.25 train back, so I proposed taking a view of the hotel from the place where the celebrated Bruno Courts Perfumery stands at the corner, and some distance from the Grand Hotel; on our way down we were followed by the usual *gamins*, and I heard one remonstrating with the others that it was of no use asking to carry their things, they would not understand you; a few yards further on another impertinent *gamin* shouted out, "Look at those Englishmen from England, who live on potatoes!" This was evidently intended for the Professor, who displayed, *à la* Highlander, some well-developed calves that had evidently been to Grasse before. It was the sun this time that began to trouble me, by playing a game at hide and seek behind the clouds. However, a fine, sharp picture was obtained by using half my lenses and stretching the camera bellows out almost to a miniature shooting gallery; then, to make sure it had not slipped back out of focus, had a second look with the dust (not dark) coat, and found there was a total eclipse of everything, and looking round to see if the shutter was open, found the stop to be the head of a lad trying, as it were, to get inside. During all these preliminary preparations, the Pro-

fessor had secured a whole-plate view of the hotel, and I caught mine when the sun was dodging in between two clouds, and this terminated the day's camera work, and we then wandered down through the old and artistic town to the station, arriving at Nice about half-past six, when I bid the Professor good-bye.

Being an amateur I naturally wished to see the result of the day, so set to work at once developing. First picture more like a dirty black board, evidently the effects of that slit. Nos. 2 and 3 rather thin and washy. No. 4, very fine negative barring about a thousand or so pinholes, not my fault, perhaps; the dustcoat had something to do with it, as the emulsion makers never do. No. 5, English church, A 1 negative, but spoilt in my excitement by scraping out one of the front windows with my nail. No. 6, exterior of hotel, a decent negative only a little sky-high; could call it an hotel cloud effect. I exposed in all a dozen plates; the remainder were passable, some being duplicates. The lesson to be learnt is never to go out before trying all stops, lenses, &c., especially the dark cloth and dark slides to work easy, so as not to skin off the top of one's finger joints as I did on the above excursion. Bidding my readers adieu, and hoping to address you one of these days as a *Professor* and not the Amateur,—I am, yours, &c.,

C. GLANVILLE.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

TONING.—Do not line your tray with these lead compounds, but use paraffin wax instead.

BLACK TONES, S. J., W. READ, and BRILLIANT.—Your queries are answered in a sub-leader on another page.

SETH.—We think you may safely entrust the pictures to the house named. They are a highly respectable firm.

W. & T. BRADING (Newport).—Messrs. Lancaster, of Birmingham, will supply the brass fittings and bellows wanted.

J. R. C.—If you can show any fraud in the sale of the business—such as the accounts shown not being correct, or the business stated to have been done was not really done, or similar misstatements—the law will give you redress. But if the vendor has merely, as you say, "used up the neighbourhood," we fear you have no remedy, inasmuch as there may have been no misstatement as to the amount of business done by the vendor.

DOUBLE writes: "Could you kindly inform me what is the best mountant for carbon prints, double transfer? I have been using starch, but when they are dry they curl up at the edges."—We know of nothing better than good starch made thick and applied with a sponge, so as to evenly distribute it, taking care that the edges are well coated. This is the mountant, we are told, that is used by the Autotype Company for their pictures.

HONEST COMPETITION writes as follows:—"I should feel very much obliged if you could give me advice anent the following:—A, an old-established photographer, has gained a great many medals for *genre* or composition photographs. He does not publish those pictures which have gained the medals. He exhibits the case containing the medals in the front of his window, which is filled with regular professional work, *i.e.*, portraits, groups, enlargements, &c. There are other two professionals, B and C, in the same town, which is visited by a large number of strangers, tourists, &c., during the season. The visitors, seeing the medals in the window beside professional work, naturally think that they are evidence of excellence in taking portraits; and B and C believe (in fact know) that these medals exhibited in the window have been the means of attracting customers who would otherwise (*i.e.*, medals being absent) have given them their orders. B and C can do as good work as A (one of them is sure he can do better), and they think that the exhibition of the medals by A is taking an unfair advantage of them, more especially with strangers. Now, I would esteem it a great favour indeed if you could answer or give me some information about the following questions:—1. Is the exhibition of the medals beside professional work not misleading to the public? 2. Can they be blamed when they think the medals are evidence that the exhibitor can photograph them better than other photographers? 3. Is the exhibition of medals gained for other than professional work in a professional window beside purely professional work not a breach of professioual etiquette? 4. Is there any precedent for it? 5. What is your own opinion on the subject? 6. Should the photographer not affix a note clearly stating what the medals were gained for? 7. What action, if any, would you advise B and C to take anent the matter?"—In reply: It is very general for photographers to exhibit any medals they may have gained in their shop windows, and we see nothing objectionable in the practice if the medals are for the work of the exhibitor, even if they are not for actual portraiture. It might, however, be stated what pictures the honours were awarded for. Of course it is open to every one to gain as many medals as he can, and the only suggestion we can make is that B and C compete in future and secure a good number of medals and do as their neighbour has done. If you care to exhibit at any of the numerous small societies' exhibitions which grow like mushrooms in and around the metropolis, and also in the provinces, you may perhaps be the happy recipient of a score or two of medals before you are a year older.

R. DAVIES.—The title is clearly misleading to the public. The picture is merely a photo-mechanical print—a collotype in colours—and not very good at that.

A. HARWOOD says that in enamelling prints many of them stick to the glass and cannot be separated without pulling up the collodion in places. This shows that the glass is not properly prepared. It should be thoroughly cleaned, and then well rubbed over with good French chalk before applying the collodion. In place of the chalk, some prefer waxing the plate; this entails a little more labour, but is thought by some to yield a better surface with less liability to stick. However, with a perfectly clean glass and careful chalking, the stripping is easy.

G. WILCOX sends some prints of landscapes taken with a lens he has just purchased, and complains that the pictures are far from sharp in the firm parts, as the twigs on the trees, and asks if it should not be returned as defective. So far as we can judge from the prints, the lens appears to be a very fair one. The want of sharpness in the twigs is due to their movement. Those parts which were stationary—such as the bridge, the railings of the house, and the trunks of the trees—are all well defined. Test the lens carefully on a stationary object.

LIVERPOOL CAMERA CLUB.—The next meeting will be held on April 8, when there will be a demonstration of hand-camera work by Mr. W. Anderson Brown.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 8, *The Development of Instantaneous Exposures;* April 15, *Printing on Emulsion Papers.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 9, Lantern night. April 16, Polariscope demonstration by Mr. J. J. Briginshaw. All interested are invited to attend.

WE were in hopes to give in this number a valuable article on *Gold-coloured Allotropic Silver* by Mr. M. Carey Lea, but, owing to pressure on space, we prefer to leave it till next week rather than give it in a curtailed form.

SINCE noticing the charming specimens of chlorotype printing received a few weeks ago from Mr. J. R. Gotz we have had an opportunity of trying the paper for ourselves. We are more than ever satisfied of its great excellence.

WE are glad to learn that the Liverpool International Photographic Exhibition in the Walker Art Gallery is not to close so soon as was originally intended, as the Executive have decided to keep the Exhibition open till Saturday, April 11.

MR. OSCAR SCHOLZIG sends us two nice samples printed on "Three Star Emulsion Paper," a new production of the Dresden Albumenising Works Company. It is a gelatino-chloride paper, and the new nitrate of lead combined toning and fixing bath is recommended to be used with it.

A NEW edition of Mr. William Tylar's *Photography in a Nutshell* is received. It differs from the former one in being printed on one side of the leaf only, leaving a blank page opposite each printed on. This is very handy for those who wish to supplement any given information with their own notes. Mr. Tylar says he is about to have it translated into two foreign languages.

AMONG trade catalogues which we have received is one from Messrs. Walmsley & Co., Philadelphia, beautifully got up and well illustrated. Another from the Birmingham Photographic Company, Limited, in which the Kallitype finds a chief place along with others of their specialities; it, too, is illustrated. A catalogue from Mr. Henry Park, Acton-street, Kingsland-road, N.E., is replete with camera fittings of every conceivable kind, including bellows bodies, parallel and conical.

PHOTOGRAPHING THE HEAVENS.—We learn from a daily contemporary that the International Congress which has met in Paris for the purpose of making arrangements for the drawing up of a new and elaborate Map of the Heavens, held its first sitting on Tuesday at the Observatory, under the presidency of its director, Admiral Mouchez. An account has already been given of the chief questions which the *savants* who have come from different points of the globe will be called upon to settle, as well as of the elements of which the Congress is composed. Admiral Mouchez delivered a short address of welcome, and soon afterwards he was elected President—one of the two vice-presidents being Mr. Gill, who is at the head of the Observatory at the Cape of Good Hope. Among those who were present were Capt. Abney, Messrs. Plummer and Knobel; Herr Schener, of the Potsdam Observatory; Padre Denza, of the Vatican; Signor Ricco, of Catania; M. Belopolski, representing the Russian astronomers; and a number of French men of science. During the meeting each of the Directors of the Observatories reported the progress made with the instruments which are being fabricated for the purpose of photographing the heavens, and stated the period at which the experiments could be commenced. Owing to the disturbances in Chili and some other countries, the work cannot be begun simultaneously, but the first step will be made probably in June. The electric light will be used in the photographic operations wherever practicable.

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PHOTOGRAPHIC *VERSUS* HAND ENGRAVING.

Photographic engraving has long since developed into an important industry, and but for it some illustrated works would have been impossible, such, for example, as the *Daily Graphic* and some of the weekly illustrated papers. So far as line subjects are concerned there is little more to be achieved. A drawing is simply made in bold line by artists who know what is required for the process. This is photographed—artificial light being generally used—the negative printed on zinc, and the image etched. By this method a type block, ready for the press, may be produced in an hour or two from the time of receiving the sketch, while the result is quite equal, if not superior, to the wood engravings formerly used for this class of illustration.

When, however, we come to half-tone subjects the case is different. Therefore it may be well to point out that few photographically engraved plates, or typographic blocks, will compare with the highest class of hand engraving, unless a considerable amount of skilled hand work is bestowed upon them. This, it may at once be explained, is not so much due to shortcomings in the various processes employed as to the subjects that have to be dealt with in actual everyday commercial work. We have often heard it remarked that the prices charged for this class of work are generally exorbitant, but a little consideration of the circumstances will show that this is not really the case.

First let us take, by way of example, intaglio plates. The larger proportion of these are reproductions of paintings, and it must be borne in mind that the finished result is not to be a photographic reproduction of the picture, but such a transcript of the colours into monochrome as a skilled engraver would make. Every one is familiar with the way that photography renders colours, orthochromatised plates notwithstanding, and this is represented in the engraved plate. Hence it is that the work of a skilful engraver becomes imperative to turn out a successful plate. It is true that much of the engraver's time is often saved by working on the negative, or on a transparency, or both, though not always to the satisfaction of the painter of the original. Be that as it may, the fact remains that on the majority of the highest class intaglio plates—"photo-gravures"—there is an immense amount of highly skilled hand work, which by the uninitiated passes unnoticed. Hence the prices charged—from three and sixpence to seven and sixpence or upwards per square inch, according to the subject, we believe—are by no means excessive, particularly when it is considered that plates of similar subjects would take many months, or even years, to engrave if the work were done entirely by hand, thereby entailing a cost of hundreds, if not thousands, of pounds.

With negatives from nature, such as landscapes and architecture, where a photographic representation suffices the plates, if skilfully produced, require very little if any hand work whatever. Such plates are supplied at a much lower rate than those of works of art, not exceeding, we think fifteen or eighteen pence per inch.

What has been said with reference to the best class of intaglio plates applies equally to half-tone blocks of the highest order. Here the photographically made block has to compete with the work of the skilled wood engraver in the proper transcribing of the various colours and tints of a painting into monochrome. Therefore the finished blocks, although the negatives may have much retouching expended upon them, usually require a considerable deal of hand work to make them perfect; and as wood engravings are quickly produced compared with intaglio plates, photography is scarcely likely to oust them from the field, at least for some time to come, for the highest class of work. Wood engravers, even for their best work, very frequently avail themselves of photographic aid by having a photograph put upon the block instead of a drawing produced by hand.

We were recently informed by a principal of one of the leading houses in the production of relief blocks that much of the would-be profit was eaten up by the hand work through the unsuitability of the subjects or of the negatives supplied. It is for the latter reason that so many trade catalogues are illustrated with woodcuts instead of process blocks, although the cuts are actually made from photographs of the objects themselves. Those issuing them find that the cuts convey the best idea of the goods depicted.

Excellent half-tone blocks upon which little if any hand-labour has been expended are in daily use, but they are usually from nature—landscapes and the like. Though here the photograph often has to be reproduced before it is used, owing to the unsuitable character of the original. The most successful half-tone blocks at present in use are those from pictures in monochrome that are specially worked for the purpose. Many of these are enlarged photographs, highly finished in "black and white," and reduced to the size desired. These blocks rarely require any retouching, except occasionally perhaps a little to strengthen the extreme high lights. Such blocks frequently form the principal illustrations in several of the weekly journals, and cost far less than would wood engravings of equal merit.

Instantaneous pictures by detective cameras are amongst the most difficult subjects that the photo-engraver has to deal with, owing to the general absence of detail in the shadows arising from under-exposure. Yet the detail has to be shown in the print. In such cases the following method is often resorted to, though it may not be very generally known to some of our readers:—An enlargement is made from the small negative on bromide paper. Then a drawing, or rather a tracing, is made upon it in line in a black unaffected by water, such as lithographic chalk or crayon. The image is then

bleached by bichloride of mercury, leaving the drawing in black line on a white ground. This is photographed and an etched zinc block made. Of course, the result thus obtained can in no way be classed as a half-tone block.

TRANSMISSION OF IMAGES, SEEING, AND PHOTOGRAPHING BY TELEGRAPH.

About fourteen years ago, physicists began to realise that we were in possession of all the individual organs of an arrangement by which impulses of light at one telegraph station could be approximately reproduced at other stations, with their periods and their relative intensities, while since this time very many proposals have been made for the construction of apparatus by which such a luminous image as that of the camera obscura may be reproduced at a distance, with no link of connexion but electric conductors. The transmission of a specially made writing or sketch is a much simpler problem, and was practically solved by F. C. Bakewell nearly forty years ago, only one connecting wire being essential. In Bakewell's arrangement, however, light plays no part.

The present state of the problem of telephotography is summed up in a little work* recently issued by Herr R. Ed. Liesegang; but as this little work is more of the nature of a scientific paper than a handbook—a scientific paper including much of the author's original matter—an ordinary review would be inadequate, so we propose to give a tolerably full account of the subject, embodying not only Dr. Liesegang's original devices, but our own ideas as to the most promising means of practically solving the problem. In perusing what we say on the subject, the casual reader who follows us will probably feel surprise at the number of methods or devices by which there may be hope of practically solving the ultimate problem—that of seeing (and if we can see we can photograph), as in a mirror, a scene which is not only distant, but is cut off from the observer by opaque obstacles. The intermediate problem, the reproduction as a fixed picture of any scene, all parts of which will remain immovable for a sufficient time, may perhaps be regarded even as near in its practical solution; while the initial problem, that of slowly transmitting a previously made writing or sketch, is already solved; and moreover, an original of the kind required for transmission may easily be obtained photographically from any sketch in full contrast—such as a line subject. As an introduction to a more detailed study of the various methods of working—as propounded by Herr Liesegang and others—we propose now to give quite a preliminary view of one way in which each problem may be dealt with, especially as these preliminary views will make our subsequent matter easier to follow by those who have not previously given much attention to electrical matters.

First, then, as to the transmission and reproduction of a specially made writing or sketch—a problem which, as before mentioned, was solved by Bakewell nearly forty years ago. In his arrangement the writing or sketch to be transmitted is made on tinfoil with a pen dipped in thin varnish, and the lines form on the conducting metal surface a number of non-conducting marks. The writing or sketch thus made on the tinfoil is fixed round a metal cylinder at the transmitting instrument, and around a counterpart cylinder at the receiving station is wrapped a piece of paper moistened with a solution of ferrocyanide of potassium, made acid with hydrochloric acid. Lightly pressing against each cylinder is an iron style, and the current is made to pass in its circuit from each style to its cylinder through the tinfoil in one case, and through the prepared paper in the other case; but the style resting on the prepared paper must be positive in relation to its own cylinder, as it will then make a blue mark on the paper when the current passes. The cylinders are now made to rotate synchronously while the two styles move along the cylinders so that each describes a spiral, the turns of which come quite close together. Under these circumstances the varnish writing, when it interposes between the style and the tinfoil, stops the electric current and makes a corresponding break in the blue spiral line traced by the iron style on the cylinder covered with ferroprussiate paper. Any writing or drawing in clear and bold black and white can be transmitted by Bakewell's arrangement if it be first photographed, and a bitumen image be made on the tinfoil; so that the photo-electric transmission of somewhat coarse sketches or writings may be considered quite a practicable thing and easy to do should sufficient occasion arise. Bakewell's copying telegraph—it may be mentioned—was found to work satisfactorily between London and Brighton, the synchronising of the cylinders being easy, and relays can be used when required. It has not come into general use because there has been no sufficient commercial demand for it.

The next problem, that of reproducing a camera scene with all its gradation of tone, is almost ready for practical solution in several ways, should the inducement to construct the required apparatus become sufficient; and to give a preliminary idea of one of the possible methods, we may suppose a minute selenium cell—such as we shall describe in detail farther on—to traverse in a series of parallel lines, over the camera field at the focal plane of the objective, the selenium having an electric current flowing through it all the time. The resistance of the selenium cell becomes less in proportion as a brighter light shines upon it, and therefore the amount of current passing will have a certain ratio to the intensity of the light shining on the cell. By a suitably graduated relay system these fluctuations of current can be made to control the luminosity of an incandescent lamp, this lamp being made to travel in parallel lines synchronously with the selenium cell, and over a dark area homologous with that over which the selenium cell travels. Under such circumstances a camera set up so as to include the area over which the incandescent lamp ranges would receive on its sensitive surface an impress of the original scene. To make this clear, we may say that both selenium cell and incandescent lamp are supposed always to be in corresponding parts of the two fields, and when the selenium cell is exposed to much light the lamp will give out a proportionately bright light.

We now come to the final problem, that of seeing simultaneously all parts of a distant scene with the objects in motion. The organs for attaining this end will be analogous to those to which we have referred in the last case. There must be transmitters sensitive to various degrees of illumination, and receivers in such sympathy that each produces a light corresponding to that shining on its transmitter; and for the purpose of our present illustration we may suppose the selenium cell, graduated or proportional relay system and lamp as before. In order to represent at one time the whole scene, we must suppose the organs to be in considerable number, the transmitters being packed closely together over the field of a large camera directed upon the scene, and the receiving lamps arranged correspondingly over an homologous area, *e.g.*, the wall of a large building. Under such circumstances, the resu

* *Beitrage zum Problem des electrischen Fernsehens.* Von R. Ed. Liesegang. Düsseldorf, 1891. Ed. Liesegang's Verlag.

would be seen as a kind of mosaic, more or less course or fine, according to the number of lamps. Putting aside the difficulty of obtaining transmitting organs—whether selenium cells, or such other arrangements as we shall describe—which will act with uniformity for long periods, and will not "fatigue" or otherwise deteriorate, it is difficult for a reader who has been unaccustomed to use electrical apparatus to realise the enormous amount of labour which would be required to set up and maintain the required number of separate organs, especially as at first sight it might appear that any arrangement based on separate sensitive surfaces would involve a telegraphic line wire for each organ. As an illustration, we may refer to our plate issued with THE BRITISH JOURNAL OF PHOTOGRAPHY on March 20th last, representing the Liverpool Photographic Exhibition. If this print is examined by means of a magnifier, it will be seen to consist of an enormous number of black dots set at uniform distance from centre to centre, the function of each dot being to diminish the amount of light reflected from a given area of white paper, and these areas of varying illumination are so close together that practically the effect of each area is so merged in the whole that we get a general gradation, or approximation to what is known as tone ("half" tone). If it were desired to transmit such a scene, and with the same amount of definition and tone shown in our print, a transmitting and receiving organ with its proportional or graduated relay system would be required for each dot. Approximately there are four hundred and ninety thousand dots in the print in question, and to show the scene as our print shows it, this number of transmitting and receiving organs would be required. Supposing each incandescent lamp of the receiving surface was only one-fourth of an inch in diameter, the whole assemblage would occupy an area of about seventeen feet by twelve feet; and allowing the same area for the sensitive surface of the transmitters as for the receiving lamps, the transmitting camera would have to be of a corresponding size.

Now with regard to the line wires. As before observed, it might appear that each organ would require a separate conductor, but recently Herr Liesegang has pointed out a method by which the number of conducting wires can, in certain cases, be reduced considerably, in fact reduced to twice the square root of the total number of organs when the group is a square, but his arrangement may involve a somewhat different system of transmission. Thus for the 490,000 organs, which is approximately the number which would be required to make such a scene as that of the Liverpool Exhibition visible to spectators in a distant theatre, only 1400 conducting wires would be required if the surface to be covered were square instead of oblong. In the case of an oblong the number of wires will be the number of organs along one great side added to the number along one short side. The advantage of the Liesegang system—of which we shall give particulars—steps in more especially with regard to areas with numerous organs. Thus the wires of a system of twenty-five organs would be reduced to ten, while those of a system of one million organs would be reduced to two thousand, or one five-hundredth of the total.

PHOTOGRAPHIC ENAMELS.—II.

THERE is, of course, no formidable reason why the collodion transparency should not be toned while it is still on the glass, and we believe that such is occasionally done; but it is open to doubt whether the substitution is so complete as when both surfaces of the transparency are exposed to the action of the solution. When the loosened film has been placed in a dish of clean water, a thorough washing should be given to it in order to remove the last trace of sulphuric acid. It is then ready for toning.

As we are now dealing with a film detached from its support, it will be apparent that some little care will be necessary in order to avoid injuring the picture. It is preferable to cast aside all ideas of toning the film without the assistance of a temporary support, the safe manipulation of a detached film in a dish of liquid being not the easy thing it may at first sight appear. Some operators proceed in this way:—In the dish of water into which the loosened film is lowered a piece of clean glass of the same size as the transparency is placed, and as the film leaves its original support the latter is adroitly withdrawn from the dish, the second glass lifted up, and the film allowed to obtain contact with it, one end being assisted to very slightly overlap the glass by gentle application of a camel's-hair brush. The toning solution is then poured on, and when it is judged that the action has proceeded as far as it will go, the picture is withdrawn from the dish and inverted, the original support placed in position, and then, by means of the brush, the film is gently detached from the second glass and allowed to fall upon the first, so that the other side of the image is now exposed to the action of the solution. There are, however, some operators who tone films entirely detached from their supports, but we recommend the foregoing plan to those who may not care to run the possible risks involved in this way of working.

By toning the image with platinum the picture takes a rich black colour. The particular formula usually employed is as follows, it has been used by photo-enamellers for something like a quarter of a century:—One grain of platinic chloride (not bi-chloride as sometimes mentioned, Pt Cl_2 being insoluble in water) is dissolved in twenty ounces of water, and the solution neutralised with bi-carbonate of soda, a few drops of nitric acid being afterwards added. The toning is allowed to proceed until the picture is of a deep black tone, and after being washed is successively treated with ammonia diluted with its own volume of water, and nitric acid of the same strength, to remove both the silver chloride and metallic silver left in the picture after toning, thorough washing in distilled water between each operation being also resorted to. To impart a warm shade to the black tone thus obtained, the picture is placed in a solution of uranium ferricyanide, formed by adding one drachm each of a five-grain solution of uranium nitrate and of potassium ferricyanide to a pint of water. A compound of iridium and gold has also been used for very many years with excellent results, the bath being composed of four parts of a saturated solution of iridium chloride and two parts of a saturated solution of gold chloride in fifty parts of water. In the foregoing formula a like bulk of platinum solution is also sometimes substituted for the iridium, and the solution so compounded gives a colour of picture of a peculiarly rich and warm character. We have here indicated the chief toning formulæ used by photo-enamellers in the substitution process between twenty and thirty years ago, as well as by those of a later date, who, it should be said, find it impossible to surpass the quality of their predecessors' work.

After the toned image has been washed, the film is floated on to the porcelain plaque and carefully smoothed into position by the camel's-hair brush. Some of the German operators apply a solution of borax to the picture at this stage; but

when witnessing the procedure of an experienced operator of our acquaintance we noted that no such addition was made, so that it is probably a mere matter of taste. The film is allowed to get surface dry, and the picture is then ready for burning-in. This is, of course, an operation of the greatest importance, and one upon which the success of the finished picture will largely depend.

The muffle having been brought to a red heat, the plaque, placed on a piece of fireclay, is held in a sloping position in front of the aperture at a distance of a foot or so, and is then gradually brought nearer and nearer to it. When the film turns brown the fireclay supporting the enamel may be thrust into the muffle without further delay. In a few minutes the whole of the plaque will darken and the image seem entirely to disappear, but the whites will soon begin to show again. At this stage the burning-in is finished, and the plaque may be withdrawn to cool. The appearance of the picture is, perhaps, disappointing, since, with the exception of the whites, nothing is clear or forcible; the enamel has also a dull surface, but this is as it should be.

The plaque has now to be glazed, which is done in the following manner:—About half an ounce of "soft" glaze is added to two or three ounces of absolute alcohol, and sufficient of it poured into a bottle containing half an ounce of plain collodion diluted with a quarter of an ounce of methylated ether and half an ounce of absolute alcohol to give it a milky appearance. This solution is applied to the plaque, which, when the glaze is "set," is refired, being withdrawn as soon as the glaze melts. The operation usually has to be gone over several times before the enamel attains its full beauty, the image taking considerably longer to gain the requisite transparency than the whites. This outline of the substitution process would be incomplete if we omitted to mention that porcelain plaques, both flat and convex, as well as the glaze employed, are obtainable without difficulty of numerous Worcestershire and Staffordshire houses.

We next come to the powder or dusting-on process for obtaining photo-enamels, which, in the opinion of many experienced operators, is the process *par excellence* for the purpose, and is, all things considered, simpler and easier to work than the substitution method. We give at page 759 of our last ALMANAC four formulæ for compounding the sensitive hygroscopic mixture, all of which are equally suitable for the purpose. We are, however, aware that the one marked No. 2, with the addition of one or two drops of glycerine, is employed by a successful photo-enameller. The mode of working is shortly this: The plate, previously cleaned with whitening, is coated with the mixture in the ordinary manner, and then allowed to dry in a suitable cupboard at a temperature of about 60°. When dry, it is exposed under a transparency, which may, of course, be in gelatine; about one minute in sunshine and twelve to fifteen in diffused daylight being necessary. This process, as is well known, is one which yields a positive from a positive, the action of light upon the exposed parts of the film being such as to destroy the property they hitherto possessed of attracting moisture from the atmosphere, and so preventing adhesion to them of the powder applied to form the image.

After exposure the picture is developed in a darkened room, the vitreous powder being sprinkled on the surface and gently worked in with the camel's-hair brush. The vitreous powders are articles of commerce in those centres of porcelain ware manufacture already mentioned, and are obtainable in great variety, such as black, grey, purple, brown, sepia, and so forth, as well as in innumerable "non-photographic" colours. They are made by melting together various metallic oxides with silicious matter, and finely pulverising the resulting mass. For photographic enamel purposes the powders as received from the manufacturers are sometimes too coarse, so that it is necessary to grind them further and pass through a fine sieve sold for the purpose.

We shall describe the remaining operations of the powder process of photographic enamelling, and conclude the subject in a third article.

PURITY OF MATERIALS AND SENSITIVENESS IN EMULSION WORK.

RETURNING to our subject of last week, we may pause for a moment or two to consider what purity means in the sense in which we employ it, for in the strictest sense the methods of purification we have to describe will scarcely produce a result that can be described as absolute purity. The "absolute" alcohol of the chemist represents, perhaps, the highest stage of purity in the abstract, and old Highland whiskey another grade, though it does not follow that either is the best form in which to obtain alcohol for emulsion purposes, or for use in connexion with silver salts.

As a matter of fact, the purest alcohol obtainable will give a decided reaction with silver nitrate at a high temperature or if exposed to daylight, so also will ether; but when we turn to the average samples of methylated spirit of commerce the difference is great enough to emphasise the necessity for purification. Methylated ether—that is to say, ether prepared from methylated spirit, because methyl-ether itself is, at ordinary temperature, a gas—does not stand in such urgent need of the cleansing process as alcohol, because the very process of etherification removes much of the impurity of the original alcohol. But if it should be decided to submit it to treatment, the same course as that given for alcohol may be adopted, with the exception of the boiling, an operation that should on no account be attempted with so volatile and dangerous a liquid.

Of course the most effective means of purification is to be found in redistillation in conjunction with other special treatment, but this is practically out of the question, not only by reason of excise restrictions, but also on account of the chemical process involved. We need, therefore, only mention distillation with a view of pointing out the different agents employed to get rid of the volatile impurities of the spirit. Simple distillation in itself is insufficient, for the plain reason some of the worst impurities of crude methylic alcohol, or "wood spirit," are themselves volatile, and are drawn over with the spirit itself; means must therefore be adopted for destroying or removing these.

Some years ago a process was patented by means of which all smell and taste of crude methyl was perfectly removed from the spirit. This consisted in diluting the spirit with water, and, after repeated filtration through animal charcoal, redistilling or rectifying it, the result being a perfectly sweet spirit perfectly suitable for the manufacture of the most delicate perfumes or even for drinking purposes. Needless to say, the excise promptly came down upon Eschwege's process and suppresed it. Another method formerly in vogue amongst photographers consisted in dissolving in the spirit to be purified a quantity of soap—not necessarily of high quality, for the common yellow bar soap answered as well as the best "Castile"—and redistilling the spirit from the solution. This gave a result far superior to the untreated article, both as regards

smell and general behaviour, though it failed to make the spirit stand the silver test. Quite recently a method has been put forward which is stated to produce the highest degree of purity obtainable and to enable the spirit to be boiled with alcohol without the least discolouration. It consists in diluting the spirit and treating it with permanganate of potash—or, what amounts to the same thing, adding a quantity of solution of permanganate and distilling the spirit off the dirty mass that ensues.

Other additions made to the spirit previous to distillation consist of hygroscopic substances intended to combine with the water the spirit contains. Of these, the two most usually employed are quicklime and carbonate of potash, both of which while possessing a strong affinity for water, are practically insoluble in alcohol. But these in the strictest sense do not purify the products, though they may under certain circumstances do so to a slight extent. A favourite method of "strengthening" alcohol that used to find its way periodically into the photographic journals and text-books of a quarter of a century back depended upon soaking a quantity of shredded gelatine in the liquid, the affinity of the gelatine for water being supposed to separate it from the alcohol. But we fancy the introduction of gelatine films gave the death blow to that good old plan, since alcohol is employed to extract water from gelatine and not *vice versâ*. Another old plan often given is to suspend the spirit to be strengthened in a current of air, enclosed in a bladder, the water gradually exuding by a process resembling dialysis, while the alcohol remains behind. The method is sound enough in theory, its only fault being the inconvenience of waiting the necessary number of months or years to produce the desired result.

Assuming then that distillation is out of the question, let us see how the amateur may succeed in dispensing with it. The methods of purification already described are not available since they involve the addition of a considerable quantity of water, while requirements for collodion or emulsion purposes include as complete an absence of water as possible. In fact, it is too often the case that the spirit requires to be strengthened rather than weakened. The use of carbonate of potash or calcium oxide, referred to above, might be supposed to render the mere removal of water easy, but such is not the case, except to a limited extent, owing to the fact that failing redistillation the alcohol retains an alkaline reaction. Potassium carbonate, though insoluble in absolute alcohol, becomes slightly so as the proportion of water present increases. In fact, if a very strong solution of the carbonate be added to really anhydrous alcohol a portion of it mixes with the alcohol, lowering its grade and enabling it to retain a small trace of the salt in solution. In the case of quicklime, the act of "slaking," which proceeds very slowly unless a very large proportion of water is present, reduces the lime to a very minute state of division, causing it to mix with the alcohol to form a "milky" fluid, which it is quite impossible to clear by filtration, and which only deposits the impalpable particles after, perhaps, several months. It is then found that the liquid has a yellow tint and a strongly alkaline reaction, so strong, indeed, that if used for collodion making, the latter loses its setting power in a few hours from destruction of the pyroxyline by the alkali.

THE progress of the mapping of the heavens will have been expedited by the recently held Congress, disputed points of procedure having been satisfactorily settled. Admiral Monchez's invitations to the Directors of the various observatories which have linked themselves with the project were widely accepted from both hemispheres, the new Republic of Brazil having acted in accordance with the scientific traditions of the old Empire, and insurgent Chili has sent Señor Maturana. The vexed point of the exposure to be given to the plates for particular conditions was not readily settled; indeed, the feeling displayed was so strong that it was deemed advisable to adjourn the meeting for a time. In the end it was amicably agreed that forty minutes should be the exposure under normal circumstances.

BEFORE the Royal Society, on the 12th ult., an important paper by Lord Rayleigh on the "Bisulphite Compounds of Alizarine Blue and Cærulin as Sensitisers for Rays of Low Refrangibility" was read. Hitherto the substances most familiar to photographers for the purpose of rendering gelatine plates sensitive to rays of low refrangibility are those of the eosine series, in connexion with which patent rights are held to stand in the way of. Not to speak further on that point we may say that the new substances introduced by Lord Rayleigh may be used without fear of infringing any patent. The particular chemicals he has experimented with belong to quite a different class of the coal-tar colours. It is true that cærulin is obtained by the aid of phenol products as also is eosine, but both it and alizarine blue are correctly classed with anthracene products. It should be noted that the pure salts are to be employed, the writer stating that only under such conditions will the results he describes be obtained. This is important, for in commerce not only may cærulin and alizarine blue be purchased, but also their bisulphite compounds, the capital letter S being added after the words to signify the bisulphited compounds. We purpose giving a full abstract of the paper in an early number.

THE ever-recurring question of the truthfulness of photographic reproductions of natural objects and scenes has been treated by us time after time, our dicta on the matter being capable of being briefly comprised in the statement that, given a lens of rectilinear type, used with its axis at right angles to the sensitive plate, the photograph taken therewith would produce exactly the same effect on the eye as would the view itself as regards proportion and perspective, provided that it be looked at from one particular distance. As, however, few people have trained eyes enough to be aware of perspective appearances, converging upright parallel lines which really present themselves when a building is viewed with the axis of the eyes not lying in the plane joining eye and horizon, our definition might be supplemented by adding that usually the sensitive plate should be perpendicular to the ground level. We have said this is a brief explanation and it would be difficult to make it shorter while preserving accuracy. If any would like to examine the question from a more mathematical standpoint, we recommend his perusal of an article by Mr. A. Mallock, which appears in last week's *Nature*, upon "Photographic Perspective and the use of Enlargement." There the same story is told in amplified language, and details given as to how a photograph should be taken to be an accurate representation, and at the same time an algebraic formula is given to show the exact ratio the false bears to the true appearance when a picture is looked at from other than a correct standpoint. We would, however, here point out that in no respect whatever does a photograph differ from an oil or water-colour painting in the need proper for seeing it at a proper distance for correct effects to be produced. Mr. Mallock points out, and wisely, that generally speaking photographs would best represent the scene if they were first enlarged from, especially in the case of hand-camera work, which commonly executed with lenses of four to six inches focus, are rarely able to be viewed from that distance which only could give correct ideas of the original scene.

ON GOLD-COLOURED ALLOTROPIC SILVER.

[AMERICAN JOURNAL OF SCIENCE.]

THE object of the present paper (which may be considered as a continuation of that published in this JOURNAL for June, 1889) will be:—1st. To describe the reactions of gold-coloured allotropic silver. 2nd. To show that there exists a well-characterised form of silver intermediate between the allotropic silver previously described and

ordinary silver differing in a marked way from both. 3rd. To prove that all the forms of energy act upon allotropic silver converting it either into ordinary silver or into the intermediate form. Mechanical force (shearing stress) and high tension electricity convert it directly into ordinary silver. Heat and chemical action convert it first into the intermediate form, then into ordinary silver. The action of light is to produce the intermediate form only, and even the most prolonged action at ordinary temperatures does not carry it beyond this. 4th. To show that there exists a remarkable parallelism between the action of these forms of force on allotropic silver, and their action on the silver haloids indicating that it is not improbable that in these haloids silver may exist in the allotropic conditions.

Reactions.

The most characteristic reactions of gold-coloured allotropic silver are those with the strong acids. When normal silver, reduced with milk and sugar and alkaline hydroxide, is left in contact with strong hydrochloric acid, even for several hours, there is no action; and the silver, after thorough washing, dissolves in warm dilute nitric acid without residue. With allotropic silver similarly treated, chloride is always formed; but strong hydrochloric acid instantly converts allotropic to ordinary silver, and consequently only a trace of chloride is produced. By largely diluting the acid the conversion is retarded and the proportion of chloride is greatly increased. Thus, for example, when ordinary hydrochloric acid is diluted with fifty times its volume of water, and is made to act on allotropic silver, about one-third of the latter is converted to chloride; probably the whole would be but for the simultaneous conversion to normal silver. This double action is very curious, and strongly differentiates allotropic from ordinary silver. Even with the same acid diluted with a hundred times its volume of water there is a gradual but complete conversion to white silver, accompanied by the production of a not inconsiderable quantity of silver chloride. Neutral chlorides also act strongly upon allotropic silver, even when much diluted. So sensitive is this form of silver to the action of chlorides, that if in washing it on the filter, river water containing a mere trace of chlorides is by an oversight used instead of distilled water, a thin grey film of normal silver will form on the surface. The reactions above described were obtained with the moist precipitate freshly prepared. By standing for some time, even if kept moist, it appears to undergo change. When freshly prepared it is slightly soluble in acetic acid, but after standing for a week or two ceases to be so.

Sulphuric acid diluted with fifty times its volume of water has no action upon normal silver; when made to act upon allotropic silver, it quickly converts it to normal, but at the same time dissolves a little of it.

It is rather curious that the dry film of gold-coloured allotropic silver seems to be more easily acted upon by some re-agents than the moist precipitate. I have noticed, for example, that oxalic, citric, and tartaric acids do not convert the moist precipitate to normal silver, but films on pure paper are gradually whitened by these acids. It is not a question of strength of solution, for the moist precipitate remained unchanged for twenty-four hours under the same solution which whitened the same material as a dry film.

Ammonia seems to be without converting action, but dissolves a trace. It will be shown in a future paper that there exists a form of allotropic silver abundantly soluble in ammonia.

In those reactions in which allotropic silver acts the part of a reducing agent, as, for example, with potassium ferricyanide and permanganate and with ferric chloride, &c., its behaviour differs from that of ordinary silver chiefly in showing greater activity. The difference is rather of degree than of kind. The formation by these re-agents of coloured films will be described at the end of this paper.

Intermediate Form.

Allotropic silver presents itself in an almost endless variety of forms and colours—gold-coloured, copper-coloured, blue, and bluish-green (these last in thin films, red or purple). Most of these varities seem to be capable of existing in two conditions, of which one is more active than the other.

If we coat a chemically clean glass plate with a film of gold-coloured allotropic silver, let it dry first in the air, then for an hour or two in a stove at 100° C., and then heat the middle of the plate carefully over a spirit lamp, we shall obtain, with sufficient heat, a circle of whitish-grey, with a bright, lustrous, golden-yellow ring round it, somewhat lighter and brighter than the portion of the plate that has not been changed by heat. This ring consists of what I propose to call the "intermediate form." Its properties are better seen by using a film formed on pure paper, one end of which is heated over a spirit lamp to a temperature just below that at which paper scorches. The change is sudden, and passes over the heated portion of the surface like a flash. Examining the changed part, we find:—

1. That it has changed from a deep gold to a bright yellow gold colour.
2. When subjected to a shearing stress, *it does not whiten or change colour in the slightest degree.*
3. It is much harder, as is readily perceived in burnishing it.
4. It no longer shows the colour reaction with potassium ferricyanide and ferric chloride, changing only by a slight deepening of colour.

Of these characteristic changes the second is the most remarkable. The gold-coloured silver in its original condition changes with singular facility to white silver. Almost any touch, any friction, effects the conversion. If the paper on which a film is spread is creased, the crease is found to be grey. Exposure to heat or to light destroys this capacity for change, and it is often lost by mere standing (even though protected from light) for a few weeks. This evidently indicates some remarkable molecular change. It will be noticed that the anomaly lies in this, that pressure instantly effects the complete change from the original form to normal silver, heat effects the same change but with an intermediate stage, at which stage *pressure no longer produces any action.*

The intermediate form is distinguished from normal silver almost solely by its bright yellow colour and its higher lustre. This last difference is very striking when a film on glass is heated in the manner above described. The central parts in changing to white silver become wholly lustreless, while the circle of "intermediate" retains all its original lustre. Its continuity is still complete, so that if viewed through the glass it still acts as a mirror.

This change may be either molecular or depend on dehydration. The latter seems doubtful, for the latter cannot be brought about by desiccation. Films on paper, on glass, and also solid material, were kept over sulphuric acid *in vacuo* for twelve days* without bringing about this modification (they were, of course, thoroughly protected from light). Light is also capable of effecting, to some extent, this change, as will be described farther on.

Copper-Coloured Allotropic Silver.

This colour of allotropic silver depends to a remarkable extent on the amount of washing which the freshly prepared material receives. With a short washing the material dries to a bright yellow gold colour, with more washing to a reddish colour, with still more, the colour is a deep rich copper shade. The washing, when conducted in the ordinary manner, is exceedingly troublesome, the material soon begins to run through the filter and blocks it up. This trouble may be completely avoided by washing with a two per cent. solution of Rochelle salt instead of pure water, until towards the end of the operation.

The mode of preparing the gold and copper-coloured forms is as follows, the difference is in the length of washing only:—

In a precipitating jar are placed—

Water	800	c.c.
20 per cent. sol. Rochelle salt	200	„
40 „ silver nitrate	50	„

In another vessel was placed—

Water	80	c.c.
20 per cent. sol. Rochelle salt	200	„
30 „ „ ferrous sulphate (crystallised)	107	„

(The substances must be added in the order above given, and be mixed immediately before using. It is scarcely necessary to say that distilled water must be used exclusively.) As soon as the mixtures are made the iron solution is to be poured into the silver and vigorously stirred for some time. The white silver tartrate becomes almost immediately bright red, then deepens in colour, and finally becomes black.

Substances of a character nearly related to those that I have described in this and the previous paper are obtained by acting on silver tartrate with stannous nitrate. The method is more troublesome and gives inferior results, the gold-coloured product is less pure. A beautiful steel-blue substance obtained in this way was found to contain a considerable quantity of tin, probably present as stannic oxide, 10·87 per cent. of tin corresponding to 13·80 SnO_2 was found by analysis. Another analysis gave 10·66 per cent., corresponding to 13·61 SnO_2. In the first case the quantity of silver found was 83·61, in the second 84·12 per cent. These results do not lead to any satisfactory formula. The tin is no doubt present as an impurity, and as the iron process gave far better results, the examination was not carried further. Silver nitrate gives similar results.

M. Carey Lea.

(To be continued.)

* A longer time was inadmissible, on account of the tendency to spontaneous alteration.

A NEW THEORY OF THE SILVER BROMIDE DEVELOPABLE IMAGE.

Preliminary Note.

Silver bromide is well known to exist in various allotropic modifications, *i.e.*, forms which, although containing the same elements united in the same proportions, differ nevertheless in colour, lustre, &c., and are also acted upon in a different way by the usual developers.

Thus, one variety of silver bromide transmits orange light, and if prepared in the dark room is unaffected by alkaline pyrogallol, whilst another variety transmits blue light, and is attacked by the pyrogallol without exposure to light at all.

To convert the orange into the blue allotrope we (usually) heat it, *i.e.*, cause it to absorb a certain amount of energy in order to bring about the rearrangement of the atoms in its molecules, the amount of energy requisite to do this being very much smaller than what would be required to cause the silver bromide to liberate bromine.

According to the present hypothesis, the action of light is, up to a certain point, precisely analogous to the action of heat in allotropising the molecule. Beyond that point the continued action of light splits up the molecule into free bromine and something else. Taking as a type the *comparatively insensitive* silver bromide just alluded to, a certain amount of energy converts it into the very sensitive allotrope, and a further amount decomposes it. Whether that energy is applied as heat or as light, the final result, decomposition, is the same, but is preceded in both cases by the allotropation of the molecule.

Exposure to light, carried out so as to yield maximum density, consists in converting any variety of silver bromide into the red-sensitive modification, which is at once decomposed by the developer.

The more energy as heat has been originally applied in the practical preparation of the emulsion, the less energy as light is required to bring about the possibility of development.

A certain amount of energy is necessary to allotropise the silver bromide; but that amount, if exceeded, will separate bromine from it.

Generally speaking, the number of molecules allotropised will determine the amount of silver capable of being reduced by the developer; hence gradually increasing exposures should give gradually increasing densities. That this is the case *up to a certain point* is well known, but once that limit is exceeded the greater the exposure the less the density until another point is reached, at which the plate is in the same condition as at first.

The present theory gives a simple explanation of these facts. Development consists initially in the developer splitting up the allotropised molecules on the surface into silver and bromine. The bromine oxidises the developer, and the silver combines with the subjacent molecules of silver bromide to form Carey Lea's photo-salt which we might—assuming bromine a triad—represent as $Ag_5 Br_3$, or $Ag_2 Br$, $Ag Br$, $Ag_2 Br$.

The photo-salt is in its turn split up by the developer into bromine and silver, the latter combining with the subjacent layer of allotropised silver bromide to form more photo-salt, and so the action continuing from layer to layer until the energy of the developer, *i.e.*, its power to become oxidised at the expense of the bromine, is exhausted.

The allotropised molecules being in a state of comparatively unstable equilibrium *are in fact ready* not only to be decomposed by the developer, but also to combine with the silver liberated by it, and so become converted into photo-salt. Increased exposure will therefore, up to a certain point, mean not only increased density but increased rapidity of development.

When the exposure is prolonged beyond the time necessary to get maximum density, the surface molecules of allotropised silver bromide are decomposed by the light itself into photo-salt and free bromine, or into silver and free bromine. A portion of the latter unites with the gelatine, the heat absorbed reconverting the subjacent molecules of allotropised silver bromide into *their original state*. On development, the effect will now be the same as if only N − M molecules had been acted upon by light, and this constitutes the commencement of the decrease of density.

When light acts for a longer period, the bromine, unabsorbed by the gelatine, *reconverts* a greater number of subjacent molecules of allotropised bromide into their original state, and a point is finally reached at which, *so far as the developer is concerned*, the plate is in the same condition as before exposure.

We have then on the plate $x Ag_5 Br_3$, and $y Ag Br$, the latter being unchanged silver bromide. Assuming that this is the case, a still longer exposure to light would act upon these, and the entire cycle of changes would be repeated. The number of times which this could be repeated obviously depends on the thickness of the film, but since each time the light must penetrate through a greater thickness of comparatively opaque material, very much longer exposures would be required each time.

It will be observed that according to these views the initial change brought about by the action of light upon silver bromide is analogous to its action upon realgar, or to the action of a moderate heat upon mercuric iodide. We might, in fact, look upon allotropised silver bromide as ordinary silver bromide + Q units of energy, the precise number Q varying with the manner in which the bromide had been prepared and the number of units necessary to decompose it would then be measured by N − Q, N being the number necessary to decompose the unaltered substance into photo-bromide and bromine.

Clement J. Leaper.

CAMERA CLUB CONFERENCE.

This annual gathering was inaugurated at the rooms of the Society of Arts on Tuesday afternoon last, the 7th inst. The President, Captain Abney, occupied the chair, and delivered an inaugural address in which, after congratulating the Club on its continued prosperity, he alluded to the endeavour that was being made everywhere to get a uniform system of weights and measures in photography. To plate manufacturers foreign markets were in some measure closed, owing to the trouble and expense of coating plates different in size from those used at home. They were trying to get the English half-plate of $6\frac{1}{2} \times 4\frac{2}{4}$ inches adopted as a starting point, and have the other sizes multiples or sub-multiples of these. Taking a centimetre as ·4 inch, which although not absolutely accurate was sufficiently near, the half-plate would be 26×18 cent., a size much used abroad. This was a size that was used to a greater extent than any other. He then adduced several examples of the dimensions of plates that would result from multiples of the standard, and by a compromise between English and French measures. As the French gramme and cubic centimetre did not seem to meet with ready acceptance here, he thought that the requirements of internationality would be met by giving all formulæ in *parts*, thus a one per cent. solution of, say, pyrogallic acid would represent one grain of pyrogallic acid, dissolved in one hundred grains of water, or if in alcohol then it would be as much alcohol as would occupy the same volume as the above quantity of water. He spoke in high terms of the researches of Messrs. Hurter & Driffield on the relation of density to exposure. Dr. Lippmann's experiments in endeavouring to obtain photographs in natural colours were next touched upon. He, Captain Abney, had recently had an interview with him, and considered him a true man of science, but the fact that the colours depended on proper relative exposure, and on proper amount of development, made the process one of extreme difficulty. He considered the problem of photography in permanent natural colours remains very much as it was before Dr. Lippmann took it up. At the conclusion of the address he said that he would ask for any remarks upon the question of weights and measures; as for the other subjects touched upon, following the custom with regard to Presidential addresses, he did not invite discussion.

Mr. W. E. Debenham thought with the President that the gramme, and the next step, the kilogramme, were inconvenient in amount as standards. In illustration of the fact that something like a pound was a more convenient weight than a kilogramme, he mentioned that in Paris he had noticed a practice of marking things in the shops at so much per half-kilo.

M. Leon Warnerke said that the present moment was very convenient for the consideration of standards. There had been a Committee of the Photographic Society of Great Britain, of which he was a member, and they had decided to recommend the half-plate as the standard for size. They found that far the larger number of cameras made were for plates of this size, and even abroad the size which was most in use was almost identical. As to the standard of light for lenses, the Committee of the Photographic Society of Great Britain appointed ten years ago had recommended *f* over 4. The Committee recently appointed by the Photographic Conference in this country had also adopted that standard, and it was in use by some opticians. On the other hand, the Paris Congress had recommended *f* over 10 as the standard, and this, he thought, preferable, for reasons which he explained by figures upon the blackboard. There was, further, Mr. Dallmeyer's standard of *f* over the root of 10. On the whole he preferred the French standard of *f* over 10.

Mr. T. R. Dallmeyer said that he chose that number so as to avoid having to put a decimal point before the number representing exposure.

Mr. Debenham said that a very good defence could be made for the Photographic Society's standard of *f* over 4, but he thought that the subject did not come within the limits of those signified by the President as open to discussion.

The President signified assent, and on Mr. Conybeare rising to address the meeting, asked whether he proposed to speak on weights and measures. Mr. Conybeare having assented, was requested to proceed, and gave his view that it would be desirable to get some standard that would be accepted by the English-speaking nations. The decimal system had now been long before them, but was not taken up except for scientific purposes.

Mr. Fullerton remarked upon the drachm as being a very convenient weight, as it could be divided by 2, 3, 4, 5, 6, 10, and 12.

Mr. Lyonel Clark read a paper on *The Use of Uncorrected Lenses*. At the outset he quoted an early writer against "the irritating and obtrusive sharpness of photographic pictures," and described means for avoiding sharpness. Lenses, he said, could be made achromatic, although formed of only a kind of glass, and instanced the Huyghenian and Ramsden eyepieces and a lens introduced by Zentmayer in 1864 or 1865. He then described a lens which he had used with success, and which consisted of a pair of ordinary periscopic spectacle lenses, mounted with a diaphragm between them. He also exhibited tables showing the size of plate that should be included in views taken with lenses of different length of focus.

Mr. Debenham said that though for certain occasional purposes it might be desirable to lose sharp definition, yet, generally speaking, he thought a photograph should be as well defined as possible. The objection to definition had, he thought, very much arisen from the different meaning of the word sharpness as employed by artists and by photographers. Photographers understood by sharpness fine detail, whereas, when painters spoke of being too sharp, they referred to harsh or cutting lines. He had known painters condemn a harsh, under-exposed photograph as being too sharp when photographically it really was not sharp at all. On the other hand, a photograph might be sharp in the photographer's sense of being exquisitely defined and soft at the same time. With regard to Mr. Lyonel Clark's statement that lenses made of one kind of glass only could be achromatic, or have the chemical and visual foci coincident, he would like some proof. As to the Zentmayer lens, he had, at the time when the claim for coincidence of focus was made, shown that apparent coincidence was managed by directing the operator to focus with a large diaphragm and then insert one of a calculated smaller size for the exposure. For lenses having spherical aberration the alteration of diaphragm practically alters the length of focus, and by regulating the sizes of the diaphragms this could be done to just the extent required. He had published this explanation at the time in THE BRITISH JOURNAL OF PHOTOGRAPHY, and shown the editor a lens of his own construction, in which these conditions were fulfilled. It had been claimed for uncorrected lenses—not in this paper, but by Mr. J. H. and Mr. T. R. Dallmeyer—that by introducing spherical aberration, and sacrificing definition at the focal plane, the focus of other planes was improved. The true view he held to be that expressed by Professor Petzval and others, and was that when definition was sacrificed at the focus, the other planes, not having a sharp one to contrast with, did not obtrude their want of sharpness so much. In the report of the last Camera Club Conference held here is a paper by Mr. T. R. Dallmeyer, illustrated with photographs professing to show the advantage of spherical aberration in giving definition in out of focus planes. This was supposed to be proved by photographs taken at a so-called "best focus," and at certain distances therefrom. On examining the photographs, however (which were here handed to the President), it will be seen that Plate XVI., which is stated to be taken half an inch from the best focus, is actually in better focus than Plate XV., which is said to be in the best focus. A similar thing, though not to the same extent, is noticeable in Plates VIII. and IX., where the one said to be removed from the best focus is in a little better focus than that in the so-called "best focus." In a more recent endeavour to meet this objection Mr. Dallmeyer says that the visual effect on the screen is not the same as in the fully developed negative. If this were so, and if it has any bearing on the subject, it would just go to show that, independent of other drawbacks, the introduction of spherical aberration would necessitate shifting the position of the plate after focussing, as with lenses not properly achromatised. If the difference in sharpness, say in Plates XV. (the so-called best focus) and XVI. (the one said to be half an inch removed from the best focus), had been less glaring, if the real best focus had been somewhere half-way, so that the one stated to be in best focus were not manifestly in the worst, the fact that the demonstration had not been performed in the manner stated respecting it might have escaped detection. As it is, the professed proof is too much overdone, and a cause which requires to be supported in such a way stands sufficiently condemned.

Mr. Dallmeyer recognised much that was valuable in Mr. Lyonel Clark's paper. It was gratifying to know that he did not think that the work of the optician was to be superseded generally by that of simpler kind. With regard to Mr. Debenham's remarks, he had answered them in print and would not take up the time of the meeting by going into the matter.

The President asked for Mr. J. T. Taylor's views on the paper, as it was a subject with which he was so well acquainted.

Mr. J. T. Taylor had not heard the paper with sufficient distinctness to enable him to say much upon it. He quite well remembered the incident referred to by Mr. Debenham and the explanation of the apparent coincidence of foci in the Zentmayer lens. He preferred to defer comment on the paper until he was able to read it, but he might say, *apropos* of the subject of single lenses, that a combination formed of such was introduced in 1844 by G. S. Cundell, and described in the *Philosophical Magazine* of October in that year. It was the first lens constructed with a special view to the requirements of a flat field, and was made of two simple meniscus lenses, which were mounted together precisely as are the rapid rectilinears and rapid symmetricals of the present time. Believing the Conference would feel an interest in this lens he had brought it with him. He then handed it to the President for examination. He also submitted another combination, formed, likewise, of single meniscus lenses, in this case of greater depth than perhaps most of them had previously seen. It was rectilinear, and included an angle of considerably over 100°. He always aimed at possessing lenses properly achromatised and giving the greatest sharpness possible.

The President said that he was one of those who preferred getting the utmost sharpness with the best lenses obtainable, although spectacle lenses might be used when there was no other instrument of the required focus at hand. He was not at all sure that there were not many cameras of the cheaper kind that were supplied with uncorrected lenses. He had purchased such an instrument and found it fitted with two uncorrected lenses as a doublet. When stopped down to *f* over 20, decent results might be obtained over a small field.

Mr. Lyonel Clark, in briefly replying, mentioned the Huyghenian and Ramsden eyepieces as instances of achromatism with lenses of one kind of glass only.

A vote of thanks to Mr. Clark for his paper was followed by the reading of a paper sent by Mr. Joseph Pennell on *Photography as a Hindrance and a Help to Art*. The author not being present, the paper was read by Major Nott. In it views were expressed that artists were not indebted to photography, but that photography had to himself proved a hindrance and a snare. Photographs were condemned as being untrue in perspective as well as in light and shade; the photographs of Muybridge and other instantaneous workers had not, as was sometimes stated, influenced artists. These photographs did not give the idea of motion. There was much more to similar effect in the paper, but the part implied in the title of the paper, as *Photography as a Help to Art*, we failed to catch.

Mr. A. Maskell said that the paper had been handed to him on the previous evening with the request that he would make some remarks upon it, and he would now read them. He thought Mr. Pennell was not very well acquainted with the subject. He appeared not to be aware of the great advance that had recently been made, of the awakening of artistic taste in the production of photographs that had taken place within the last two or three years in such works as those of Davison, Burchett, and some others. If speaking only of the kind of photograph at one time thought of so highly, he would agree with the writer.

The President asked for Mr. H. P. Robinson's views on the paper.

Mr. Robinson said that he could only look upon it as a sort of joke, and thought it ought to be received in solemn silence.

Mr. Debenham contended that, to deal with one point only, the drawing of animals in motion, artists were much indebted to the photographs of Muybridge and others. Formerly there was very little variety in the artistic delineation of horses in motion. Pictures of racing and hunting scenes, and even battle pieces, contained, for the most part, a repetition of one phase that had been conventionally accepted, and horses galloping were mostly represented something after the rocking-horse pattern. He was struck with the change when, at the recent Paris Exhibition, he saw paintings in which many of the figures of horses might have been sketched from some of Muybridge or other instantaneous photographs. A similar change might be seen in the illustrations now current in the periodicals. If these were compared with those of twenty years ago, it would be seen that photography had awakened draughtsmen, and the public too, to the fact that the old accepted conventional figure would no longer suffice.

Mr. H. N. King wished to know if Mr. Pennell condemned photographs so much, why did he buy them. He had supplied him and other artists with many of his photographs of Westminster Abbey and other cathedrals, and he knew of their being faithfully copied, with no alteration except the introduction of a few figures by artists who were not ashamed to acknowledge their indebtedness to photography.

Mr. G. Davison said that much could be said to show that artists do use photography. One of *Punch's* best draughtsmen said that he always used photographs when he could get them. Mr. Robinson had taken a strong view, but he (Mr. Davison) thought that the paper might do a good deal of harm. He considered that the point that Mr. Maskell wished to establish was that there was an absolute difference of kind; he (Mr. Davison) looked upon it only as a difference of degree. It was said in the paper that art had always been unpopular, and artists had always been sneered at. This was certainly not the fact.

Major Nott said that he had read the paper in the absence of the author, but he was very much surprised at some of the sentiments expressed in it. It was plainly shown that that Mr. Pennell was ignorant of art. Modern French art no longer tolerated the fantastic pictures formerly accepted as representing animals in motion, and this change was due to the influence of photography.

Mr. Valentine Blanchard entirely dissented from the views of the author of the paper as to the influence of photography, and illustrated his views by reference to engravings and pictures which formerly were accepted, but would not now be tolerated as correct.

The President, in proposing a vote of thanks, said that we ought to be glad to have any criticism. He was sorry that it was said in the paper, and would have to go down in the Camera Club's records, that distances were rendered differently in proportion in photography from that they occupied to the eye. He was very glad that Meissonier and other artists had recognised the accuracy of photography, and changed their method of representing animals in motion in accordance with its showings.

Second Day's Proceedings.

The proceedings of the second day were opened by the reading of a paper by Major J. F. Nott on *Photography and Illustrated Journalism*. He said that we owed it to ourselves and to posterity to preserve pictorial records of our times, and this was more effectively accomplished by photography than could be done in any other way. The rubbish that had been palmed off by artists as representing facts would no longer suffice; the public demanded truth, and it would not do now to offer (as he had known to be done) such absurdities as elephants racing with the action of horses, or of tigers in African scenes. For the purposes of illustrated journalism photography was now very much employed, and, generally speaking, hand cameras were the only ones practically useful. He preferred to use a roller slide and films rather than plates, not only because so many more exposures could be given without changing the back, but because of the convenience of films for being rapidly developed together, washed, packed, and taken to the newspaper office. Simplicity was essential in the camera construction and arrangement. A film was also essential, and it was necessary to see that the camera was level. A wood block prepared for engraving by having a photograph of it was handed round for examination.

The President inquired if that method of producing that particular wood-block was published.

Major Nott replied that the process was a secret one.

Mr. W. E. Debenham said that there were two methods by which the illustrated papers made use of photography. One was that which had been dealt with in the paper, the use of photography as a guide to the engraver, and the other, of which he had hoped to hear something, was the use of photographs converted into blocks. With regard to the latter method, which was coming more and more into use, it might be said that its employment was only practicable with printing of high quality, such as formerly could not be got on the rotating machines necessary for newspaper work. The Marinoni rotary machines, however, had been found to produce a class of printing that would assist in bringing photographic blocks more into use.

Mr. Leon Warnerke said that there were difficulties in producing satisfactory photographs on wood-blocks. A film would crack or chip, and any process which involved soaking the wood with fixing material made the surface soft. The best he considered was to make a collotype print, which could easily be done by a process he had recently described.

Mr. Hepworth said the ordinary methods of photographing on wood were quite useless. He had formerly tried collodion and albumen, and he thought the best results he then obtained were with chloride emulsion made with very little gelatine and rubbed on to the wood.

Mr. A. Maskell would like to know whether the journal *Pick Me Up* was illustrated by wood-cutting or by what means.

Mr. G. Davison observed that Major Nott had said that soul and sentiment could not be put into photographs. He did not know about soul, but as to sentiment he entirely disputed the statement.

Major Nott, in replying, said that he was very glad that the papers preferred to reproduce artists' work by engraving, instead of by Meissenbach and other process blocks. If there were some artistic qualities in an artist's work containing washes, they were entirely lost in photo-block processes.

The President, in thanking Major Nott for the paper, said that he was sorry that the method employed in producing a photograph on the wood-block was not made known. He had found it convenient to make a half-tone papyrotype and transfer it to the block itself.

Mr. H. Sutton then read a paper on a new method of photo-mechanical printing. The method consisted in making a negative and, before development, exposing it under a plate with minute transparent openings, so as to impress it with a series of dots. After development with pyro or hydroquinone, the negative was developed, fixed, and slightly washed, and then placed on a level stand and dried at a heat of 212°. By this means gelatine ran in under the dots, and caused them to be raised. The plate was then blackleaded and an electrotype taken, which formed the printing surface. Specimen prints and blocks were shown during the reading of the paper.

Mr. T. Bolas thought the process one of very great interest. He was under the impression that Swan had suggested the use of a gelatino-bromide plate in the same way some years since. Warnerke's process involved a removal of the gelatine from parts of the plate, which was not the case here, but presented somewhat analogous features.

Mr. Lyonel Clark inquired whether the film was strong enough to bear having a stereotype moulded into it with *papier mâché*.

Mr. Sutton had not tried this.

Sir H. Trueman Wood would like to ask what evidence there was that gelatine was drawn under the exposed portions when the film was dried by heat?

Mr. Lyonel Clark could quite confirm what Mr. Sutton had said about the gelatine being drawn under the lights when the film was heated.

The President thought that the Conference should congratulate itself on this paper introducing a new process having been presented to it. He thought he was acquainted with all the photo-mechanical processes, but this was new to him.

Professor Minchin, in his communication on *A Review of Photo-Electricity*, referred principally to electro-motor cells, in which light is the exciting agent, and, after mentioning the arrangements of Becquerel and others, he described several of his own contrivances, and showed how, by an ingenious double relay system, he could control an electric lamp or a bell by a photo-electric cell. He also found that the current from a photo-electric cell, when passed through an electrolytic cell, in which the plates were of silver coated with Liverpool emulsion, produced on one of the plates (the negative one) an impress analogous to that of light capable of development. He pointed out the bearing of this fact on telephotography, and showed how the action on a receiving plate could be localised. Perhaps the most interesting point touched on by the Professor was the behaviour of a photo-cell in which the conducting plates were silver and the solution was eosine. When a strong light, rich in the shorter waves, was projected upon one plate, a current impulse was generated which passed across the liquid from the unexposed plate to the exposed plate, but after this sudden impulse the galvanometer showed a steady current in the reverse direction. On cutting off the light the current passed as in the first impulse. A weak taper light only brought about the steady current. The contrary current was attributed by Professor Minchin to the fluorescent quality of eosine, and he compared it to induction in a wire parallel to a conductor in which a current initiates or terminates. The condition precluded the notion of it being due to an electrolytic polarisation, and he proposed to study the action of other fluorescent substances. Professor Minchin then made reference to the researches of Hertz on the action of ultra-violet light on the striking distance of the electric spark, and of other investigators, who found that ultra-violet light acts mainly on the kathode discharging the negative electricity only, these observations having been most comprehensively of all studied by Stoletow, who, our readers may remember, based a very remarkable photo-electric cell (with air as the fluid) on this circumstance. The action of ultra-violet light on discharge has also been studied by Wiedeman, Ebert, and Hallwachs.

The President referred to the experiments of Mrs. Somerville, in which she found that violet light magnetised a steel needle, and, although subsequent experiments had not confirmed her results, the recent physical investigations on the action of violet light, might make further experiments desirable.

Mr. C. W. Boys showed sequential photographs of falling drops, and united these by a praxinoscope, the result being very striking and realistic.

Mr. H. M. Elder, M.A., showed examples of Professor Carey Lea's allotropic modifications of silver, and in doing so he gave a short account of the investigations which led to their discovery. At the same time he appeared to have some doubt whether the presence of foreign bodies had not something to do with the matter. In one case Mr. Carey Lea considered his position proved or strengthened by the fact that the plate showed the effect of elliptic polarisation. Professor Sylvanus Thompson, however, found that any metal surface would give the like elliptical polarisation.

The time having become late, the President briefly thanked Mr. Elder and Mr. Carey Lea for the paper and examples, and the proceedings terminated.

Foreign Notes and News.

It appears that even astronomers, in spite of the contemplative and abstract nature of the science to which they are devoted, are capable of growing excited, and even heated, in discussion—that is, supposing we are justified in drawing general conclusions from the Homeric combat that arose round Mr. Gill's proposal to the Astronomical Congress for limiting the time of exposing the plates to forty minutes for all magnitudes up to the eleventh. It also appears that astronomers are, like ordinary mortals, amenable to the soothing and pacifying influences of a cup of tea. For, on the discussion becoming exceptionally warm with regard to the above point, Admiral Monchez, the President, proposed an adjournment for the purpose of partaking of the cheering cup. On subsequently resuming the discussion it was of quite a temperate character, and the point at issue was ultimately agreed to *nem. con.*

Another innovation has also been proposed in regard to the methods employed for charting stars from the ninth to the eleventh magnitudes. It is proposed—namely, by Professor H. C. Vogel and others—to make the exposures from behind a very fine wire screen, which is to have the effect of practically equalising the times of exposure required for these higher magnitudes.

A paper was recently read by Professor Eder before the Vienna Academy of Sciences on photographing the spectrum of ammonia burning in oxygen. It appears that the greater part of the bands and lines occur in the ultra violet.

There seem to be a good many German photographers in India. Dr. F. Jagor has recently forwarded a rather lengthy communication on the subject to the *Photographische Mittheilungen*. He states that they are all very good Germans, and would much prefer to obtain their supplies of plates from Germany; nevertheless they all work with English plates,

which are, according to the Indo-German photographers, much better, are not affected by the heat, and preserve their sensitiveness for years, whereas the German plates fog after keeping for a few months. Dr. Baessler and Professor Oppert seem to have had similar experiences, and these gentlemen are all Germans! The *Mittheilungen* attempts to take the sting out of these revelations by saying that *if* the German makers understood the tropical trade better, and *if* people would use the alum bath with the plates, &c., the difficulty would be overcome. "My friends," says Carlyle, "*if* the sky fall there will be catching of larks."

The ordinary method of colouring prints is, according to Liesegang, advisably replaced by the following:—Beat up the white of an egg till it froths thoroughly, let it settle, and pour off the portion still remaining liquid and dilute it with about half a pint of water, to which a little alum may be added with advantage. Proofs coated with this solution take colour well.

It appears from an article in the Swedish *Year Book* that a cabinet plate 12 × 16 c. contains 0·58 grammes of bromide of silver, which corresponds to 0·52 grammes of nitrate. Eight-tenths of this at least find their way into the fixing bath, so that each plate fixed contributes about 0·4 grammes of nitrate of silver to the bath. Thus much more silver finds its way into the fixing bath from the plate than is required for printing. We thus see that the silver that goes into the fixing bath from the plate ought to be enough to provide for making eight prints from the negative, and that the photographer ought to be able to obtain sufficient silver from his old fixing baths to do his printing.

Our Editorial Table.

Adams & Co's. Photographic Annual.

This Annual, issued by Messrs. Adams & Co., of 81, Aldersgate-street, E.C., and 26, Charing-cross-road, W.C., forms a goodly volume of 304 pages, of which over one-half consists of a carefully compiled and well-illustrated catalogue of the goods sold by the firm. This department of the Annual is exceedingly complete. As instances we find no fewer than fourteen pages devoted to the lenses of leading makers, eight pages to shutters, something over thirty to printing paper, mounts, and dry plates, and considerably more than one hundred to the other innumerable things required in or cognate to photography, and which are found specified in eight columns of index matter at the end, indicating a large and varied stock.

The literary portion of the Annual consists of articles on practical topics by various writers, amongst whom are Captain Abney, Messrs. Pringle, Harrison, Welford, Chapman, Jones, Robinson, Golledge, and others. By the way, Mr. Snowden Ward, in an article on photographs in natural colours, speaks of the late Henry Collen as "a drawing master who had no knowledge of photography." We do not know how Mr. Ward could have been so misinformed, for Mr. Collen was the first to take out a licence for producing portraits under Fox Talbot's patent. Talbot produced his first portrait on paper in February, 1841, and during that same year hundreds of portraits, mainly of scientific men and members of the press, were taken in the studio of Collen, who at that time was the only professional photographer in London. Nay, more, Collen was the first to take a photographic portrait for the stereoscope, this being one of Mr. Babbage, which was produced on August 17, 1841. The third lens ever made by the late Andrew Ross for portraiture was for Mr. Collen, the first one being for Mr. Talbot, and the second for Mrs. Massey. We think it right to rescue the name of Henry Collen from the slur thus unwittingly thrown upon one to whom photography was very greatly indebted at its outset. But to return to the *Manual*. It contains all the necessary working formulæ, is well printed, and costs ninepence, post free.

It contains three page portraits, one of Mr. W. H. Harrison, recently editor of the *Photographic News*, the others being Mr. Henry Sturmey and Mr. J. Traill Taylor. The two latter are by Vandermeyde. All are well printed.

Great Thoughts (A. W. Hall, 132, Fleet-street, E.C.) for April has its usual quantum of illustrations. Among portraits that of Dr. Nansen is both well engraved and well printed, and of George Ebers the same may be said. The others are inferior. The literary portion is excellent, as usual, and embraces many gems of thought, being in this way far in advance of many other serials.

Fallowfield's Photographic Remembrancer, for quarter ending March, contains a special feature that will prove of interest to many, viz., a number of "job lines" of goods of olden times, including plates by makers whose names belong to a former period. This affords a good opportunity for those who desire to make investigations into the keeping properties of plates to acquire material for their experiments. The *Remembrancer* contains four phototype illustrations of scenes in Irish life taken by the "Facile," besides many woodcuts illustrating cameras, stands, and other pieces of apparatus; and, of course, it contains a list of all the chemicals, plates, and photographic requisites up to date.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5591.—"Improvements in Apparatus for Producing and Delivering Photographic Pictures in Exchange for Coin deposited therein." W. H. C. Bernitt.—*Dated March* 31, 1891.

No. 5627.—"Taking Photographs of Small or Large Angles up to 360°." R. W. Stewart.—*Dated April* 1, 1891.

No. 5800.—"Improvements in Photographic Dark Slides." Complete specification. T. Scott and J. Davenport. *Dated April* 4, 1891.

No. 5833.—"Improvements in the Manufacture or Production of Sensitive Paper for Photographic Purposes." Communicated by P. Mercier. J. Y Johnson.—*Dated April* 4, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 3743.—"Photographic Cameras, &c." Scorer.—Price 8*d*.

No. 4178.—"Flexible Phototype Plates." Balagny.—Price 6*d*.

No. 7236.—"Photographic Cameras." Miller & Hawkins.—Price 8*d*.

1891.

No. 2725.—"Photographic Cameras." Sanders. Price 8*d*.

PATENTS COMPLETED.

Improvements in Photographic Printing Apparatus for Producing Photographic Copies at a Rapid Rate.

No. 4956. William Friese Greene (also known as Friese Greene), 92, Piccadilly, London, and Frederick Henry Varley, 82, Newington-green-road, London.—*March* 7, 1891.

The object of this invention is to effect a rapidly consecutive reproduction of photographic prints of photographic representations, letterpress, type-written matter, &c., on a continuous strip or band, in a machine adapted to effect successively the several necessary operations.

The invention consists in an apparatus in which are combined: a holder of a continuous roll of any required length of suitable paper or other material on which it is desired to produce the photographic prints; a series of sensitising, developing, toning, fixing, and washing or other necessary tanks, with appropriate means of supplying the proper solution or liquid to each thereof, and of withdrawing the exhausted solution or liquid therefrom; means for squeegeeing the liquid from the continuous strip as it passes from each tank, both before it passes to the printing apparatus and before it passes from each tank to the next thereof; means for simultaneously exposing both sides of the sensitised band, and for holding it stationary during exposure, and releasing it immediately thereafter; adjustable means for at each actuation drawing forward the exact length of sensitised band required for the next following print, such means, during such operation, co-acting with means for feeding forward the same length of sensitised band to the printing frame (so that the band, while between the squeegeeing rollers of such tank and said drawing-forward device will be kept at about the same tension), and, during its return or inoperative movement, co-acting with the first or any other or others of the following series of squeegeeing rollers, so as, at each such return movement, to cause the band to be drawn forward a length equal to that last fed, and drawn forward, as aforesaid, in order to maintain the band at a nearly uniform tension until it issues from the machine in a finished condition, when it may be wound directly on to a drum or the like. The printing and following apparatus may, however, be used conjunctively with a previously sensitised roll of paper or other material in lieu of a roll of paper, or other material sensitised at the time of being used, and for printing only on one side of the sensitised band.

(A description of the apparatus, with drawings, follows.)

The claims are as follows:—1. The hereinbefore-described improved apparatus for effecting a rapidly consecutive reproduction of photographic prints of photographic representations, letterpress, type-written matter, and the like, on a continuous sensitised band. 2. In apparatus adapted to effect the object of the invention, the use, in combination, of a continuous roll of suitable paper, a series of sensitising, developing, toning, fixing, washing, or other necessary tanks, with appropriate means of supplying the proper solution or liquid to each thereof, and of withdrawing the exhausted solution or liquid therefrom; means for squeegeeing the liquid from the strip as it passes from each tank; means for simultaneously exposing both sides or for exposing one side of the band, and for holding it stationary during exposure and releasing it immediately thereafter; adjustable means for, at each actuation, drawing forward the exact length of sensitised band required for the next following print, co-acting, in the manner aforesaid, with means for feeding forward the same length of sensitised band to the printing frame, and drawing forward a similar length of the band from the printing mechanism, and with a frictionally driven drum or the like for taking up the finished band. 3. The use, in combination, of such means referred to in Claim 2 (excepting as regards the sensitising tank), with a roll of sensitised paper. 4. The use in such

apparatus of the hereinbefore described means of intermittently feeding and drawing forward the sensitised band and preventing any retrograde movement thereof. 5. The use in such apparatus of the hereinbefore-described means of separating and closing together the opposed negatives, between which the band is passed, and is held stationary during exposure. 6. The use in such apparatus of the hereinbefore-described exposed mechanism. 7. The use in combination, in such apparatus, of a printing frame and exposure mechanism adapted to print both sides of a sensitised band simultaneously.

Improvements in Panoramic Cameras.

No. 21,012. George Gardiner Rockwood, 17, Union-square, New York, United States of America.—*March* 7, 1891.

My invention relates to a method of, and apparatus for, photographing extended or panoramic views.

The special object of the invention is to provide means for photographing an extended view by a single operation, as will more clearly appear hereinafter.

The method, stated in general terms, consists in exposing successive portions of a sensitised plate or film to successive portions of the view to be photographed by directing light-rays from the different portions of the view towards successive portions of the plate or film through a lens so moved as to bring successive portions of the plate or film in the path of the light-waves simultaneously with the exposure of that lens to successive portions of the view. The apparatus and method will, however, be particularly described in connexion with the accompanying drawings.

(Drawings and descriptions are given.)

The claims are: 1. In a panoramic camera, the combination of a roll-holder, guides for guiding a flexible film from one roll to the other through a cylindrical plane, a lens pivoted in the axial line of the cylinder for directing light-rays against different portions of the cylindrical plane in succession, a shutter for exposing and covering the lens, a releasing device for automatically opening the shutter at one limit of the movement of the lens, and a tripping device automatically closing the same at the other limit of the movement of the lens. 2. The combination, with the pivoted lens, of a panoramic camera, a stationary curved back plate, and an automatically-operating shutter exposing the lens at one limit of its movement and concealing it at the other limit, substantially as described. 3. In a panoramic camera, the combination of a stationary camera box having a semi-cylindrical back, a revolving camera box pivoted in the axial line, and the stationary box and rollers at the end of the pivoted box pressing toward the back, substantially as and for the purpose set forth. 4. In a panoramic camera, the combination of a stationary camera box having a curved back, a completely-closed pivoted inner camera box, a lens at one end of the pivoted box, and light-intercepting walls projecting inward from the walls of the inner pivoted box, substantially as described. 5. In a panoramic camera, the combination of a stationary camera box having a semi-cylindrical back and an inner lens-carrying box pivoted in the axial line of the semi-cylindrical back, and having side walls extending from the lens to the back and top and bottom walls, closing the space between the side walls, and contacts moving with the inner box for holding the film at any time exposed to the lens at the end of the box against the back, substantially as described. 6. In a panoramic camera, the combination of a stationary camera box having an opaque curved back for receiving the film, and a plate of ground glass inserted in said back. 7. In a panoramic camera, the combination of a stationary camera box having a curved back, a plate of ground glass inserted therein for use in adjusting the camera, and an opaque cover for the same.

Improvements in and connected with Photographic Cameras, Dark Slides, and Tripod Stands.

No. 3743. William Scorer, North-street, Havant, Hants.—*March* 10, 1891.

My invention consists of an improved means of holding the two sides of the dark slide of a photographic camera together when made of the book form, they being usually held together by means of hinged clips. I dispense with these hinged clips, and hold my slides together by means of screws so formed that, when released, by means of a turnscrew, the two sides of the slides may be separated the one from the other without the screw coming out. This is effected in my invention by making each screw clip in four parts, consisting, 1st, of a screw with a head, the screw being threaded right up to the head; 2nd, a socket for the head, which is let into one side of the double slide. The screw is kept from falling out of this socket or recess by means of, 3rd, a hollow screw screwing on the first. This has also a head, and when screwed tightly on to the first screw keeps it from falling out and thus getting lost. The 4th part is the nut, and is let in flush with the surface of the frame of the slide or film holder, and exactly opposite the screw in its socket. The slide being closed in the usual way, the screws are turned into the nuts, keeping the two halves of the slides firmly together, as many screws being used in each side as may be thought necessary. The fastening has a very neat appearance. The slides may also be held together by a similar arrangement without a screw by a kind of lock, turning partly round, and shot up when released by a spring, the same principle of action being maintained in both forms, but the construction different.

The dark slides of a photographic camera held together in the ordinary way by means of hinged clips are very liable in use to come unfastened, and to fix them requires the slide to be cut away in a very clumsy-looking fashion, causing an otherwise neat-looking piece of apparatus to assume a somewhat mutilated appearance. In my invention I overcome these objections, the two portions of the slide being securely held together, in fact locked, until released by the turnscrew, which is done when changing the plates in the dark room.

This screw fastening used with a lock or catch arrangement fitted to the sliding shutter of the dark slide and only released by the catch holding the dark slide in place after the insertion of the slide in its holder in the back of the camera renders the double slide thoroughly locked against ordinary interference, thus preventing the possibility of the sensitive film being fogged either by accidentally withdrawing the wrong side when in the holder, or by the shutter coming out on being withdrawn by meddlesome individuals desirous of ascertaining prematurely how the picture looks when the photographer's back is turned.

I also use on the back of the camera a stop for the dark slide attached to or formed as part of the camera frame, and so placed as to cover the joint caused by the insertion of the dark slide in the camera back, thus securing the joint from the admission of light to the sensitive film, protecting it from injury from light admitted through an imperfect contact of the camera frame and dark slide. This arrangement already partly exists in some forms of cameras, and is useful so far as one end of the slide is concerned, but the other end at which the slide is withdrawn is usually protected by a cloth thrown over it, and known as the focussing cloth, which, when the slide is withdrawn previous to exposure, is sometimes apt to be blown away. When such is the case the joint is liable to admit light. To overcome this difficulty I make a narrow thin shutter which I attach to the back of a photographic camera to the reversing frame of such a size as to fly up and cover the two joints formed on the two sides of the slide shutter, when it is removed, thus securing both ends of the slide from the admission of light after the shutter is removed for an exposure; this additional shutter is preferably covered with velvet or cloth, protecting the slide from scratches.

In a photographic camera which has double extension it is usual to have a frame sliding one on the other telescopically, the outer frames being held in place by a cross tie or bar or a piece of wood covering the whole or part of the frame. I now dispense with these cross bars or ties, and on the upper side of the outer frame I fix a metal plate at each side, with a hook pointing downwards and extending over the edge of the inner frame a sufficient distance to engage with a parallel strip of metal securely attached thereto, a suitable groove being formed in the frame for the admission of the hook. I thus secure a thin base practically of one thickness of material, the legs being attached to the inner portion of the frame, securing a very rigid support.

If more than one slide is required, they can be fitted the one within the other, each outer frame consisting of two parallel bars held together with a cross piece at one end, forming three sides of a square or parallelogram. This arrangement enables both sides of the base to be available for attaching pieces of apparatus connected with the camera which could not be otherwise affixed, a frame formed of four pieces mitred or morticed together being sufficient for the inner frame, and in which a tripod head or other stand may be inserted at pleasure, being buttoned or bolted in place.

This arrangement used in place of the cross bar *b*[11] used in my camera Patent No. 12573, A.D. 1888, enables the base to be formed with a slotted path to hold a strut to support the front, which is also fixed by means of a screw or cam, the advantages being a front which has a swing, and which can be brought nearer the back and over the hinged joint when a short extension only is used. The front may also be brought with the lens directly over the centre of the turntable, making the camera available for taking panoramic pictures, the camera as it were turning on an axis. The base being fixed level, the camera can be turned completely round, the lens axis remaining unchanged, completing the circle on as many plates as the angle of the lens permits, and, my turntable being already provided with gear, the correct angle is easily measured at each exposure by means of the pinion or a device for counting which may be readily connected to the gear. When a film and roller slide is used, the view may be correctly joined without a break, care being taken to include the correct angle, which may also be marked on the focussing glass. The picture is thus completed on one sensitive film, the same time being allowed for each exposure with the same aperture to the lens, and being all developed at one operation secures a uniformly dense negative.

I make also a form of leg to be used with a portable camera which has even more rigidity than the old form of tripod stand known as the bow-legged tripod, but which had the disadvantage of not folding. The one I have now invented folds in the middle, and consists of six laths and a strut or stretcher to each leg, so fixed together as to form a very rigid support.

The leg is made thus:—Two laths of suitable strength are fastened together at the bottom, which is shod with a pointed shoe. These pieces are not fastened close together, but separated the distance of the thickness of two laths fixed to the upper portion of the compound leg.

This upper portion consists of four laths, two being about equal to the lower laths in length, the other two, which are about half the thickness, and extend about two-thirds up this upper part, are fixed together at the top by screws or other means; quite close together on the top of these is fixed the stretcher which separates the parts bowing the legs in contrary directions. The upper parts of the legs are connected together by two plates, one to each pair of laths, keeping them the thickness of the lower lath apart; this lower lath is placed between each pair of upper laths, and turn on a pin like the folding legs in ordinary use. The plates which tie the two pairs of upper laths together act as a stop to prevent the leg when opened for use bending in an opposite direction The leg is prevented from closing when in use by a button on each division of the lower half of the leg, and which is turned across when the leg is extended.

When it is desired to have the legs to differ in length, the short piece which carries the shoe may be made movable and connected with a thumbscrew, with suitable guides on each side.

The leg somewhat resembles two ordinary folding legs connected together at the toes, one side of each leg being shorter at the top and thinner, and securely fixed together, the stretcher being hinged on either side of this piece and opening right and left, the ends being held in slots or mortices in the outer pieces.

These legs are attached to a triangular-head turntable, or any arrangement in ordinary use, three being the least number that can be used. This tripod stand may be used for other instruments requiring a portable rigid support, and is especially useful to support the large cameras now coming into extensive use, and are also equally rigid for small sizes.

Improvements in or appertaining to Photographic Cameras.

No. 2725. William Sanders, 91, Mount Pleasant, Liverpool, Lancashire.—*March* 14, 1891.

The invention has for its object a photographic camera formed with two parallel tubes similar to the tubes of a binocular, and either with or without

the external appearance of the same. It is applicable for the use of detectives and, owing to its external appearance, can be directed towards a scene or object for the purpose of producing a photographic picture thereof, without suspicion being aroused as regards the real purpose which the operator has in view. The apparatus, being of very compact form and easily portable, is also applicable for tourists, surveyors, civil engineers, and others. In the examples I am about to describe, a pair of telescopic tubes, having parallel and simultaneous adjustment, are employed as in an opera or other like binocular glass, one of which is adapted for focussing, and the other for receiving the sensitised surface or plate which is exposed to the actinic action of light. The apparatus is so arranged that, when an object is focussed by the one tube, the sensitised surface in the other tube is in the proper focus to receive the image of such object.

Improvements in or relating to Flexible Phototype Plates.

No. 4178. George Balagny, Paris, France.—*March* 14, 1891.

The object of this invention consists in flexible phototype plates with or without silver salt. Up to the present time phototype impressions were made upon thick glass panes or so-called St. Gobain slabs by means of a film of bichromate gelatine dried in a suitable drying apparatus.

This method was attended by the following drawbacks :—

First, it did not allow the formation of the image to be closely followed in the frame during the exposure.

Second, it did not permit of the image being seen from the rear, the rigidness of the glass preventing the frame used for the impression from being raised.

Besides, bichromate gelatine gives but an indistinct image. It takes a long time to obtain an impression in the winter, in dark weather it frequently lasts several hours and even as much as a whole day. To remedy these inconveniences I propose to substitute for the rigid supports formed by the film of bichromate the flexible support formed by my pliable plates.

I have also found that by simply treating with bichromate such flexible plates covered with an emulsion of bromide of silver, such as are supplied by the trade, that after the bichromate has been allowed to dry in a dark room a perfect phototype plate is obtained, which may be used for the preparation of photographic negatives in lieu of the bichromated plates formerly used. A double impression is obtained by this novel method : first, that of the bichromate gelatine contained in gelatino-bromide of silver, and second, that of the bromide of silver itself. The result is a double impression, offering to the eye an admirably clear image, since the lines thereof are perfectly black. The flexibility of the support, moreover, enables the operator to follow in the frame the development of the image.

Mode of preparation :—Upon any suitable flexible support, such as gelatine, collodion, celluloid, multiple films of collodion, indiarubber, guttapercha dissolved in the usual solvents, in fact upon any support prepared by the solution of gum or resin in essences, benzines, ether, or acids, is spread either a film of gelatine alone, or one of gelatino-bromide of silver, or any emulsion prepared with either gelatine or dextrine or gum or starch or albumen, or prepared with any organic body capable of producing an image after treatment with bichromates.

A film is thus obtained containing silver mixed with the organic substance upon which the bichromate is to exert its action ; the films will be flexible and perfectly flat if prepared upon glass ; they may be preserved in portfolios for occasional use, and when it is desired to employ them they may be cut to the required size and placed for a period of five minutes in a solution of three per cent. bichromate of potash. After being removed from the bath they are dried by means of a roller, and left in a dark room for the drying to be completed, for which purpose they are pinned by means of one or more ordinary pins to a small table or plate, so that the elaborate drying process in a special chamber is avoided. Phototype plates will thus be obtained which can be used instead of the bichromated slab for the impression of photographic positives. As usual, the exposure will be made in ordinary press frames without its being necessary to use the cumbersome and expensive apparatus now made use of in phototyping. The image will form rapidly, inasmuch as the impression will be double and not single, as it is in the case of bichromated gelatine films.

The plate, when ready, is removed from the frame and placed in an ordinary water bath. The washing may be completed rapidly, and then the inking and printing can be directly proceeded with after the plate has been placed upon the steel block or lithographic stone, or any rigid support that can be used as a substitute for a St. Gobain's slab, such as is now used to support bichromated gelatine. This rigid support may be of any desired description, provided it is not crushed by the cylinder of the press. Well-planed steel, in the inventor's opinion, is preferable for this purpose. To avoid altering the lever of the machine, this block will be made of the same thickness as that of the ordinary St. Gobain's slabs. When thus the new flexible phototype plate is spread upon a suitable block, it can be in the usual way inked and printed from.

The flexible support may be composed of paper, cardboard, cellulosite, wood veneer, parchment, ebonite, cloth, oilcloth, leather, metal, or other suitable material, and the sensitised film may be separated from it by an intermediate layer of albumen, or some silicate productive of adhesion, for the purpose of preventing the film from blistering.

The flexible phototype plate may be stretched and fixed upon the printing block, which may be steel, stone, marble, slate, or other suitable material, by means of gelatine, or other adhesive substance, such as dextrine, albumen, and the like. For this purpose I cover the steel, stone, zinc, or like block, with a layer or film of water. Upon this liquid layer I place a perfectly smooth sheet of gelatine. I remove the bubbles and the water from between the gelatine and the surface of the block by means of a roller. The atmospheric pressure then comes into action, and causes the gelatine to adhere to the block. In a second similar operation, and by spreading water over the surface of the sheet of gelatine adhering to the steel, the phototype film is caused to adhere to the gelatine, such adhesion being most powerful in this case, also owing to the atmospheric pressure. The moisture is then wiped off, and ink is applied to the film.

This process is intimately connected with my phototype process, which, being mainly a printing process, naturally includes the means of stretching the gelatine printing surface, and such a method of stretching is capable of being extended to any printing process.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is :—1. In a flexible phototype plate, the combination with a flexible support of a coating of either pure gelatine, or gelatine treated or mixed with bichromate or any other organic material capable of producing an image under the influence of light after treatment with bichromate, substantially as described. 2. In a flexible phototype plate, the combination with a flexible support composed of gum or resin, of a coating of pure gelatine or gelatine treated with bichromate or other organic material capable of producing an image under the influence of light after treatment with bichromate, and containining a suitable silver salt, such material being capable of producing a double phototype impression, whether used with bichromate, gelatine, or silver salts, substantially as described. 3. Flexible supports of paper, cardboard, cloth, oilcloth, leather, metal, or other suitable material, the sensitised film upon which may or may not be separated from the flexible support by an intermediate layer of albumen, or some silicate productive of adhesion, for the purpose of preventing the film from blistering, substantially as described. 4. The employment of a gelatine film such as used by engravers, or any other adhesive substance, such as dextrine, albumen, or the like, for the purpose of fixing and stretching the flexible phototype plate upon a plate or block of steel, lithographic stone, marble, slate, or any material capable of being used as a printing block or plate, such fixing and stretching being feasible with or without the assistance of atmospheric pressure. 5. The process substantially as described, whether applied to sheets of gelatine, albumen, dextrine, or any other adhesive material alone, or to sheets of this nature applied to hard bodies, such as slabs of marble, steel, sandstone, slate, and the like, or to a flexible surface or support such as is above referred to, consisting of collodion, gelatine, indiarubber, guttapercha, celluloid, cellulosite, cloth, oilcloth, veneers of wood, plates of glass, metal, parchment, carboard, ebonite, such material being used either separately or in combination, in superposed layers, and so forth.

A Method of Changing Plates in Photographic Cameras.

No. 7236. Edward Scott Miller, 11, Bath-road, Bedford-park, Chiswick, and Edward Charles Hawkins, 5, High-street, Bloomsbury, London, W.C.—*March* 14, 1891.

Our invention provides a simple and effective method by which dry plates, or other sensitive surfaces used in photography, may be removed from the position in which they are necessarily held opposite the lens during exposure into a position outside the angle of light between the lens and plate, allowing a fresh plate, or other sensitive surface, to be brought into position for exposure.

The method we adopt is more particularly useful in hand or detective cameras.

Each plate, or other sensitive surface, is provided with a carrier of metal, vulcanite, or other substance through which actinic light cannot pass. These carriers are open at the front, and provided at the sides, near the top, at a uniform height, with short projections or arms. The arms are supported and slide upon horizontal metal guides, with L-shaped ends fixed on the side of the dark chamber or camera, and are pressed forward towards the lens by a spring operating behind the carrier furthest from the lens. One or more stops, in addition to the L-shaped ends of the guides aforesaid, are placed at or near the bottom of the carrier, so that the sensitive surface in its containing carrier is held firmly in a vertical position in the focal plane of the lens.

Just in front, and below the foremost plate, we provide a bobbin-shaped device on a shaft communicating with a handle or key outside the camera, by which the shaft may be turned round. The shaft of the bobbin runs from one side to the other of the camera, and is of a length a little greater than the base of the plate being used. On the discs which form the ends of the bobbin, we provide metal arms constructed to pivot on axes removed a suitable distance from the main shaft of the bobbin, the extent of movement of the arms in the radius of a circle drawn from the axes on which they are pivoted being limited by blocks on the discs of the bobbin aforesaid.

The ends of the metal arms are provided with V-shaped ends, and lie alongside the carriers aforesaid in a vertical position with the V-shaped ends, terminating just below the projections of the carriers.

It will be seen that by turning the main shaft of the bobbin forward the movement first imparted to the metal arms is upward. The V-shaped ends of the arms engage in the projections of the front carrier and lift it and its contained plate upwards beyond the retaining L-shaped ends of the metal guides, &c., aforesaid. The amount of upward movement of the arms is dependent upon the distance of the axes of the arms from the main shaft of the bobbin and upon the position of the blocks provided upon the discs of the bobbin. On the continued movement of the main shaft until the carrier with its contained plate is brought into a horizontal position when it is deposited.

In the meantime the next following carrier has taken the place of the one just removed, and on the return of the metal arms is ready to be operated on in like manner, and so on till all the plates have been exposed.

"A Day in the Zoo."—On Thursday, April 2, the Elizabethan Photographic Society and their friends spent a very pleasant evening together in the hall of the Boys' Grammar School, Barnet. Mr. Lewis Medland, whose skill in photographing animals is well known, exhibited about 250 slides of animals and birds to a large audience. The exhibitor briefly described the peculiarities and habits of the animals as the pictures were thrown on the screen. A number of slides, painted some thirty years ago, were shown, and also some made from Egyptian monuments. Not the least interesting feature of the exhibition was a collection of reproductions of extinct animals, presumably taken from the casts at the Crystal Palace.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 13	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 14	Great Britain	50, Great Russell-st., Bloomsbury.
,, 14	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 14	Derby	Society's Rooms, Derwent-bldings.
,, 14	Bradford	50, Godwin-street.
,, 14	Manchester Amateur	Manchester Athenæum.
,, 14	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 15	Bury	Temperance Hall.
,, 15	Hyde	
,, 15	Manchester Camera Club	Victoria Hotel.
,, 15	Edinburgh Photo. Club	5, St. Andrew-square.
,, 15	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 16	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 2,—Mr. W. Coles in the chair.

The regulations framed by the committee as to lending works from the Society's Library were read. Mr. F. W. Pask was appointed Librarian, and a fresh accession of books was received from the Hon. Secretary.

Mr. G. W. Atkins showed negatives taken at the Bank holiday outing on Easter Monday.

Mr. J. R. Gotz then gave a demonstration of the toning and fixing of prints on printing-out gelatino-chloride paper. There were, he explained, several modifications of Obernetter's gelatino-chloride paper. The first was the most known, and gave prints, as would be seen, of extreme richness, and with a gloss, when stripped from a polished surface, like that of enamelled photographs. The next was very similar, but was made expressly so as to give a softer print when the negative was of full density. This was called the portrait paper. Then the third kind was that which gave a matt surface when dry. These were toned in a variety of baths, the composition and character of which were described, and included a combined fixing and toning bath, sulphocyanide baths, and platinum toning. There had recently been a cry raised for black tones as being artistic. Many superficial people thought that artistic only meant being like an engraving. Well, this black tone could easily be obtained on these papers, and the closest imitation of the colour and appearance of an engraving could be got with the matt-surface paper, whilst the detail is not lost to the same extent as with other methods of printing on matt surface. For those who preferred warmer tones, there was, as might be seen, a variety of rich colours to select from. As to permanency, he believed that they were superior to any other method of silver printing, and when the toning by substitution was complete, might rank with platinum prints.

Mr. P. Everitt asked whether the prints would stand the same tests as platinum prints, say immersion in chlorine water.

Mr. A. Haddon said that that would not be a fair test in this case, as not only would the gold be acted on, but the gelatine would be attacked. He observed that the prints were treated with chrome alum finally. Would it not be possible to use this treatment before toning, so as to harden the gelatine and render it less likely to suffer from careless handling in the subsequent operations.

Mr. Gotz replied that it was quite practicable, in fact in the summer they always adopted that course.

Mr. W. E. Debenham was glad to note that a modification of the paper, giving a softer image, had been introduced. With gelatino-chloride paper generally the image was more intense and vigorous than on albumen, and although this might be an advantage for thin negatives, yet for such as gave the best results on albumen paper the effect was too powerful. It certainly was an advantage to have two densities available to suit particular negatives. As to permanency, gelatino-chloride appeared to be amenable to sulphocyanide toning to an extent not easily obtainable with albumen. He remembered some years since an objection being made to sulphocyanide toning on the ground of the quantity of gold consumed by it. That objection he considered to be its greatest recommendation. If the toning could be carried so far as to make substitution complete, he thought the prints might fairly be called permanent, and so that quality, which was the unquestionable recommendation of platinum prints, be obtained without the loss of gradation in the deep shadows that was noticeable in the latter.

Mr. Haddon inquired whether it was necessary to make the prints very deep in order to allow for lighting in toning.

Mr. Gotz said that it was not.

A vote of thanks to Mr. Gotz closed the meeting.

CAMERA CLUB.

April 2,—Sir George R. Prescott occupied the chair.

Mr. Henry Sturmey gave an address upon *Norway as a Photographic Field.* His lecture consisted of a description of his tour with the Vesey Club in Norway, and the narrative was illustrated throughout by a large number of lantern slides prepared in a variety of ways from hand-camera negatives taken by the lecturer himself. The address was lively and interesting, and such as to prove very useful to any traveller proposing to go the same trip. Many of the slides were picturesque.

A brief discussion followed the lecture, and questions were asked.

Mr. Sturmey stated that the camera he used was a Facile, with the shutter modified by a contrivance of his own. He thought the light in Norway at least twice as quick as at home.

The Chairman made some remarks, based upon a prolonged experience of the country. He suggested another route—namely, to go by steamer from Hull to Trondjhem, and then drive over the Dorrefield to Christiania. June or July was a good time, but he should advise intending tourists to take a gimlet and a mosquito net.

Major Nott objected to Mr. Sturmey's preference for a wide-angle lens in his Norwegian mountain work. They destroyed instead of assisted the effect of grandeur.

Mr. Sturmey replied that he had specially taken out a long-focus lens, but he found that to get an inclusive view, from which the place might be recognised, he had to have recourse to the short-focus lens.

Mr. Davison remarked that views taken with a wide-angle lens were so falsified to the eye as to be unrecognisable even by those who were well acquainted with the spots.

Mr. Sturmey stated that the long-focus lens gave him only bits and fragments, and it was impossible in most cases to move back. In regard to the best time for touring, he strongly recommended the early part of the season—say not later than June, before the roads were dried and dusty and the place overrun with tourists.

On Monday, April 13, there will be a special lantern evening at the Club, and on Thursday, April 16, Mr. Howson will read a paper entitled *Conventionalism in Colour.*

HOLBORN CAMERA CLUB.

The third annual general meeting of the members of the Holborn Camera Club was held on Friday last at 100, High Holborn, Mr. T. O. Dear (Vice-President) presiding, over thirty members being present.

Before receiving the reports of the Treasurer and Committee, Messrs. G. Luxton and F. Henderson were elected members of the Club, and the Secretary read a letter from the London County Council granting permission for the members of the Club to photograph in Waterlow Park on the 11th inst.

The Treasurer then read a statement of the income and expenditure of the Club for the year ending March 31, 1891, showing a nett balance in favour of the Club of 18*l.* 2*s.* 3½*d.*

The Secretary read the report of the Committee, which showed that during the past year nineteen members had been elected, while eight had resigned. With regard to lectures they had been very successful, while the various lantern entertainments during the year had proved very attractive. During the summer months the Club had made excursions in the neighbourhood of Carshalton, Epping Forest, Greenwich, Highgate, Kew Gardens, Laindon Hills, St. Albans, the Temple, and Wanstead Park, all of which were well attended. Thirty-eight members and friends sat down at the annual supper in November, while sixty-nine were present at the annual exhibition and Cinderella in March. On the whole, it was considered that the Club had made very satisfactory progress during the past twelve months.

The reports having been adopted, the question of raising the subscription was considered. After a long discussion it was decided to raise the subscription to 7*s.* 6*d.* Another addition having been made, it was resolved that Rule II. of the Club should read as follows:—"2. The annual subscription shall be for gentlemen 7*s.* 6*d.*, with entrance fee of 5*s.*; for ladies, 2*s.* 6*d.*, without entrance fee. All subscriptions and entrance fees shall be paid in advance. Any member who shall have omitted to pay his, or her, annual fees by the following 1st of July shall, after having received two applications at one month's interval from the Secretary, cease to be a member of the Club, except in special cases to be decided by the Committee."

The following officers were then elected:—*President:* T. C. Hepworth, F.C.S.—*Vice-Presidents:* Fred. Brocas, S. T. Chang, T. O. Dear, and R. B. Lowe.—*Committee:* E. H. Bayston, E. Benest, F. J. Cobb, A. J. Golding, Alfred Hodges, F. Knights, and R. Luxton.—*Librarian:* H. C. Gay.—*Treasurer:* Albert Bell.—*Hon. Secretary:* J. E. Smith.—*Assistant Hon. Secretary:* Herbert Thompson.

Ten members attended the Club outing to Richmond and Kingston on Easter Monday, and an enjoyable day was spent in this beautiful neighbourhood.

To-night (Friday) Mr. J. Traill Taylor on *The Art Composition of Photography.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

April 3.—Annual General Meeting.

The Committee reported that at the close of the first year of the Society's existence, April, 1890, the number of members then was 63. During the past year there had been an influx of 44 members, thus making the total at the present time 107. There was a balance in hand of cash 4*l.*, and furniture to the value of 3*l.*

It was resolved that an entrance fee be imposed on all entrants after May 3 of 2*s.* 6*d.* Finding that the members are unable any longer to obtain the use of their present meeting place on Friday evenings, it was resolved that in future the meetings take place on the first and third Mondays in the month on and after May 17.

Elections were as follows:—*President:* F. H. Edwards.—*Vice-Presidents:* Maurice Howell, Dr. Munyard, W. Rice, and H. G. Banks.—*Committee:* Messrs. Boxall, Farmer, Fitness, Fellows, Groves, Herbert, Kelly, Lyon, and F. Webb.—*Hon. Treasurer:* A. E. Whitby.—*Hon. Secretary;* S. W. Gardner, 7, Barry-road, Peckham Rye, S.E.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

On Saturday, the 4th inst., a well-attended meeting of the members and friends of the Club was held at Beale's Restaurant to bid farewell to the President (Mr. J. Humphries, F.S.A.), who is about to leave London for Glasgow, where he will in future reside. A smoking concert was organized, Mr. W. T. Goodhew (Vice-President) in the chair. The event of the eveuing was the presentation of an illuminated address bearing the signatures of the members to Mr. Humphries.

In making the presentation the Chairman said that the success which had always attended the Club had been to a very great extent due to the business abilities and amiability of Mr. Humphries. He had ever shown himself ready to support and advance the Club regardless of the sacrifice of his own time and convenience, and in bidding him farewell the members felt that they were losing an officer whom they could not replace.

Mr. H. WALKER (Vice-President) and Mr. L. MEDLAND also spoke of Mr. Humphries' good qualities.

Mr. HUMPHRIES, in reply, said that the work he had done for the Club had brought its reward in the kindly feelings it had generated. Although he could no longer attend the meetings, he would always remain a member and cherish the warmest feelings of friendship for those with whom he had worked. The address, with its signatures, would be one of his most treasured possessions. It would be a source of constant pleasure to him, and would be, he felt, an "open sesame" to any photographic society he might wish to join. The North Middlesex would advance and prosper, for he knew the value of the officers who formed its Council.

The meeting continued to a late hour.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

APRIL 3,—Mr. Edward Lovett (President) in the chair.

Mr. A. R. DRESSER read a paper entitled, *The After Part of Hand-camera Negatives*, illustrated. He gave a brief outline of the method he adopted for developing hand-camera negatives, but entered largely into the intricacies of solar enlarging, and also making slides; he also explained and illustrated a simple arrangement for enlarging or copying a negative that had been taken askew, the carrier holding the plate to be copied rotating within a turntable.

A large number of fine enlargements made from quarter-plate negatives were exhibited and a good number of slides were passed through the lantern, and were well appreciated by the members.

CROYDON CAMERA CLUB.

AN exhibition of the members' work was held on 31st March and two following days at the Braithwaite Hall, Croydon. There was also a representative show of apparatus. The following prizes were awarded:—Class A, silver medal, for the best photograph in the exhibition, G. Cardon. Class B (architecture), silver medal, A. E. Isaac. Class C (amateurs only), medals given by the *Amateur Photographer*, silver medal, N. Maclean: bronze medal, A. J. Sargeant; certificate, Messrs. Elliot and Whitaker tied. Class D (lantern slides), table lamp, won by C. F. Oakley.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

ON Easter Monday nine members visited Cobham and Ockham, and, in spite of the wind, succeeded in getting some good negatives.

APRIL 3,—Mr. Faulkner presided.

Mr. ARDASEER showed and explained the pneumatic shutter of Adams' "Ideal" hand camera; and thereafter a number of slides were shown by the lantern.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

APRIL 2,—Mr. E. W. Jones in the chair.

The SECRETARY reported that on March 11 Mr. E. Howard Jaques gave a very successful entertainment at the Temperance Hall on *Through Ryfilke to Hardanger, Norway*, illustrated by 160 lantern slides.

Mr. A. J. LEESON exhibited and explained Marion's "Radial" hand camera. He also exhibited Thornton-Pickard's new instantaneous shutter. Also Messrs. E. & T. Underwood's new instantaneous blind shutters.

Mr. E. C. MIDDLETON then gave a demonstration of *Carbon Printing*.

BRISTOL CAMERA SOCIETY.

APRIL 3,—Mr. Bryant presided.

The President of the Society, Mr. HARVEY BARTON, gave a demonstration on *Flashlight Portraiture*. After a few remarks on the introduction of magnesium in connexion with photography, he exhibited several forms of flashlight lamps; and afterwards, with the kind assistance of some young ladies who had accompanied him for that purpose, proceeded to make several exposures by means of a series of lamps of his own construction erected on movable wooden arms, and which were capable of giving, through the medium of a foot-bellows, eight simultaneous flashes. The plates were subsequently developed, pyro potash being used.

A set of flashlight portraits were exhibited in the room, which Mr. Barton explained were his first efforts in that direction. They were much admired.

LEWES PHOTOGRAPHIC SOCIETY.

WINTER PHOTOGRAPHY.

APRIL 2.—Professor E. H. JACOB, M.A., M.D., read a paper on the above subject before the members of this Society. In the course of his remarks Dr. Jacob said that photography in the winter, that is, when trees had lost their leaves, was far too much neglected by amateurs. He dwelt on the greater truth to nature of winter photography, the values of the almost monochrome pictures being more correct than views which contained a profusion of colours, mostly green, while from an artistic point of view there were a large number of spring and winter views of great beauty. As subjects for pictures he instanced:—1. *Buildings*, the greater part of which are frequently in summer obscured by trees or foliage, and interiors in the same way are often shaded by trees. 2. *Snow Scenes* or pictures taken during a hoar frost, which formed some of the most beautiful subjects for the camera. 3. *Trees.*—Here the photographer had a great advantage over the artist with the brush, for the winter trees could be rendered with absolute accuracy. He thought people were unaware of the great beauty of most trees without leaves, especially the birch, the elm, and the oak, besides the artistic value a collection of good photographs of leafless trees would be most useful from a botanical point of view, and should find a place in the collection of every school of botany. Some of the most beautiful trees he had seen were to be found in Nuneham Park, near Oxford, and in Studley Park. 4. *General Winter Landscapes*, where interest was given mostly by the conformation of the land, hills, buildings, or by contrast of bare trees with evergreens; seaside views were better in winter than in summer, as the waves and skies were more varied. Dr. Jacob illustrated his paper throughout by a series of lantern slides of winter scenery, including a number of fine prest trees from the parks referred to above.

Mr. J. W. ADDYMAN, B.A., brought before the members an account of the recent investigations of Colonel J. Waterhouse, S.C., Assistant Surveyor-General of India, respecting electro-chemical reversals with thio-carbamides, the principal points established seeming to show—1. That the same kind of reversal of the deposit on silver bromide films can be affected by a developer containing thio-sinamine both chemically and electrically. 2. That the reversal of the photographic image on such films by thio-carbamides is to a great extent, if not entirely, due to electro-chemical action. 3. That the development of the photographic image on silver-bromide films is accompanied by electro-chemical action.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 31,—The President (Mr. William Dougall) in the chair.

Mr. ROBERT HUNTER read a paper on *Limelight Exhibitions*, which dealt specially with the last popular meeting. He pointed out rather forcibly that several lessons were to be derived from it. Among others he suggested that fewer tickets for such meetings should be issued, thus making them more select and valuable, so that the audience, whom they wished to be benefited by the exhibitions of their work, should not be so overcrowded as on that occasion, especially by young people and children. He also impressed upon exhibitors to send only their best work, and urged the necessity of mounting, labelling, and naming their slides on one uniform system, instead of, as in some instances, leaving this for the committee to do for them, and with scant time for the purpose. Another point he insisted upon was no slides should be received which were not so arranged, and that they should be sent in at least a week in advance of the meeting. He also deprecated the Association meeting as a body to select the slides, as they did at present, and suggested the appointment of a special small committee from the Council for this purpose, who should have full power to accept or reject any slide without question. The screen used was a plain stretched cloth, and Mr. Hunter pointed out the loss of light which this form of screen involves in consequence of a great portion of the light filtering through it and so becoming lost. He advocated a paper-faced screen, which should be perfectly opaque, so that the whole of the light from the lantern should be conserved and reflected in full force to the audience, who would then see pictures with much greater brilliancy.

The writer and the paper were taken to task, several of the speakers seeming to think that the strictures were intended for individual, not general, use.

Mr. HUNTER replied, justifying all that he had advanced, pointing out that what he had said was for the good of the Association and the advancement of their knowledge and capacity in photography, in which they were all interested, as one of the many ways of representing the beauties and facts of nature.

EDINBURGH PHOTOGRAPHIC SOCIETY.

APRIL 1,—Mr. W. T. Bashford presided.

Professor HUNTER proceeded with an interesting demonstration on *Photo-micrography, especially as Applied to the Bacteria of Yeast and Other Allied Organisms*, and, in stating the case, said he desired it to be understood that he would treat the subject at a meeting such as this popularly rather than scientifically, and wished only to bring before them the characteristics of yeast, its mode of production and growth, without introducing any controversial scientific matter, and also a few of the many bacteria and bacilli which had been found in the human organism and several of the lower animals. The lecture was illustrated by photo-micrographs. The amount of enlargement varied from about four hundred up to two thousand diameters. Yeast being the principal topic, he exhibited by the slides the various kinds and qualities of that fungoid growth, which is of so much service to mankind in both food and drink, pointing out the inherent differences visible between those which are good and healthful, those which are indifferent in quality, and those which, being bad, must, or ought to, be rejected as harmful to the body. In dealing with these and other bacteria, he pointed out that the spores from which they spring were endowed with a wonderful faculty for life—they took a deal of killing. Many of the forms were quite unaffected by boiling water, or indeed even by prolonged boiling. The only certain form of destruction was by dry heat, such as that of an oven. This showed the uselessness of trying to disinfect garments which had been in contact with an infected person by simply washing and boiling them.

In accordance with a resolution of the Council, Professor Hunter, Professor Coleman Jellars (of Philadelphia), Professor Meldola (of London), and Dr. Eder (of Vienna), were elected honorary members of the Society.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

MARCH 19,—Mr. J. Craig Annan (Vice-President) in the chair.

Ex-Provost CLARK, Paisley, who was the lecturer for the evening, gave a very interesting and graphic account of *Scenes in Ireland*, with limelight illustrations. Views, in addition to those of scenery, were also shown descriptive of recent events in Ireland.

APRIL 2.—The sixth general meeting of the session was held, Mr. William Lang, jun., F.C.S. (President), in the chair.

Mr. James Gardner gave a practical demonstration of the application of the air brush for working up bromide enlargements, and prints were shown illustrative of the method.

Mr. WILLIAM HUME, Edinburgh, explained the construction and uses of his cantilever enlarging apparatus, and by its means showed a series of physical experiments projected on the screen.

Mr. WILLIAM LANG, JUN., F.C.S., read a paper on *Lantern Slide Making by the Woodbury Process*, and gave a demonstration of its working.

Thereafter a number of members' slides were passed through the lantern.

Correspondence.

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

THE MEDALS AT THE LIVERPOOL EXHIBITION.

To the EDITOR.

SIR,—Letters having appeared regarding the awards at the Liverpool Exhibition, I will just name one or two matters which may throw some light on the matter.

H. P. Robinson is one of the judges.

R. W. Robinson, *son* of H. P. Robinson (and, I believe, a member of the firm), is awarded a gold medal. Shapoor N. Bhedwar is a photographic pupil of R. W. Robinson's, and is awarded the champion gold medal and a silver medal!

Let any one compare Sawyer's *Cruel Work* with the *Garland of Roses*, and they will at once see the injustice of the award in the Champion class.—I am, yours, &c., WALTER JOHNSON.

Liverpool, April 2, 1891.

[We really cannot see that the fact of Mr. H. P. Robinson's son and partner being among the exhibitors at Liverpool is any obstacle to the recognition of the artistic merit of his pictures, even to the extent of awarding them a medal. Possibly, on the principle that Cæsar's wife should be above suspicion, it would have been better that no award had been made in this instance, as then there would have been no possible opportunity for cavilling. On consulting the catalogue we find that the pictures in question were entered as "Not for Competition." Mr. Johnson is, of course, entitled to his opinions as to the relative merits of any works exhibited, but we may remind him that the pictures of Mr. Shapoor N. Bhedwar were considered by the judges at the last London Photographic Society's Exhibition also as being worthy of a medal.—ED.]

DROP-SHUTTER EXPOSURES.

To the EDITOR.

SIR,—Let me thank Mr. E. J. Smith for his very clear and explicit letter. There is, however, one point on which we appear to differ materially, perhaps due to our misunderstanding each other's meaning.

What I maintain is that using a stop in the lens does not in any way effect the time during which the shutter allows light to pass through. That the stop cuts off a number of the actinic rays I admit.

This is proved, I think, by the following experiment:—Put a stop, say *f*-64, in the lens, and fasten the shutter so that one-sixteenth of an inch of the edge of the lens is exposed. If the head and camera be covered by the dark cloth, an appreciable amount of light will be found to pass through the lens.

I do not see how the formula can be correct unless the stop cuts off *all* the rays admitted by the edge of the lens, which does not appear to be the case.—I am, yours, &c., H. G. M. CONYBEARE.

The Hut, Ingatestone.

AN OXYHYDROGEN EXPLOSION.

To the EDITOR.

SIR,—Could you or any of your correspondents explain the following?—On Saturday evening, March 28, while getting my lantern ready for exhibition, I had attached the tubing to the oxygen cylinder, but found it was leaking at the coupling; I had to readjust this several times, and, of course, each time turning on and off the gas. The last time I turned it on the regulator, which was of the bellows pattern, or exactly like an oxygen bag, exploded with a very loud report, equal to a four-bore gun, accompanied with a flash of light at least fifteen inches in diameter. Naturally I jumped back several feet, but at once turned off the gas, but in the few seconds of time a portion of the metal was fused. Now, there was no light nearer than the gaslight in the hall, ten feet off—and we know oxygen is not inflammable of itself—nor was the hydrogen turned on, so what could have caused the explosion with combustion? No doubt pressure would have caused the collapse of the regulator, but whence the fire unless there was friction caused by expansion and some sparks thus generated? The fire must have come from within.—I am, yours, &c.,

Links View, Hoylake, April 2, 1891. HENRY D. BRANDRETH.

THE NEW SENSITIVE IRON COMPOUND.

To the EDITOR.

SIR,—I am obliged to your correspondent, Mr. W. E. Debenham, who, with a commendable desire for historical accuracy, inquires who is the discoverer of the extremely sensitive iron compound announced by Prof. Meldola at the Society of Arts. I will at once say that Mr. Friese Greene and myself both claim a share in the discovery. We started upon the work by studying a series of experiments, these pointed out a direct line of investigation. Mr. Greene, having special facilities for carrying out experiments, very speedily dropped into the right track, and by following it up the new sensitive compound reached the perfect stage of development. In thus working together we succeeded in rendering the process more sensitive by a discovery I had the good fortune to make. I regret that through my anxiety to get through with the demonstration, and not unduly keep the audience waiting, it did not occur to me to supply the omission by mentioning Mr. Greene's name. I am glad Mr. Debenham has drawn attention to this, as it affords me the opportunity to make the correction.—I am, yours, &c., FREDK. H. VARLEY.

82, *Newington-green-road, Highbury, N., April* 4, 1891.

NATIONAL PHOTOGRAPHIC EXHIBITION, APRIL, 1891.

To the EDITOR.

SIR,—Owing to the decision of the Liverpool Photographic Exhibition Committee to keep their Exhibition open until the 11th inst., and as many of their exhibits are entered for the Crystal Palace, I beg to inform you that it will be impossible for the judging here to take place before Thursday, April 16.—I am, yours, &c., S. G. BUCHANAN WOLLASTON.

Crystal Palace, S.E., April 6, 1891.

PORTRAITURE BY GASLIGHT.

To the EDITOR.

SIR,—Your correspondent, Mr. J. Fred. Simmance, Manager William Sugg & Co., is somewhat misleading when he states in your last issue that "the pictures made by Mr. Laws, of Newcastle-upon-Tyne, of which you speak, were produced by the aid of William Sugg's London Argand." As a matter of fact, and I might say of history, all my portraits taken by gaslight in 1879, and subsequently up to the present time, were and are still taken with Wigham's burner.

This burner, a permanent fixture in my studio, has now been in use twelve winters with very satisfactory results. At the request of Mr. Sugg in the summer of 1879 I tried his burner—the largest he had then made, of 400 candle power, I think—and found it gave a good, steady actinic light. Having, however, obtained a Wigham burner of 1200 candle power, giving pictures in eight to twenty seconds, according to plate, sitter, &c., I made no change.—I am, yours, &c., P. M. LAWS.

Newcastle-on-Tyne, April 6, 1891.

THE NEW TRIMMER.

To the EDITOR.

SIR,—In your report of the last meeting of the Camera Club, at which my parallel trimmer was shown, it is mentioned as being designed to make the top and bottom of prints parallel with the horizon. As this is one of its least advantages, for the horizon is rarely shown except in seascapes, may I be allowed to add that it will also make the sides parallel with the walls of a building, or any other vertical lines in the picture, so that houses in prints trimmed with my apparatus cannot appear with sloping walls?

It can also be used to cut mounts, masks for transparencies, &c., and as each trimmer can be used for all sizes, from the largest it is constructed to take to the smallest, the print can be trimmed to any size or proportion that will best suit it.

Hoping you will be able to find space for this correction—I am, yours, &c., W. R. BAKER.

Wallington, April 6, 1891.

Exchange Column.

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

Will exchange enlarging easel on wheels with runners, for rustic chairs, tables, &c., suitable for outdoor use.—Address, WILLIAM COLES, Photographer, Watford.

Wanted, superior four-wick optical lantern; exchange Rouch's half-plate patent camera, three double dark slides.—Address, H. COUCH, 11, Waterloo-crescent, Dover.

Will give in exchange whole-plate camera by first-class maker, with three double dark slides (good as new), for a first-class violin, violoncello, or lathe.—Address, ALBERT VALENTINE, 138, Church-road, Islington, Loudon.

Exchange good telescope (opens to thirty inches) for samples of posing, C.D.V. upwards, damaged or unmounted no object. Approval.—Address, H. H., Emmeline Villa, Canterbury-road, New Brompton, Kent.

I will exchange interior backgrounnd, boat oar and waterpiece, Tylar's current producer and discharger, and pair of opera glasses, for conservatory or exterior backgrouud and accessory for studio.—Address, FREDERIC C. D. HURD, Shepton Mallet.

I will exchange twenty-four BRITISH JOURNAL PHOTOGRAPHIC ALMANACS, from 1867 to 1891, in good condition (one volume missing to complete quarter of a century), also 17×14 glass bath for negatives in travelling-case, air-tight top, two dipping baths for cabinets in cases, and retouching desk, for showcase for garden, interior backgrouuds, &c.—Address, GEORGE JOHNSON, 55, Laurel-grove, Penge, S.E.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

Alfred James Bailey, Pimlico.—*Two Views of the interior of Curzon Chapel, Mayfair. Portrait of Sir Walter de Souzá.*

CHAS. J. KIRK.—The firm named is respectable.

N. G. (India).—See the leading article in our ALMANAC for 1889, and note what is said on page 371.

PATENT.—The only remark we can make on the print on celluloid is that is is fairly good, as you can see for yourself.

JAMES MUNN.—Try sensitising the wood-block with oxalate of silver, and after printing do the engraving under a yellow light.

PERPLEXED.—It is against our rule to recommend any particular maker's apparatus or to reply to anonymous correspondents.

CRAYON.—We are unable to say whether the Air Brush Company have now an agent in this country, but a clever mechanic ought to be able to repair yours.

COMBINATION.—1. The lenses are suitable for enlarging or for lantern work. 2. Yes. 3. Such lenses are now of small value. 4. Mount them three inches apart. They seem at if they would work fairly well.

B. R.—There is no work specially devoted to the manufacture of commercial dry plates, nor is there likely to be, seeing that the makers of commercial plates treat their methods as more or less trade secrets.

MACLUCAS & Co.—We are sorry that any artist in London conducts his business in such a loose fashion, and is so inattentive to his promises and customers. We have had innumerable complaints against this man.

A. ABERCROMBIE.—The collotype process is described in Burton's *Printing Processes* (Marion & Co.). The colour prints are made in several printings from plates for the different colours after the manner of chromo-lithography, that is, a different plate for each colour.

WILTS.—Your friend can scarcely call himself an amateur photographer if he gets a professional to develop his negatives and print from them, and afterwards sells the negatives themselves to a publishing house. Does he style himself a photographer of any description?

W. J. C.—You are correct; an ordinary printing press would be far more convenient than a "copying press" for printing "collographically" from paper. Typographic presses are what are generally used for collotype. Of course they are more expensive, but may often be met with second hand at a very small price.

A. SOUTHWOOD.—The work is old, but by no means scarce. Copies are in the library of the Photographic Club, also in that of the Camera Club. Some of the new societies who are forming libraries would no doubt be glad to accept it, though we question if any of them would pay much for it. We have often seen copies on bookstalls at a few pence each.

G. SMART inquires where and how specifications of patents can be obtained, and their price.—The specifications are on sale at the publication department of the Patent Office, Cursitor-street, Chancery-lane, W.C. The number of the patent, and the year, must be quoted These may be ascertained from the indices at the office if not already known. The price varies from pence to pounds. The average of ordinary specifications may be taken as from sixpence to one and sixpence, according to their length and the number of illustrations.

L. P. TAYLOR asks: "Can over-printed albumenised prints be reduced with cyanide of potassium? If so, what strength should the solution be, and would the prints be as permanent after using cyanide of potassium? Also would this way of reducing over-printed prints also apply to bromide prints? I should be very much obliged if you will answer this."—Over-printed albumen and bromide pictures can be reduced by cyanide of potassium, but it is far less trouble and much more satisfactory to make fresh prints. Reduced prints are rarely so good in quality, and no professional printer wastes time in the attempt.

H. F. F. (Chatteris) writes: "I enclose two slips of paper (Whatman's) salted and sensitised on Mr. Lyonel Clark's system for platinum toning. The paper was salted on his strong bath for thick papers, and sensitised by brushing over with his citrate of silver sensitiser. Can you suggest the cause? I used the quantity recommended, *i.e.*, about two drachms for a sheet 12 × 10."—The failure arises from the solution being applied unevenly. The streaky appearance is due to brush-marks. "About" two drachms of silver solution, including what is taken up by the brush, is a very limited quantity for a sheet of paper of the dimensions mentioned.

F. S. (Chorlton-cum-Hardy) writes: "The last complete paragraph on page 212 in the April 3 issue of the JOURNAL contains a useful dodge for drying plates quickly; but you say, 'There were no means of opening the dark room without admitting light.' If the plates were fixed, what was the objection to admitting light? but, if there was really some unexplained objection, then there follows:—PUZZLE.—*How did he get the butter boxes in the room?*"—If our correspondent had read the article a second time, he need scarcely have troubled himself to write. Of course sensitive plates are not fixed, hence the necessity, after orthochromatising them, of drying them in the dark. The boxes were taken into the room by the door, and the plates placed therein after preparation.

R. PRITCHARD.—We have not heard of the dry plates mentioned by you. See the advertisement columns of the JOURNAL for the addresses of reliable dry plate makers. Any of the recognised makers can be relied upon for quality. The method of enamelling prints has often been described in back volumes of this JOURNAL, therefore we cannot afford space to give the working details in this column.

IGNORAMUS says: "I have not made it quite clear in my last letter as to the engraving referred to. The engraving has been glued on to wood instead of cardboard, as stated in my last letter, and as it is cracked in several places I wish to remove it from the wood and fix it on cardboard. Will you kindly say as to which would be the best method of removing it from the wood and taking out the cracks of the paper?"—The question is difficult to answer without seeing the picture or knowing what was the mountant used. If the mountant was glue the best plan will be to soak in cold water for some hours and then immerse in warm, when the picture should come off easily. If the engraving is a valuable one, as we presume it is, we advise our correspondent to place it in the hands of an expert in this kind of work, or he, through want of experience, may irretrievably ruin the work.

COLLODION says: "I have a prize negative, which unfortunately has got cracked; the film, however, appears to be intact. I have never attempted negative stripping. What would you suggest I should do? Could I easily, with a little experience on useless negatives, strip it myself? An answer in your next issue would be a great favour."—We should advise our correspondent to practise on some valueless negatives in the following way:—First, treat the negatives with alum, wash, and dry. Then immerse them in a very dilute solution of hydrofluoric acid—say, a drachm of acid to a pint of water. In a few minutes the film will show signs of leaving the plate. The negative is then transferred to a dish of clean water, when it may be floated off on to another plate. A camel-hair brush may be used in adjusting the film into position. When proficiency is gained the valuable negative can be dealt with.

W. C. COLES writes: "Would you kindly inform me if silver prints toned and fixed in one bath would be as good tones and as permanent as those toned and fixed separately? I should imagine the tones would be a muddy brown, but I see no reason why they should not be as permanent. Of course there must be something to neutralise the effect of the hypo on the toning bath, as it would precipitate the gold. I have never tried the combined toning and fixing, but have done a good deal of it separately. I should be much obliged if you would inform me if in platinum printing there should be anything to neutralise the hydrochloric acid, or are several changes of plain water sufficient?"—Prints toned and fixed in the old toning and fixing bath are of as good a tone as by the modern method. They are by no means "muddy," but in this method a vigorous negative gives the best results. If the bath be made in the proper way, *i.e.*, the gold added to the solution of hyposulphite of soda, no precipitation will take place. In platinum printing copious washing is all that is necessary.

RECEIVED too late for notice this week:—G. Oakley, British Canadian, "President," J. E. G., R. B., and others.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 16, Lantern polariscope demonstration, Mr. J. J. Briginshaw. April 23, Demonstration on light, Mr. W. E. Debenham.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 15, *Printing on Emulsion Papers.* April 22, *The Keeping Qualities of Developers*, and a special series of slides by Frank Haes.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—April 14, at eight p.m., Mr. W. Willis will read a paper on *Platinotype.* A specimen of M. Lippmann's colour photographs will be shown. April 28, Discussion on *Animal Photography.* May 12, M. Leon Vidal will read a paper on *Photographic Methods of Obtaining Polychromate Impressions.* May 26, Discussion on *The Influence of Development on Gradation.*

THE following comes from America:—The Excelsior's latest eikonogen developer. No. 1, 20 ounces hot water (ice or distilled); 1 ounce sulphite of sodium (crystals); ½ ounce eikonogen. No. 2, 15 ounces of water (ice or distilled); 1 ounce carbonate of potass. For use, take two parts of No. 1 and one part of No. 2. Use the old developer repeatedly, adding, as is required, a little more of No. 1 and No. 2, two to one. If softer results are desired, use the developer more dilute.

TESTING LENSES AT KEW OBSERVATORY.—We have received a letter from Mr. G. M. Whipple, Superintendent, from which we learn that photographic lenses may now be tested at Kew on the easy terms of payment of 10*s.* 6*d.* in Class A, and 2*s.* 6*d.* in Class B. The former embraces the equivalent focus, the apertures of the stops, the field of view, number of surfaces, coincidence of visual and chemical focus, flare spot, general workmanship, definition, and astigmatism. All this and more is told for the small sum of half-a-guinea. For the half-a-crown fee will be given the focus of the lens, the coincidence of its foci, the angle of view, and the size of aperture with largest stop. The testing is to be made on the first and fifteenth of each month.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1615. Vol. XXXVIII.—APRIL 17, 1891.

POSTING PHOTOGRAPHS.

A few weeks ago we dealt with one side of this subject, promising shortly to return to it, a promise which we now proceed to fulfil; and this we do the more readily as, from remarks that have come to our knowledge, the latter part of the article referred to contained information which was novel to many who read it. This is by no means unexpected, though, it must be admitted, a little singular, for all the information possible about posting photographs or other articles can be found in the *Post Office Guide*, published quarterly at the price of sixpence; or the *Post Office Handbook*, price one penny, will be found to contain the principal regulations. But, as a matter of fact, the printed regulations of the Post Office, just as happens with the printed conditions on an insurance policy, are just the things that are not usually read. We have pointed out that, no matter how badly a parcel of photographs has been injured in transit through the post, no compensation will be made unless under such conditions as do not generally govern their posting. Cartes, cabinets, &c., when lost or injured will not be made good if simply posted as letters or book packets; but, if either registered or insured, compensation may be obtained under certain conditions. Contrary to the common belief, when a letter was registered, until quite recently there was no power to recoup the sender for either damage or loss; but fortunately this rule some little time ago was abrogated.

Turning now to the more usual mode of despatching the average packets of cartes or cabinets—Book Post—damage or loss will only be made good if the packets are registered, the well-known fee being twopence, whatever the weight. Now, as what the photographer desires to provide against is *damage* rather than loss of the parcel, he must understand it is not enough to pay the registration for and obtain the receipt, he must mark the packet "Fragile, with care," for there will be found in the regulations, and printed in italics, the following by no means generally known rule:—"*If it be desired to secure compensation for damage, the letter must bear the words 'Fragile, with care.' These words should appear on the face of the cover, above the address.*" When all these rules are observed, the Postmaster-General, when satisfied of the *bona fides* of a claim, will make it good to the extent of five pounds; if the packet is specially valuable, an extra fee of twopence further, called "insurance fee," will cover a parcel of photographs up to ten pounds in value, the fee being the same for letter or book post.

Let us now turn to the alternative, and, except as regards despatch, the better mode of sending the usual dozen of cabinets or cartes, we mean Parcel Post. This mode of posting, though it has been a great boon to all, has been less adopted by photographers than might have been anticipated. It is quite easy to believe that the difficulty of remembering the rates when the system was first launched, combined with the fact that light parcels were charged high, has interfered with the adoption of this method; but, now that a minimum of one pound can be charged for, its convenience for the particular purpose is quadrupled. We remind our readers that rate may be described as three halfpence per pound, with one extra booking fee of three halfpence added, whatever the weight.

Let us at once say that when parcels of photographs are sent by Parcel Post a receipt should be obtained from the booking clerk for every packet sent. We know that this is not usually done, but it ought to be. The obtaining such receipt entails no cost, and when many packets are sent out in the course of a year the best plan is to obtain (gratis) a packet of receipt forms from the Office, enter legibly the address of each parcel, and send the forms so filled up by the messenger who posts the packets, and he will bring them back stamped with the office receipt. At present parcels sent by "Parcel Post" cannot be "registered," though important changes in this direction are announced as probable; but they may be "insured," the rate being a penny up to five, and two pence up to ten pounds value. Compensation to the amount of one pound is given without any insurance at all, provided the sender has a receipt as above described to prove the posting of the parcel. Herein will be seen the importance of obtaining a receipt, which, we may add, the official will not proffer, but he is compelled to give if asked.

Finally we point out that, to protect the Office from ingenious fraud, of a kind, perhaps, morally certain, but not capable of legal proof, the Postmaster General offers this compensation, "voluntarily as an act of grace." He is not legally responsible for the safe delivery of registered letters and packets; similarly, with postal parcels, the compensation is stated to be, "not in consequence of any legal liability, but voluntarily and as an act of grace." It is to be noted also, that when valuable photographs, painted, &c., or of large number, of value above ten pounds, are sent by post, the amount of compensation will decrease the greater the value of the parcel. Thus, although it were insured to the maximum value, if a forty pound parcel of photographs were damaged or lost, the sender would get fifty shillings; for a twenty pound parcel five pounds; and a ten pound parcel, ten pounds. A similar rule holds good for uninsured or under-insured parcels. We learn, too, that, when parcels of negatives are sent by post, no allowance will be made for any or all being broken, whether insured or uninsured, unless the outside of the parcel bears visible marks

of ill-usage. The reasons for this rule may be readily guessed. We believe that we have now given an abstract of the chief information necessary to be acquainted with; further details will be found on pages one to twenty, *Post Office Guide*.

TRANSMISSION OF IMAGES, SEEING, AND PHOTOGRAPHING BY TELEGRAPH.

HAVING last week indicated the general principles of the problems in question, the main points now to be considered are the various organs which may replace those to which we have already referred, the relaying of the current, so that the relaid current shall be proportional to the initial current, also such various matters as the reduction of line wires, both in area and number, and other special contrivances. Constructive details we do not propose to discuss at much length, as these matters soon become practically solved when general principles are clearly apprehended and the inducement to construct becomes sufficient.

Instead of the selenium cell so constructed that the effect of light upon it merely diminishes its resistance, and allows a larger current to flow through it, it is possible to construct a selenium cell in which the light itself shall initiate a current; but other and better forms of Photo-electro motive cell have been described, and these we shall refer to after having dealt with those organs in which light influences the resistance.

As far back as 1852, Hittorf found that the metal-like form of selenium conducts electricity, while, about twenty years after, some experiments of Smith and May led to the observation that the resistance of selenium is less in light than in darkness, and that this is due to light, independently of accompanying heat rays. The various ordinary forms of selenium cell consist of two metallic conductors, with a fine connecting link of selenium between them, and the main object in designing a selenium cell is to make the connecting link of selenium so that it shall present extreme thinness to the impinging light, and as much surface as possible to the metallic conductors. Siemens' plan of making a selenium cell is to set out two thin platinum wires, in zigzag fashion, on a small piece of mica about half an inch square, so that both wires are parallel to each other, but do not touch, or the two wires may be coiled round the mica so as to form a double-threaded spiral. A little melted selenium is now spread over the wire so as to fill the interstices, and a second piece of mica is pressed down on the melted selenium. The whole is now maintained for some hours at a temperature of 210° Centigrade, and very slowly cooled, in order to convert the selenium into the metal-like variety. Such a selenium cell is very sensitive to light, and in some cases the resistance, when exposed to sunlight, is reduced to one-fifteenth of what it is in the dark, the temperature being the same in both cases. Iron, copper, or brass wire may be used instead of platinum in making the selenium cell, but they tend to deteriorate rapidly from the formation of metallic selenides. Platinum cells deteriorate with time, one source of mischief being the separation of the selenium from the platinum. If platinum wire is used, which is rather larger than required, and its diameter is reduced by a partial solution of the metal in rather weak *aqua regia*, the selenium adheres better to the rough surface thus obtained.

Other forms of selenium cell may be mentioned. Weinhold etches, by means of hydrofluoric acid, a double spiral line (two-threaded screw) on a piece of glass tube, the pitch of either screw being ·8 millimetres, so that ·4 millimetres represents the distance between corresponding parts of lines. In each screw thread is now wound a wire of ·3 millimetres in diameter, care of course being taken that these wires do not touch at any point, and the interspace between the wires is now filled with melted selenium, after which the cell is heated and slowly cooled as before. A selenium cell of a cylindrical form is very convenient when it has to be exposed to light in the focus of a parabolic reflector. Mercadier prepares a selenium cell by winding two long strips of metal into a flat spiral, the strips of metal being separated by a strip of parchment. One face of the spiral is now made flat, and coated with melted selenium. Liesegang makes a cell by silvering a piece of glass; after which by tracing with a needle, he separates the metallic coating into two parts, the line of bare glass being then filled in with selenium. The line of separation may be a closely ruled zigzag covering a considerable area if a cell of low resistance is required. Silver, however, is readily attacked by melted selenium, and possibly, in some cases, thickly platinised glass might advantageously be used rather than silvered glass. There are difficulties in forming a definite opinion as to whether selenium simply conducts as metals conduct, or whether there is some sort of chemical action involved, in which the metal terminals take part. The experiment of Fritts, in which a layer of selenium, spread on a metal basis and covered with a layer of gold leaf, gave a current between the gold leaf and the metal base when light shone through the gold leaf, does not elucidate the subject much, although Fritts looked upon his arrangement as showing a direct transformation of light into the electric current. Experiments by Bidwell, in which sulphur containing silver sulphide behaved like selenium, seem, however, to favour the chemical theory, and it may be mentioned that Mercadier and Chaperon have prepared sulphide of silver cells which are more sensitive to light than selenium cells; but, at the same time, they are disproportionately sensitive to the heat rays. That thin leaf metals—such as gold, silver, and platinum—acquire increased conductivity under the action of light is indicated by experiments of Bostwick and Bornstein, although it cannot be regarded as finally established; but the experiments of Arrhenius show pretty conclusively that a film of chloride or bromide of silver, obtained on glass by the evaporation of an ammoniacal solution of the haloid salt, conducts better when exposed to light than when in the dark, and that it loses its increased conductivity when the light ceases to act. Liesegang has found that many salts which are sensitive to light—notably the haloid and organic salts of copper, mercury, platinum, and gold—conduct better after exposure to light; but in most cases the change is permanent, the conductivity not becoming reduced to its old standard when the action of light ceases.

A very remarkable sensitiveness to light is possessed by lamp black, this having been investigated by Tainter, who filled the space between two parallel conductors (a zigzag line traced with a needle on a silvered glass surface), and thus obtained a cell so sensitive to light that, placed in a circuit with a telephone and battery, and exposed to an intermittent light, the telephone gave the sound corresponding to the variations of the light. Liesegang's view of this is that the light drives off some of the condensed gases of the carbon, and in the absence of these it conducts better, a view perhaps supported by the fact that platinum black may be used instead of lamp black.

We now pass on to photo-electro motive cells—that is, organs which yield a current upon exposure to light; and although we may say that in certain cases the current is even

ntly derived from a chemical action between the materials the cell and not from a direct conversion of light into electric rce, there may be—and probably are—cases in which the rect transformation of light into electricity takes place.

Early in the century an exposure to light was observed increase the activity of De Luc's dry pile, and M. Hausman, investigating this phenomenon, concluded it to be due to the tion of light, and not the result of radiant heat accompanying e light. In 1838 E. Becquerel published the first of several vestigations. He found that certain liquids which act upon ch other in the light become polarised when the junction tween them is exposed to light; for example, alcohol floating a solution of ferric-chloride or other readily decomposable etallic chloride, this action being mainly due to the blue end the spectrum. He also found that various metal plates, nen placed as pairs of the same metal in acidified water, gave current on the exposure of one of the plates to light, the posed plate generally becoming negative. When the plates ere polarised by being made the terminals of a voltaic battery, e oxidised plate became positive on exposing the pair to ght. Since the time of Becquerel's experiments very many vestigators have substantially repeated them, and often with- t knowledge of the original work; and Herr Liesegang, in s book, gives voluminous particulars as to the behaviour of rious metals in liquids and under the action of different parts the spectrum; but to make anything like an abstract of this rtion of the work would be impracticable in the space at our mmand. In order, however, to give an idea of the best rking photo-electric cells, we may describe Becquerel's ctro-photometer and some cells recently devised by Professor inchin. In a glass trough about two inches square two silver ates are suspended from insulated brass clamps, the liquid in e trough being two parts of sulphuric acid in one hundred of ater. The silver plates should be covered with a layer of loid salt, but a basic chloride or sub-chloride answers best. his coating of basic chloride may be obtained by dipping the ates in a solution of cuprous chloride, or by connecting them th the positive terminal in an electrolytic bath where weak drochloric acid is the electrolyte. The plates being now nnected with a galvanometer, and the apparatus kept in the rk, a feeble current generally circulates, owing to the un- ual chlorination of the two plates, but after some hours this ases; and on now exposing one plate to the light a deflection obtained, the light of a candle often giving 12° to 15° on the lvanometer. Although Becquerel did not very thoroughly udy out the electrical conditions—as, for example, the tential generated—he carefully investigated the action of e various parts of the spectrum, not only when the plates re chlorised, but also when bromised and iodised. In the se of silver sub-chloride the maximum was in the green, the tion of extreme red light or of ultra-violet being scarcely preciable in the case of chloride plates. In the case of ilised silver plates the maximum was in the indigo if the posure was commenced with the red end, and in the een if the exposure was commenced with the violet end, seeming proof of the continuating action of the rays of ver refrangibility. Minchin, in 1880, prepared a cell with ver plates coated with collodio-chloride, the liquid being a ak solution of sodium chloride; and he found that, approxi- tely, the current is proportional to the intensity of the ht; the red rays, however, have but little action. Minchin o investigated the currents produced when collodio-bromide s used on the plates in a bath of potassium bromide, collodio- iodide in a bath of potassium iodide, and collodio-sulphide in a solution of potassium sulphide.

The experiment of Fritts, mentioned above, gives an example of an electro-motor cell constructed with selenium, and several arrangements of similar character have been described, perhaps the most interesting from a tele-photographic point of view being the arrangement of Uljanin, in which the platinised sides of two pieces of platinised glass are cemented together with a layer of selenium, the thickness of the selenium being about a tenth of a millimetre. When one side of such a cell is exposed to sunlight so that the light shines through the semi-transparent platinum film on the selenium, the exposed platinum film becomes electrically negative, the maximum observed electromotive force being ·12 volt.

We have now sufficiently indicated the various organs which may be used in the transmitter, either to bring about a modification of current, or to initiate a current by exposure to light, and our concluding article will deal with the other matters bearing on the problem of tele-photography.

PURITY OF MATERIALS AND SENSITIVENESS IN EMULSION WORK (*continued*).

The course to be adopted, then, resolves itself into the destruction of the objectionable organic matter contained in the spirit without any more than possible reducing its strength. For this purpose we proceed on much the same lines as in clearing a "foggy" bath in the good old days; or, in other words, we convert the impurities into insoluble silver compounds, and so render them easy of removal by filtration or otherwise. The process as applied to the silver bath consisted in rendering it alkaline, and then boiling for a few minutes, or exposing it to daylight or strong sunshine until it became clear, either treatment causing first of all a dense blackening of the solution. In the case of alcohol we proceed on precisely similar lines, first adding a small quantity of silver nitrate, then rendering it alkaline, and finally boiling, or, preferably, sunning, the mixture. For very small quantities, as, for instance, in sensitising a few ounces of emulsion, the alkali may be omitted, a grain or two of silver nitrate being added to the quantity of alcohol necessary for sensitising; after boiling until the silver is dissolved, the spirit is allowed to cool, and then poured off the black deposit that is formed. This slightly weakens the spirit by driving off a portion of its alcohol, but not to an injurious degree, and it is very easy to allow for the minute quantity of silver remaining when sensitising.

For larger quantities, it is better to proceed differently. We will suppose that a quart of spirit is to be operated upon. We first test it by pouring a few drops into water in a clean glass, when, if an opalescence or milkiness forms, the sample is "finish," and should be at once rejected. If it remain clear, measure out two separate quantities of, say an ounce each, and in one dissolve twenty grains of silver nitrate, and in the other five grains of caustic potash, using heat if necessary. Both will most probably discolour more or less, and when cold are to be added, the silver first, to the bulk of spirit. It is well if the time can be spared to "sun" the spirit and allow it to clear before adding the potash, and to expose it a second time after the addition of the alkali; in this manner the silver has a better chance of attacking the impurities.

A variation of this plan, which has some advantages, consists in exposing the spirit to light for a time after adding

the silver, not necessarily long enough to perfectly clear it, and then to add half an ounce or an ounce of pure carbonate of potash reduced to fine powder, and previously dried for some hours in a hot oven. Shake up well at intervals until the carbonate begins to combine with the water present, when it will at once form carbonate of silver and render the mixture milky, and upon subsequent exposure to light the carbonate will be blackened and deposited, carrying down with it the impurities. Where time permits, the process of shaking and clearing may be repeated several times to ensure the total purification of the spirit, though once if properly performed will usually suffice.

After perfect classification the liquid is poured carefully off the sediment into a clean, dry bottle, and now contains saline matter that may be for many purposes classed as impurities. For instance, by the first method there will remain a slight excess of silver nitrate—the bulk having been thrown down as oxide and in combination with the impurities—nitrate of potash, and a slight alkalinity. The nitrate of potash is, for emulsion purposes, absolutely harmless, if not actually beneficial, and if the silver is objectionable, as it may be in a very delicately adjusted formula, it may be precipitated by cautiously adding a very weak alcoholic solution of a soluble bromide. And, finally, the alkali must be neutralised by means of an alcoholic solution of citric acid, a slight excess of which will be found an advantage in the emulsion.

If the carbonate of potash plan be followed, the supernatant liquid, after clearing, will cover a layer of blackened carbonate of silver and undissolved carbonate of potash, together with a stratum of dense, heavy, aqueous solution of the carbonate, varying in thickness according to the time that has elapsed during the process. The dissolved contents of the spirit will consist almost solely of potassium nitrate, formed by double decomposition, together with the small trace of potassium carbonate held in solution. The latter will require to be neutralised by means of citric acid as already described. In this case the silver nitrate added in the first instance will be wholly precipitated in the form of carbonate without any further provision for its removal.

As we commenced by saying alcohol submitted to this treatment cannot in a strict sense be said to be *pure*, except for the particular purpose for which it is intended, namely, for emulsion, of the soluble crystalline matter retained after treatment, the silver nitrate is the only one that can exercise any injurious action, and that only by upsetting an otherwise nicely balanced formula, though, as we have pointed out, it is scarcely needful or desirable to attempt to work so closely to theoretical lines as that. The nitrate of potash formed by double decomposition will be, at the worst, harmless, but more probably actually beneficial in assisting in the formation of a "clean" emulsion, a remark that may be extended to the presence of any slight excess of acid after neutralising the alkali employed in clearing. It is customary to intentionally add acid to the emulsion in sensitising, so that no harm can possibly accrue from this source.

The trouble involved in the method of purification we have described is practically none at all, for, though the description involves some little writing, the actual work resolves itself into patience and passiveness rather than any more active form. But the gain in quality of result obtainable with such purified or "doctored" alcohol is out of all comparison with the trouble entailed, as will be acknowledged upon the very first trial; and the way is opened for still further advances in the direction of sensitiveness.

Turning more particularly to the manner in which the purity of materials affects extreme sensitiveness in an emulsion, we need not confine our remarks to any particular ingredient nor to collodion as distinguished from gelatine emulsion. It has been already remarked that, the purer the chemicals employed, the longer will an emulsion keep free from fog during the process of ripening; and, as extreme sensitiveness is invariably dependent upon "prolonged emulsification," or some equivalent fog-inducing condition, no further argument need be put forward.

The precise change that occurs in the production of the foggy state, at least in emulsions, is not perfectly clear. In the case of the negative bath the most prolific cause, or alleged cause, was "organic matter," but obviously this can be no complete explanation, since the three absolutely necessary ingredients of collodion itself all consist of organic matter. If we look to emulsions, we have, again, to deal with the same materials, and also with gelatine, as the vehicles in which the sensitive salts are suspended, while organic matter in innumerable forms has been added to collodion emulsion for the purpose of increasing its sensitiveness or its power of giving density, and it is impossible to say into how many other forms gelatine itself may be split up in the process of "cooking." Organic matter, as such, can therefore be set down as necessarily a fog-inducer.

The truth appears to be that fog is produced by any form of organic matter that has a reducing action upon salts of silver whether soluble or insoluble, but in this connexion we are more particularly interested in those forms which act upon silver nitrate. To these may also be added any *in*organic substance which may cause reduction or oxidation. Tannin, for instance if added to an emulsion containing free silver nitrate in quantity sufficiently small to produce no visible discolouration, will nevertheless, render it foggy, unless there be free nitric acid present, in which case it remains clear. Tannic acid is said to form a tannate of silver when added to the nitrate, although gallic and pyrogallic acid, kindred substances, produce under similar circumstances metallic silver. Whatever the brown precipitate may be, it is soluble in nitric acid; hence, presumably, the fog-preventing power of the latter. In a similar manner, if a caustic alkali be added to an emulsion containing free silver, *but no other soluble salts*, immediate fog will be the inevitable result; but, if added to an emulsion after sensitising in the ordinary way—that is, while it still contains the decomposition salts formed during the process—fog will not supervene for some time, owing to the fact that the silver oxide formed is kept in solution by the soluble nitrates present. In either case, however, whether with an organic or inorganic substance having a tendency to reduce or change the silver salt, the decomposition sets in in course of time, despite the restraining influence that at first holds it in check.

The impurities with which we have to deal may, therefore, be considered in the same light of reducing or oxidising agents which, while present, require some restraining agent to prevent their injurious action. Hence the necessity for free acid in the bath or in an emulsion containing free silver. But, as the beneficial influence thus introduced is at best but temporary, it is palpably better to start with pure materials, on the principle that prevention is better than cure.

Pyroxyline itself, and ether and alcohol when they are pure, exhibit comparatively little organic reaction with soluble silver salts. Gelatine is different, and in its application to emulsion purposes it is never submitted to the action of free silver

trate in the same way as collodion. In the one case, in fact, ee silver and prolonged emulsification form a justifiable ethod of producing great sensitiveness; in the other, not. ut the pyroxyline must be of a suitable kind, and the solvents urified by the removal of the objectionable impurities. No mpler and more effective plan exists than that we have given allowing the silver to have unrestricted action until it has erted its full influence.

It is possible that if the pyroxyline, or, in other words, the llodion after manufacture, could be purified in the same anner as alcohol, it might be feasible to keep an emulsion r an indefinite period with an excess of silver present. This, owever, is a consummation that has yet to be attained, for the eriod during which such an emulsion may be kept is limited a few days, certainly does not extend to weeks. But with urified solvents the time is very greatly extended, with the rst result that a higher degree of sensitiveness can be reached. Vith gelatine, if an analogous process of purification were avail-ble, it is probable that even greater results might be achieved n the direction of practicable sensitiveness than have yet been ttained, for it is well known that almost fabulous rapidity has een obtained in an experimental way though useless for work-ng purposes.

There is another way, however, and a very important one at he present time, in which the extreme purity of materials may ffect the preparation of emulsions, especially those of collodion, amely, in connexion with orthochromatism. In the case of elatine the process of rendering colour sensitive is said to be etter performed during the manufacture of the emulsion than y any after treatment, the useless and injurious products eing then removed from the films, whereas, in the "bathing" ethods, it is necessary to leave a soluble silver compound in he film, with the result that decomposition rapidly ensues. If elatine could be deprived of its great affinity for silver, the eeping qualities of such plates would, no doubt, be greatly ncreased.

Collodion, whether sensitised in the bath or in the form of mulsion, has, according to the experiments of Vogel and thers, shown itself very much more susceptible to the nfluences of "colour sensitising" than gelatine, very possibly or the reason that it permits the use of free silver. Here, hen, is the chance of vastly increasing the sensitiveness of ollodion plates, which has formed the dream of many for ears past. A good deal has been done in that direction by Mr. Wellington and others, to the extent, indeed, of reaching a legree of sensitiveness not far short of gelatine under some cir-umstances. Possibly, with a closer attention to purity, still reater results may be achieved, and collodion once more re-tored to use for ordinary negative work.

The weak point of collodion is its comparative insensitiveness n a poor light, and it is just then where orthochromatisation would improve it, if an emulsion or film can be prepared that will keep for a reasonable period. At present, in this respect t least, collodion seems to be in a worse condition than elatine, for, though a greater effect of colour sensitiveness is roducible, it is only by means which render it evanescent.

For instance, an emulsion can be made which is, pro-portionately, very many times more sensitive to yellow than in he case of gelatine; but, owing to the free silver and other natters it contains, its career of utility is confined to a few ours. If it be "washed" to remove the soluble and injurious contents, it practically loses its orthochromatic properties, and similar remark applies to the dried films prepared from it. With an increase of attention in the matter of purity it is possible that the keeping qualities of an orthochromatic emulsion might be very considerably extended, and the ortho-chromatic property transmitted to the dried films as well.

In reference to an article which appeared a few weeks back, a correspondent complains that, in mentioning the fact that many bromide pictures had turned yellow in the light, we did not state that the same frequently happened with platinotypes, which are generally characterised as being absolutely permanent. He adds that this is scarcely fair to bromide. We were then dealing with silver prints only. It is a tolerably well-recognised fact, known to most of our readers, that unless the whole of the iron is removed from a platinotype it will eventually, if exposed, become more or less yellow in the lights in the same way that the whites of a bromide picture become yellow if the silver salts are not eliminated.

In all photographic processes certain conditions have to be fulfilled, and unless they are the pictures will suffer. For example, in the carbon process—undoubtedly a "permanent one"—if the bichromates were not removed the picture would have a yellow tinge, so it would eventually unless the paper itself was unchangeable by light. Again, if fugitive pigments were used, the picture would suffer if submitted to a strong light. The same, of course, applies to Woodburytype, and, indeed, to all the photomechanical processes. An instance of this may be found in some photomechanical prints in colour, recently issued. A few days' exposure at some of the book-stalls at railway stations has wrought a marked change on the colours.

Professional photographers and those who supply them with material are complaining loudly of the badness of trade that has existed during the last few months. The abnormally long winter, followed by an absence of genial spring weather, has proved a serious matter to many. The complaints are by no means confined to the metropolis, as they extend to almost all parts of the kingdom. It may be some consolation to our London friends to know that they are not the only ones who are suffering from the stagnation of trade.

Some appear to think that the present state of depression in the photographic business is somewhat due to the spread of amateur photography. This may be the case to some extent, it is true; but the greater portion of it, no doubt, is caused by the continuance of bad weather. There can be no question that certain *pseudo*-amateurs, who supply their friends with pictures at a small charge, do inflict injury in more ways than one upon the profession. But their influence is, we imagine, confined more particularly to the lower and middle-class businesses.

The census of 1891 is now taken, though it will be many months before the returns are issued. It will then be interesting to see the number now engaged in photography and its many ramifications as compared with 1881. It will be remembered that at that time—the last census—gelatine plates were just coming into general use, which have caused a large influx into the ranks of photography; also that several processes which were then only budding—some, indeed, only in embryo—have now developed into important industries which directly or indirectly give employment to thousands of hands throughout the kingdom. Notably is this the case with the various phases of mechanical photography. It is needless to mention that the return must necessarily be incomplete, inasmuch as many trades are involved which will not be included under the head of photography, such as printing-press makers, paper makers, and enamellers, the manufacturers of copper and zinc plates, cardboard manufacturers, *et hoc genus omne*.

In an article in the Swedish *Year Book*, quoted in our "Foreign Notes and News" last week, it is stated that sufficient silver finds its way into the fixing bath from a dry plate to make eight prints

therefrom. A natural inference from this is that either the Swedish plates contain a larger proportion of silver than do English plates, or that Swedish paper is not so highly sensitised as English. Possibly, however, the silver used for the prints is calculated at the amount actually existing in the finished picture, no note being taken as to the quantity necessary to sensitise the paper. Be that as it may, the figures, if they be correct, show that the Swedish plates must be much richer in silver than are the general run of commercial plates in this country.

WHAT was announced as one of Lippmann's photographs in colours is to be on view for a week at the rooms of the Photographic Society of Great Britain, and all who can do so should call and see it. To our eyes, so far from being a photograph in colours, it is not even a photograph of the spectrum, two colours only being suggested. It would be going too far to say two colours are reproduced.

OPINIONS appear to vary very much as to the desirability of two projects that are now being mooted. First, the proposed Photographic Institute. This would without question be a great advantage to the rising generation of photographic workers in every department, whether artistic or mechanical. Some, however, whose business depends upon technicalities and "trade secrets" not unnaturally view the subject from quite a different standpoint. Second, the suggested federation of the societies. Some members of the older societies, while for the most part composed of experienced workers, both amateur and professional, have remarked to us, What shall we gain by federation? Shall we get a *quid pro quo?* The societies, one gentleman observed to us, most in favour of the federation scheme are new ones, whose members are chiefly novices—or, in his own language, "babes and sucklings," and are anxious for the experience of the older societies without becoming members thereof. Without in any way subscribing to this idea, it must be recognised that there is and ever will be different opinions on the same subject.

THE subject of the high fees for English patents as compared with those of America was again introduced in the House last week by two Members, who suggested the desirability of foregoing the fifth and sixth years' fees. This would be a great boon to many poor inventors who in the first four years have not been able to turn their inventions to a profitable account. Particularly is this the case with some photographic patents. Four pounds is low enough for four years, it must be admitted, but for the fifth year ten pounds additional have to be paid, and for the sixth another ten pounds. The total fees on an American patent for the full term of seventeen years is but seven pounds, while those on an English one for fourteen years is no less than one hundred and fifty-four pounds. There is, however, but little prospect of alteration at present.

IT is gratifying to learn that a very representative committee is now at work considering the subject of the designs on our coins. When the Jubilee coins were first issued great complaints were made of their generally inartistic character, especially with regard to the portrait of the Queen. Every one was struck with the marked dissimilarity of the likeness on the coins with the published photographs of Her Majesty. There is no reason why the dies should not be made photographically, without any hand work at all. The method is simple enough. A gelatine relief is made, and from this an electrotype is obtained. From this electrotype steel dies may be produced by pressure while the metal is in a heated condition. Possibly, however, a strictly correct likeness is not the principal consideration.

THE CRYSTAL PALACE EXHIBITION.

IT is, or to put it more accurately, will be, a highly successful exhibition.

When we visited the palace on Tuesday, only a portion of the pictorial exhibits had arrived, a large accession being expected on Friday from the show in Liverpool. In apparatus there is a falling off from the display in former years, although what is shown is of a high class.

Messrs. Watson & Son have a fine exhibit of their manufactures, one of the leading features in which is a display of their "Acme" cameras from 18×16 down to the smallest size. Since last we specially noticed this masterpiece of camera-making ingenuity, we find that, in some instances at any rate, an improvement in weight has been effected by the substitution of aluminium for brass in the various portions which demand metallic fittings. In other respects, so far as we could discover, the original improved model has been adhered to.

Films, plates, film negatives, and transparencies of excellent quality are exhibited by J. Desiré England.

Among the exhibits of S. T. Matthews & Co., Birmingham, are cameras of a very portable type. One of them, formed of japanned tin and of a very light nature is entitled the "I take it." It is of a low price, but seems to act with a wonderful degree of efficiency.

W. F. Slater, Southampton-street, Camberwell, exhibits cameras, lenses, and mouldings for frames in considerable variety.

As in previous years, D. Noakes & Son show a large collection of lanterns and appliances. They have mechanics at work engaged in turning and fitting lens mounts, of which a variety both finished and partly finished are shown.

Of the exhibits of Houghton & Son, Taylor, Taylor, & Hobson, and others, we shall speak again after their exhibits have been laid out, for at the time of our visit several things were only in course of being displayed.

We are unable to say much at present relating to the display of photographs, mainly for two important reasons—a large collection of pictures which are in course of being received from the Liverpool Exhibition will not be in their places before Friday (to-day), and the catalogue of the Exhibition is not yet published. But meantime we may say that there are already many fine pictures hung.

Several societies are competing, among them being Birmingham, Cardiff, Derby, South London and West London. Hackney and Bath, which were expected, have not yet put in an appearance. While some of the pictures from Derby are most admirable, and embrace choice examples by T. Scotton, W. Winter, and others, yet taken in their collective capacity, we doubt whether they are quite equal to the Birmingham Society's exhibits, which, thanks to Karleese Leeson, Jaques, Harrison, and others, will take "a lot of beating."

Downer (Watford), A. R. Dresser, L. Meldon, West & Sons, Smedley, Harry Selby, Alex. Ayton, jun., J. Pettingall, C. Heginbotham, C. Shadbolt, Douglas Pym, John Collier, and several other good names are represented in the general exhibit. Nor are ladies awanting for we see some works by Miss Smith and Miss Rosa Henderson.

The transparencies are in great force, there being upwards of 1200 slides in competition. Many of these are admirable.

Lantern displays take place each evening, Mr. Wollaston and Mr Noakes alternating. The lantern used by the former was built by Watson & Sons expressly for this course of entertainment, with the optical parts by Taylor, Taylor, & Hobson. It is a noble instrument. The condenser is four inches, the focus of the objective being twelve and an eighth inches. We have not yet witnessed any of the displays, but they are said to be of superior excellence.

We shall give a more critical notice next week.

COMBINING PHOTOGRAPHS.

IT frequently happens that a worker has placed before him a series of photographs which it is desired should be combined into one picture, a very common example of this sort of work being a collection of photographs, such as family portraits running back for several generations, which it is desired should be collected together, so as to form one group. There is an old and true saying that everything is easy when you know the way, and this is true in regard to what I am about to describe.

In the suggestions which I am about to offer I do not wish my readers to understand that I lay down a hard-and-fast rule as to what is the only way such work ought to be conducted, for doubtless in this, like many other branches of practical photography, there are more ways than one of going about such an operation; but the method of working which I am about to describe has been practised by myself and has yielded results so satisfactory that, at least, it is worth the consideration of those to whose lot such an undertaking falls.

Let us suppose a typical case in which a photographer receives from his client some family portraits, embracing, say, five generations. Here we have great-great-grandmother, great-grandmother, grandmother, mother, and say a couple of children, in all six separate photographs of varying styles as to size, lighting, tone of backgrounds, in fact, all different in every way, and in very many instances some c

e earliest will most likely be off colour and somewhat faded, and idedly the worse for wear and tear through time.

Now, the first question that has to be considered is that of size, and a rule this is easily settled so far as the size of the resulting otograph is concerned; but there are other considerations that uire to be taken into account. A very little thought will suffice show to a careful student that a more pleasing and natural result btained when the figures of very young children are not copied on h large scales as those of adults. Bearing this in mind, the worker y proceed at once to do all in his power to remedy glaring defects the originals so far as the same are really permissible; this may an the strengthening of eyebrows, or other weak and faded portns which on being renewed tend to lend force and vigour to the otograph. This may be gone about without in any way damaging e original, which as a rule are highly prized copies of antiquity. rhaps one of the best and simplest methods of working up an old l faded photograph is by strengthening the shaded and dark portns by means of a slight wash of India ink, very fine touches can be plied with an exceedingly small sable pencil, and, after such pictures ve been copied and a satisfactory negative has been obtained, such rking up is easily removed with a damp cambric handkerchief or nge.

In copying the various pictures a worker should endeavour to pull negatives full of details, and which will yield nice, soft, harmonious nts. These negatives should eventually be retouched and modelled so as to yield the very best prints possible, and in copying the ginal prints the utmost regard should be paid to avoid showing any nularity from the grain of the paper; this I believe is best done by arranging matters as to have the prints copied through glass. By s I mean they should be placed flat up against a sheet of glass and ied through it by means of artificial light thrown on the picture from th sides of the camera; by this means the grain of the paper will not observable, as is nearly always the case when the light comes from e direction or one side of the picture only.

A little judicious care and thought exercised at this stage will go towards the complete success in the after operations.

Having obtained negatives from each of the pictures, suitably tched as to size and free from granularity, the next step is to ceed and pull off prints from same. These must be of as nearly as ssible the same density when toned and fixed, the reason for this is vious when it comes to be considered that each of these individual tures have to be combined and photographed with one exposure into e negative. With pictures of varying densities this becomes almost possible; therefore, let every care be exercised that all the prints be nearly as possible of the same printing value when the resulting gative comes to be made. Should it be the case that, owing to some lent contrasts in the different pictures, some one or two of them ld more vigorous prints than it is possible to obtain with the others, n let the worker proceed and tone down those that are too decided til they correspond in tone and value with the rest. When such nts are obtained the final negative will be more easily obtained, and ll print right away without any bother or dodging; this is a very portant factor in the work we are considering, and should be closely ended to.

When making these prints from the individual negatives the worker d pay no attention whatever to the nature of the various backunds the pictures possess, for in the method which I am about to scribe the difference of tone or colour or nature of the backgrounds es not matter in the least; the sole aim must be to obtain the best ssible copies of the face, and such portions of the figure only as it is ended to embrace in the resulting picture, and when the negatives e being modelled some attention should be given to the draperies as ll as the faces, for it is wonderful what an amount of improvement y be made by judiciously working up such portions as lace, and ite collars, &c. As a rule, this is easily done with a pencil, or ght wash of Chinese white, but any intelligent retoucher will know ite well how to set about improving a flat piece of drapery.

In my next I hope to refer to the subject and describe the method making the resulting background and combining the various portits into one group on same.

T. N. Armstrong.

NEGATIVE MAKING.*

a developer is taken containing a quarter of a grain of pyro, one-teenth of a grain of bromide, and a quarter of a minim of ammonia to h ounce—in other words, a "normal" developer diluted with eight es its bulk of water until all the required details in the shadows were t—the result would be totally different. The negative at this stage would be very thin, but the detail and gradation in both high lights and shadows would be very strong; in fact, the lightest parts of the shadow detail would be almost as dense as the darkest tones in the lightest work. I am not speaking of the intermediate or half tones, as in a subject of this kind they can generally be left to take care of themselves. If, now, a "normal" developer be applied to the plate it will easily attain printing density *without losing in gradation*, the shadow detail gaining proportionately with the remainder of the plate, and a result obtained that would be quite impossible with any other treatment.

Many instances will occur in an amateur's work in which such treatment may be of the greatest value in obtaining special effects that ordinary development would fail to render. In giving the amounts per ounce I have only quoted an example to illustrate a principle; it is impossible to lay down any hard-and-fast rule, in some cases a larger quantity of each can be used with advantage, and, frequently more ammonia proportionately to the others will be advisable; if the principle and reason of applying a weak developer first, followed by a stronger, is understood, it is not difficult to apply it in practice.

No better answer could be given to those who contend that there is no control over the "values" or tones of our picture by skilful development than to take two or more identical exposures of a suitable subject and by developing each differently, but approximately to the same density, exhibit the widely different results attainable.

Some workers have advocated developing all negatives in this manner, but this would be almost as bad as adopting any other standard method irrespective of subject or result wished for; many negatives would be ruined by this treatment, especially those of very evenly lighted views.

In making studies of clouds, or taking negatives of skies for adding to landscapes, since brilliancy and sparkle in the highest lights is most essential, and there is no difficulty in securing all the work required in the darker masses, it will be found best to use the full amount of pyro and bromide, two grains each per ounce, and develop slowly, commencing with about one minim per ounce of ammonia, and adding more until sufficient density is obtained.

So far, in speaking of development, I have assumed that the plates under treatment have received a fairly correct exposure. Unfortunately, I have no golden remedy for either under or over-exposure, the most that I can do is to indicate what I consider the best means of obtaining most from them. The method given of obtaining softness when photographing scenes possessing excessive contrasts will commend itself as the best treatment for under-exposed plates, as the principal fault in such is hardness and want of shadow detail. In a few instances, where there is very little contrast in the view and no strong shadows, it is better to add the maximum amount of ammonia that the plate will allow, but generally the former treatment is far the better. When the exposure is doubtful, a good plan is to commence developing with a small amount of ammonia, one minim to each ounce only; if it has been too long, it will frequently be possible to develop all the required detail without further addition, and then, if the density be insufficient, more ammonia and more bromide may be added. Unless the plate be excessively over-exposed, this treatment will generally save it.

An old maxim is, "A good beginning makes a good ending," and this may be applied to development by enforcing the importance of *commencing* development to suit the *aim* of the exposure. Careful notes should be made of each exposure, and the plates marked if taken from the slides, so that there is never any risk of finding, when the image is appearing, that the wrong plate has been taken, and that the treatment it is receiving is most unsuitable.

One of the greatest obstacles to success in photography is the plan of working favoured by some amateurs of buying a ready-made developer, of which the proportions, and in many instances even the ingredients, are unknown; still worse, however, is the plan adopted by some who call themselves photographers to expose a plate correctly or incorrectly (most frequently the latter), send it away to be developed, call the result their own, and then talk about the artistic possibilities of photography, claiming that they do the artistic portion of the work, the composition of the picture, and leave the mechanical to others. If an artistic success is to be achieved, it is absolutely necessary that the development be suitable to the subject, the exposure, and *the result wished for*.

Treatment of the Plate before Exposure or after Development.

Plate Backing.—Very few photographers realise the extent to which the brilliancy of their negatives is impaired by halation. This evil is modified by the use of thickly coated plates, but only to a moderate extent. As the thinly coated form the great majority of the plates used, it is very important to prevent halation and loss of brilliancy from spoiling otherwise successful negatives. In subjects in which there are

* Continued from page 186.

no violent contrasts, halation is not very noticeable, though generally present to a greater or less extent, but where branches of trees cross the sky, and especially in photographing under trees when the exposure is long and the sky is seen here and there, halation frequently thoroughly spoils the result. If masses of light tints occur, such as light draperies, white flowers, clouds, &c., the general flattening of the effect, and merging of one tone into another, and loss of sparkle, are very pronounced, in addition to the usual halation if such light objects end with a sharp outline against a dark mass. In interior work it is frequently necessary to include windows in the view taken, and these always give violent halation, even with thickly coated plates.

A *perfect* remedy for all ordinary work, and for most interiors, is backing the plates. Many object to this as being messy and troublesome, but a dozen plates can be easily backed as quickly as *one* could be developed and fixed, and it seems very inconsistent in those who aim at good results, and who cheerfully work hard to obtain them, to object to such a trifling amount of extra trouble when the gain resulting is so great. An experiment that I should strongly advise every one to make is to take duplicate negatives of any object or view of moderate contrast, one plate being backed, the other not. They should be carefully examined from the *back* before fixing, and compared in the ordinary way after fixing and washing, and prints taken from each. The difference is very striking, the gain in brilliancy and sparkle and quality generally far greater than any one would imagine possible who has not made the experiment.

A simple and effective backing is burnt sienna (water colour, procurable at any oil and colour shop), mixed with equal quantities of gum and glycerine to a stiff paste, and thinned with methylated spirit to the consistency of cream, and applied with a camel-hair brush. It dries quickly, and is easily removed with a wet sponge before developing.

Intensification.—It will sometimes happen, either from errors of exposure or development, or even in cases where both have been the best under the circumstances, that the printing qualities of a negative may be considerably improved by intensifying. Silver intensification is so much more satisfactory than mercurial that no one who has once used silver would ever intensify with mercury again. A negative intensified with silver should be as free from stain, have exactly the same character, and be equally as permanent as one developed and fixed in the ordinary manner. The most simple and effective method of silver intensification is that published by Mr. J. B. B. Wellington in The British Journal Photographic Almanac for 1889, page 575, one of its advantages being that if the negative has not been thoroughly freed from hypo it does not in any way prevent its working properly; in fact, a negative may be intensified soon after fixing with but very little washing. A ten per cent. solution of nitrate of silver is made, and to this sulphocyanide of ammonium is added, until the precipitate first formed is just re-dissolved. The solution is now diluted with water to five times its original bulk, when a precipitate forms again, which is dissolved by the addition of hyposulphite of soda. Sufficient of this solution is taken to cover the plate, and to each ounce three grains pyro, two grains bromide, and six to eight minims ammonia are added, intensification being now exactly the same as ordinary development.

In judging when sufficient density has been obtained, allowance must be made for the fact that the negative is decidedly stronger after drying than it appears when wet. After intensifying it should be placed for a few minutes in hypo, and washed as usual.

Reduction of Density is generally very unsatisfactory, and consequently should rarely be resorted to. Mr. Howard Farmer's method of adding ferricyanide of potassium to a solution of hypo reduces very effectually, but it acts far more on the weaker parts of a negative than on the denser, in some instances entirely removing weak shadow detail; and while the general density is less, the hardness which it is the object of the reduction to improve is frequently strongly accentuated.

In Preparing for Printing, amateurs are frequently advised to paint out with some opaque colour a sky which is not sufficiently dense to appear white in the print when clouds are to be added. This should *never* be attempted; any masses of foliage or any distant object will generally appear very softly defined against the sky, and if this is painted out the softness of definition is replaced by a harsh outline that has a very crude, hard effect. In many cases a slight tone on the sky is no disadvantage in adding clouds, but when a pure white is wanted, so that the cloud effect may be brilliant, the best plan is to cut a shield of brown paper or any opaque material roughly to the shape of the sky line, and fasten it with drawing pins to the printing frame about an inch from the negative similar to a vignetting mask, and, if a similar shield is fixed over the landscape portion during printing in the sky, one will soften into the other perfectly.

This method of shielding will be found very useful when printing negatives that are too hard to give satisfactory prints, any weak p being covered while the lighter gain sufficient force, the result bei generally far preferable to chemical reduction.

I have now taken every stage in the production of a negative from t choice of plate to preparing for printing. I trust that those who ha followed me through the various processes will have gained some item information.

The negative is only a means to an end—the production of a pictur but, as all final success must depend entirely on the quality of t negative, no trouble should be considered too great, no work spared order to make that negative as perfect as possible. All our artistic a manipulative skill should be concentrated, so that when the print finished it may well express our sentiments and approach our ideal of picture.

H. W. Bennett.

FOCUSSING AND DEFINITION.

A review of some of the later photographic journals shows us that singular "fad," if we may use the term, has been agitating phot graphic circles. The turgid and apparently deeply scientific expre sion for this silly fad is "naturalistic definition," or "naturalist focussing."

The meaning of the expression is that all parts of the photograph picture ought not to be equal in sharpness of definition. The adv cates of this ridiculous idea cover their want of sound photograph knowledge by wordy jargon about "art," quoting the examples numerous celebrated painters, who shunned any "biting sharpness in their works; and they speak of certain portions of the photograph picture that, in deference to the examples left by these masters, shou not be so well defined as other ones.

Mark the words used. Well defined, they say. Now, could a mo ambiguous term have been found? Any one with photographic ide in his head immediately thinks of the optical definition of the pictu when he meets this expression; but, in paintings and other sorts pictures made by hand, *well defined* means, in the majority of cas a clever artistic effect of light and shade, by which contiguous portio of the picture are made to relieve themselves and become easi visible.

From the earliest days of photography, artists, as a general ru have justly condemned the over-sharp photograph as inartistic. W can call to mind any number of examples supporting this assertio It is particularly true in portraiture. We have often seen portrai where the hairs in the beard and moustache were so biting sharp th we felt inclined to ask the sitter if they did "prick and sting him In landscapes the defect is not so often observable, but we sometim have what is even worse—glaring contrasts of solarised whites a inky blacks, giving hard-cut edges to the masses of light and shad and producing extreme crudity of effect. This, a purely chemic defect in the picture, is unthinkingly ranked in the same catego with that peculiar optical superfineness of definition which at times made unpleasantly prominent by an improper lighting of the subje or choice of processes by which the print is printed from the negati Many of the modern mechanical printing methods have so strong tendency in this direction that they will give only crude, harsh resu from negatives capable of yielding first-class silver prints.

This complaint about the over-sharpness or over-nice focussing photographs is no new thing. Some of our readers may be famil with the expedients resorted to to get rid of excessive optical defi tion, such as lenses producing "diffusion of focus" when the cell at o end of the tube is unscrewed a little; or the interposition of some th translucent material between the negative and the sensitive pap while printing. When we see that such newspapers and art journ as occupy themselves with the discussion of matters photograp (outside of our own trade journals) all seem to concur in preferri photographs which are decidedly unsharp, we can understand how t members of our craft have employed the means or dodges just referr to in the hope of catering to the taste of that portion of the public which the newspaper might be considered the voice.

We are glad to note the fact that of late years artistic effect in t photograph is more and more becoming the object sought for, techni excellence being quite a secondary matter. Amateur photographe of the present time particularly, do not study as laboriously as th of former days, and it is therefore of great importance that what th do learn should take its start on a good foundation, and not have be painfully unlearned after much failure and discouragement. N class such ideas as the so-called naturalistic focussing, therefore, amo the trash which is better let alone. We only mention it to put readers on their guard against it, and give a few reasons in support our assertions, which may prove of interest to those who have considered the matter.

The advocates of this improper and unphotographic manner of focussing attempt to support their ideas by reverting to the fact that the human eye sees only one object distinctly at a time, all others being out of focus. This is quite true, but they only tell us half the story. If we could cut a hole into the head of a man with good normal vision, and examine the image on the retina of the eye, we should find it greatly resembling that given by a large-aperture photographic lens, in having but a small portion of the field sharply defined optically. But the eyeball is constantly in motion, and very rapid motion, too—instantaneous, indeed—so that the limited circle of sharp optical definition is quickly brought to bear upon each successive portion of the object regarded, and thus the brain takes cognisance of the object as *perfectly defined in all its parts*, and not with this or that part left fuzzy and indistinct.

Any one who will just quietly think of the matter in this light will soon see how incredibly foolish any attempt to imitate the imperfect optical definition on the retina of the eye by photographic instruments must be. His own good sense will show him the superiority of a properly focussed photograph over one that leaves a portion of the picture meaningless and without outline. ELLERSLIE WALLACE.

LIKES AND DISLIKES.

MANY writers on photography seems to take it for granted that the professional has only to use the formula they recommend (probably a good one) and sitters will be delighted over the fine work it produces. A more mistaken idea never entered the mind of man. Making a good picture is one thing and suiting the customer quite another—making the picture a mole-hill, suiting the customer a mountain. They expect it to be well executed, but they value it by the expression, or "how it looks." The perfect execution may show a frown; the poor one is not perfect enough to show it; they "like it" because it is vague.

Let twenty sitters present themselves in a day, and let the photographers make three sittings of each; as the proofs are sent, let him in each instance designate the better one; and not ten of the twenty will order from the one marked; they "like the looks" of the poorer one, and prefer it to the better one.

During the wet-plate days it was very discouraging to be compelled to throw the best negatives in the acid tank to be destroyed, while the poorer one went to the printer. It was done in thousands of instances. "Well," says the reader, "you should have explained, and urged them to take the better one." It was done almost hourly. The operator does not always have the time or inclination to preach a sermon to convince ignorance that his judgment had better be taken, and if you

> "Convince a man against his will
> He's of the same opinion still."

A lady from Virginia could not tolerate the one recommended, but insisted on having the inferior negative finished. I was so sure that she was wrong that I had the better one retouched, and one print from it placed in the package when mailed. She saw her mistake when she received them, and wrote me, acknowledging her error, saying her friends *all wanted the one*, and coolly asked if I would not make the entire dozen from that *if she returned the others*. A satisfaction, but rather expensive on my part.

Photography in those days was a difficult profession to follow. It was difficult to get *pure* chemicals and mix them right, and after they worked to your entire satisfaction it was more difficult to suit the whims of sitters—the one made your head ache, and the other made your head and back both ache.

These facts tend to make a man indifferent as to the quality of his negative. He says, "What is the use of my splitting hairs if they won't take the picture after I have done so?" If his negative is only fairly good, he contents himself by saying, "I will let it pass; perhaps they will like it better than a more perfect one even if I take the trouble to make it." So he lets it go at that. An indifferent piece of work was sometimes the means of bringing whole families and their friends, because it was so well "liked." While they were eulogising the picture "I couldn't see it," yet it brought in good dollars, and I humbly submitted without a murmur. More patronage from that than from a dozen pieces of work of which I was proud. We sometimes made a *hit* when we *missed* it.

These facts are not given as an inducement for making inferior work, but are mentioned as one of the trials a practical man must contend with. A man may resolve that he will not allow an inferior picture to leave his gallery. That is a good resolution; but there are occasions when he will be obliged to weaken a little on his resolve, as when the sitter, in answer to your recommendation, says, "Who is to pay for this picture?" or "Why did you make several sittings if I am not allowed to make my own selection?" Under such circumstances it will not do to be stubborn and insist on your opinion. If you do, you will soon lose your customer. Another man can and will make work that will gratify and satisfy the patron. Concede your opinion rather than lose a customer.

In the mad rush for money some men have no principles to live up to or good resolutions to break; they do not stop to ask whether an action is right, they are only interested to know whether there is "money in it." Right or wrong, they are after the money. They are like the two *cullord pussons* who were robbing a hen-roost. One asked the other, "Say, Sam, is it right to steal this man's chickens?" "You, John Johnson, we got no time to discuss great moral questions now. *Just hand down another pullet!*"

There seems to be but one way to suit *all* in the monument matter. The one at the Smithsonian bears the name of *Daguerre*, and cannot be altered. Now, when the fraternity feel rich, let them erect one to *Talbot* and another to *Niepce*, as they are all entitled to honour. Then we shall have "three of a kind," and devotees can bow at either shrine. "They pay their money and take their choice."

Another county heard from. A writer in a contemporary admits that I have written *one* good article, and has just discovered that I favour fine work and good prices for the same. Well, I suppose there will be *eleventh-hour converts* as long as time shall last. If our friend from his high perch will scan not very ancient history, he will see that in my address at Cleveland, 1870, and at St. Louis, 1872, and on other occasions, I advocated the same doctrine, and have *never stopped doing so*. I am ready to "shake" as he proposes, and hope he may spend as much time and money in his efforts to advance the interests of photography as the record of the past shows to the credit of ABRAHAM BOGARDUS.

—*St. Louis and Canadian Photographer.*

PROPOSED AFFILIATION OF PHOTOGRAPHIC SOCIETIES.

REPORT OF COMMITTEE, CONSISTING OF SIR H. T. WOOD, L. WARNERKE, AND G. L. ADDENBROOKE, ON APRIL 13, 1891.

THE Committee appointed by the Council to consider this question have met and discussed it. Two of the members, Mr. Addenbrooke and Mr. Warnerke, attended the meeting called by Mr. Biden on the 23rd of March.

At this meeting a Committee was appointed to consider the matter and afterwards to confer with the Committee appointed by the Photographic Society of Great Britain, the general wish being that the initiative should proceed from the Photographic Society of Great Britain.

Having regard to the fact that the Camera Club for some time promoted an affiliation scheme, which has not proved very successful, the Committee do not feel very sanguine of the success of any such movement. They think, however, that it would be desirable if the majority of local photographic societies could be affiliated to the parent Society, and they think that, if too much is not expected of the movement, such a scheme ought to be useful and practicable. A model for it might be found in the British Association list of corresponding societies, a Conference of Delegates from which is held annually at the time of the Association's meeting. To carry the proposal into effect the Committee would propose a scheme based on the following considerations:—1. That any photographic society in the United Kingdom be eligible for affiliation. 2. That the admittance to affiliation be by the Council of the Photographic Society of Great Britain. 3. That each affiliated society pay a small subscription, say, 20*s*. per annum. 4. That a conference of delegates from each society should be held at a convenient time, of which conference the Council of the Photographic Society of Great Britain, or a certain proportion of them, should be members. The object of the conference would be to assist in promoting uniformity of work among the various societies, devising means for their mutual co-operation and intercommunion, &c. 5. That there should be a standing Committee, of which the Assistant Secretary of the Photographic Society of Great Britain should be Secretary, he being paid a small addition to his salary for any additional work involved; that the duty of this Committee should be to facilitate communications between the societies by the interchange of papers, lectures, slides, photographs, &c. 6. Each affiliated society might have, say, two transferable tickets admitting to all meetings of the Photographic Society of Great Britain, and, perhaps, to the Exhibition. Possibly a reduction of the charge for wall space at the Exhibition might be made to members of the affiliated societies. One copy of the Society's *Journal* should be sent to each affiliated society, and also notices of their meetings.

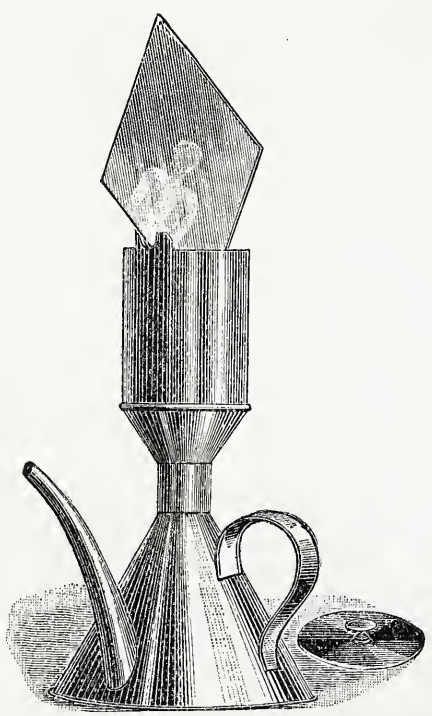
Our Editorial Table.

WE have the March and April copies of the *Figaro Illustré* (Boussod, Valadon, & Co.). It may not appear much to say that they are well up to the high standard of this firm's works; those, however, who know the class of work done will easily recognise that this is in itself a marked success. In both these copies the advantage of the full-page illustration on outside cover is again appreciable. The March number is naturally inspired by the carnival time, while the April one breathes the welcome scent of sweet violets. The phototypes of a troupe of "Dahoméens" now in the Jardin d'Acclimatation in Paris represent these strange people as faithfully as the

ordinary photographic print, the technical details in these pictures being everything that could be desired. The coloured pictures in the earlier number are indeed excellent. The one representing the gay proceedings to be witnessed at "Le Moulin Rouge" are so real and full of "go" that to look at it is the next best thing to going over to Paris and indulging in the "real unadulterated." The second plate is full of colour and force, although rendered in that sketchy style so thoroughly French. The phototypes in April are not less effective. They represent episodes in the coronation of the Emperor and Empress of Russia in 1883. There is also an excellent portrait of the late Prince Napoleon which deserves mention. There are two excellent coloured plates, as usual, but the one which will recommend itself most to our taste is that of *A Shower*. In this we have two ladies standing under a slight shelter out of the heavy rain, with a little pugdog in the foreground, the manner in which these ladies are trying to preserve the lower portion of their skirts from being splashed giving a pregnancy to the picture and showing one at the same time what giddy, reckless things they are to venture out in such dainty shoes, &c. This is quite a picture, and the colouring is vivid, yet in perfect harmony. Quite a specimen of colour printing.

The Handy Varnish Pot.

Under this name Mr. W. Edward Wright, of Forest-gate, E., has brought out an appliance for aiding in the varnishing of plates. Its nature will be ascertained from the cut and directions for use. Press



a piece of fine Turkey sponge free from chalk or grit into the neck of the funnel. Pour in the varnish and in a few minutes it is ready for use. After varnishing the negative return the surplus to the top receiver, resting the plate between the supports provided while another is being warmed. The varnish runs through as fast as you use it, and hundreds of plates can be coated before a new sponge is required; or the old one can be washed out in soap and water with ammonia added. When not in use the loose lid is provided to keep out dust.

Messrs. Newton & Co., 3, Fleet-street, E.C., have sent us their new catalogue of science and other lanterns. Its 130 pages are well filled; and it is profusely illustrated, especially with those high-class scientific lanterns and projection appliances for which this old-established house has so long enjoyed such a high reputation.

A pretty little pamphlet-album, published by the Blair Camera Company, Boston, U.S.A., has been set to us through their English agents, Messrs. Taylor, Taylor, & Hobson. It is entitled *Africa, as seen by Thomas Stevens and the Hawk-Eye*. The latter, we may explain, is the designation of a hand camera manufactured by the Blair Company. It contains a few wood engravings of some subjects photographed in Africa and much highly interesting descriptive reading matter.

It is so long since we saw the *Photographic Reporter* that we had almost concluded it had ceased to exist, but the April issue (sent by Hazell, Watson, & Viney, Limited) attests its continued vitality. As of yore, it contains some of the papers lately read at Societies, and a digest of the proceedings of Societies in general. It is embellished with a nice frontispiece, *Winter's Morning, Bidston*, by T. Mansell.

The fact has already been published by us that Mr. J. Weir Brown has succeeded in giving rich brown and sepia tones to bromide prints, and his *modus operandi* was published at the same time—last January. We have received from Mr. Weir Brown several charming prints which, having undergone the toning operation referred to, are of a delightfully warm tone.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5859.—"Improvements in Photographic Printing of a Picture, Figure, or Design, in Conjunction with other Printed Pictures, Figures, or Designs for Useful and Ornamental Purposes." G. Rydill.—*Dated April* 6, 1891.

No. 5998.—"Improvements in Photographic Cameras." T. R. Dallmeyer and F. Beauchamp.—*Dated April* 7, 1891.

No. 6172.—"Improvements in the Production by the aid of Photography of Surfaces for Printing in Colours and in the Means and Apparatus employed therein." G. T. Teasdale-Buckell.—*Dated April* 10, 1891.

No. 6228.—"Improved Means for Producing an Optical Illusion." H. Herrmann.—*Dated April* 11, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 7066.—"Photographic Shutters." Tweedy.—Price 8*d*.
No. 11,891.—"Photographic Cameras." Clarke.—Price 11*d*.
No. 12,669.—"Photographic Cameras." Miller.—Price 8*d*.

1891.

No. 2830.—"Panoramic Device." Keeler.—Price 8*d*.

PATENTS COMPLETED.

Improvements in Means or Apparatus for Separating and Manipulating Sheets or Cards, more especially applicable to the Separation and Manipulation of Sensitised Sheets or Films in Photographic Cameras.

No. 11,891. Joseph Thacker Clarke, Boston, United States of America, but at present residing at 3, College-road, Harrow, Middlesex.—*March* 21, 1891.

My invention has for its object to provide means whereby sheets or cards can be readily and with certainty separated one after the other from a pack, or series of such sheets or cards, and deposited in another pack or series.

My invention is more especially adapted for manipulating the sensitised surfaces in photographic cameras so that they can be exposed one after the other for photographic purposes, and after exposure be arranged and securely held so as not to be exposed to light, the operation being effected within the camera without opening it. I will describe my invention as applied to this purpose, from which its application to other analogous purposes will also be readily understood.

According to my invention, the films are arranged one behind the other with their sensitised faces presented towards the lens, the series of films being pressed forward by means of springs against selecting and separating devices, which select and separate the forward one of the series after exposure and deliver it on to a frame or carrier, by which it is turned at, or about, right angles to the series of unexposed films, and thus the exposed films are formed into another series with their sensitised faces downwards, this series being held in position by a presser or fingers. I do not limit myself to precise details by which my invention is to be carried into effect, but a convenient arrangement consists of a quadrantal centered rack provided with two series of teeth, one of which series engages with a toothed wheel on the axis which carries the presser or fingers, which, under the action of a spring, press upon the series of exposed films. The other set of teeth gears with a wheel by which the selecting devices are operated, and with a wheel by which the receiver of the exposed film is so operated as to lay it into position upon the series of exposed films. The selecting and separating devices consist of discs mounted at the edges of the films, and having a tongue set back from the face of the disc to a distance equal to the thickness of one film. The receiver of the exposed film preferably consists of bars or strips hinged at its lower side, and having upon them notched pieces which receive the edge of the film

separated by the selecting devices from the series of unexposed films. The presser which bears upon and holds the series of exposed films is centered on a rod, which carries the aforesaid wheel which operates them, the said wheel having a stud for bearing on and lifting the presser by moving it up against the action of a spring which tends to press it downwards. A light spring keeps the teeth of this wheel in engagement with the rack teeth. After a film has been exposed, the aforesaid quadrantal rack is operated by a device projecting to outside the camera, and the wheels are operated upon thereby so that the selecting and separating devices separate the foremost film, which has been exposed from the series of unexposed films, and passes it into the notches of the receiver; the presser is raised, and then the receiver is turned down to deposit the film upon the series of exposed films. When the rack is released it returns to its normal position, the receiver rising and the presser bearing on the back of the exposed film and removing it from the receiver so that the said film is deposited upon the series of exposed films and there held by the presser, the receiver returning to its normal position to receive the next film. The gear by which the selecting and separating devices are operated is such that the said devices do not turn back when the rack returns to its normal position.

The aforesaid selecting devices may be used for selecting or separating sheets or cards from a pile or series of them for other purposes than that described.

Improvements in Photographic Cameras.

No. 12,669. Tom Miller, Broughton-road, Salford, Lancashire.—*March* 21, 1891.

This invention relates to improvements in the description of photographic cameras which are usually termed "detective," but part of this invention is alike applicable to the ordinary or "Kinnear" form of photographic cameras.

At the back of a photographic camera, which may be of a rectangular or other preferred form, I construct two chambers, an upper and a lower one; the upper chamber is for the purpose of retaining any number of sensitised plates in position, so that they may be used successively for taking pictures, and the lower chamber is for the purpose of receiving said plates after the picture has been taken, without requiring the plate or plates to be removed from the camera.

In the floor of the upper chamber I form an opening through which the plate, on which an object or a view has been taken, slides into the lower chamber and allows the next plate to be exposed. The front portion of floor of upper chamber is placed at an angle to facilitate the discharge of the plate into the lower chamber through the aperture in floor. In order to place the plates in position for taking a picture, and to remove them out of the way when a picture has been taken, I employ a double cam or worm, the rounded edge of the back part of which has been flattened vertically, and the rounded edge of the front portion has also been flattened, but horizontally. When the plates are put in this upper chamber the bottom front edge of the first plate comes in contact with a small ledge or register on the edge of the opening in floor, and the upper part of the said plate rests against the back of the aforesaid double cam or worm; this cam or worm is attached to a spindle passing to the outside at end of camera. I attach a handle or a wheel to this spindle by which to operate said cam. When a quarter of a turn is given to the cam or worm by means of aforesaid handle, the flat vertical side at back of cam assumes a horizontal position level with the top of the front plate, thus allowing the upper edge of the front plate to enter the groove of the cam or worm, and rest against the front part of said cam, the flat side of which having, by the above-mentioned operation, been placed in a vertical position. When a quarter turn back is given to the worm, the flat sides are again placed in the positions they originally occupied, thus permitting the front plate to fall forward after exposure on to the inclined front portion of floor, and slide through the aperture into the receiving chamber underneath, while at the same time the plate next in succession is pressed forward into position for taking a picture by means of a spring inside the back of case until it in its turn is caused to fall forward and slide into the receiving chamber by the action of aforesaid double cam or worm.

In like manner the entire number of plates may be utilised successively as quickly as required.

For the purpose of attaining either instantaneous or prolonged exposure, I employ a flap shutter, which, when closed, effectually prevents admission of light through aperture formed in camera front. To the upper part of this shutter I attach a coil spring, which keeps said shutter closed. In combination with this spring I place on the inside of camera front a slide bar, on which is a spiral spring; by means of a cord this slide bar may be drawn back until said spiral spring is compressed, in which position it is retained by means of a stud attached to aforesaid slide bar.

When it is required to open shutter for admission of light this stud is removed by pressure on a horizontal bar, when the spiral spring on slide bar in combination with coil spring attached to shutter causes said shutter to open and close instantaneously.

Prolonged exposure may be obtained by checking the outer coil spring by the hand as long as may be necessary.

The form of shutter mechanism, hereinbefore described, may also be applied or attached to the front boards of ordinary photographic cameras.

If it is preferred to use any form of roller slide at back of camera in lieu of glass plates, I disconnect the back part of camera containing chambers hereinbefore described, and attach said slide to back of camera.

Mr. A. L. Henderson appears to be in active employment with his camera on the Continent, for we learn by telegraph from Monte Carlo that on Wednesday last he was summoned to Grasse to receive her Majesty's orders for photographs.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 20	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 21	North London	Wellington Hall, Islington, N.
,, 22	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 23	Burton-on-Trent	The Institute, Union-street.
,, 23	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

April 14.—Ordinary meeting.—The President (Mr. J. Glaisher, F.R.S.) in the chair.

It was announced that the Council had appointed a Committee to take the management of the next exhibition, and to act as Hanging Committee. The names were Messrs. Baggally, Chapman Jones, G. Davison, J. Spiller, and A. Mackie.

Mr. Willis read a paper on *Platinotype*. He said that he did not propose to introduce any new process, unless an application of platinum printing to the production of photographs on wood could be so called. He first described the processes of 1873 and of 1878. In the former of these the print contained at first about equal weights of silver and platinum. The silver was then toned with gold and sulphocyanide, and gave prints specimens of which were handed round. These prints had a gloss resembling albumen, and the prints looked like those made on albumenised paper and richly toned with gold. The replacement of silver by gold could not be fully carried out without inducing a cold blue tone. In the process of 1878 the image was solely due to platinum. He then passed on to the cold-bath process, which was introduced at a meeting of the Camera Club in March, 1888. In that process the paper was prepared with a ferric salt, tartrate, or oxalate, and after exposure developed in a bath containing platinum and a solution which he called a developer. If to the paper, after exposure, a salt of silver or gold were applied, an image would be produced by reduction of the metal, but this would not take place with platinum unless another agent were used as a developer. Of all agents he had found nothing to equal oxalate of potash. Prints that had been exposed were then developed. It was explained that the first appearance of the image was flat, and the whole of the picture was rough and granulated. As development went on this granulation disappeared. There was a difficulty in the cold-bath process of producing paper of equal quality. He would now come to the only novel thing he had to describe; it was the application of the cold-bath process to photographing on wood. Since the year 1873 he had been experimenting with printing on wood, in regard to which there were several conditions to be fulfilled. With the hot-bath process it was well-nigh impossible to get platinum enough on to the wood, but with the cold-bath process, in which the platinum was applied after exposure in the form of a developing liquid, the difficulty did not exist. The best wood for the purpose he had found to be chestnut. Wood required longer exposure than paper. Specimens of prints on wood were shown, and exhibited great vigour and brilliancy. A little different treatment was required. No hydrochloric acid was used, but a two-and-half per cent. solution of citric or oxalic acid was used instead, and the wood treated with acid sulphite of sodium. For decorative purposes he thought wood panels would serve very well. On the different results to be obtained by the hot bath, according to the temperature and strength of the developing solution employed, it was stated that lower temperature had the effect of somewhat shortening the range. Strips of paper exposed simultaneously, and developed differently, were shown to illustrate the effects of these variations of treatment. Assuming the gradation of the negative to be fixed, it was certain that a good platinotype worker could modify the effect of it in the print by variations of development. Still further modifications could be produced by additions to the developer, such as hydrochloric acid, chloride of potassium, &c.

Mr. John Spiller had at the first demonstration of the platinum process in 1878 been struck by the beauty of the results. He would ask which process Mr. Willis now preferred, the hot or the cold. He was surprised to learn that salts were found to penetrate the paper in different ratios.

Mr. W. E. Debenham inquired whether the greater range of gradation in the prints now shown by the early process with silver, gold, and platinum would be attributed by Mr. Willis merely to the fact of the gloss which they possessed, or was it due to different rendering of gradation in the process itself?

Mr. Chapman Jones said that one great drawback to the cold-bath process was that the solution was always changing its character with each print placed in it, and so regularity was not obtained.

After some remarks on rough papers by Mr. Gale and Mr. Dawson, Mr. Willis said that, in answer to Mr. Spiller, he really did not know whether to prefer the hot or cold-bath process, but as soon as the cold-bath paper was quite perfect it would be by far the best. The difference of penetration of salts into the paper was a fact which he considered to depend upon a dialysing action. With regard to Mr. Debenham's question, the gradation was entirely under control. The negatives formerly used were much denser than those now made. He thought it very possible that the gloss on the old platinum, silver, and gold prints had something to do with the gradation. That gloss was entirely due to starch, with which the paper was coated three times and dried between each coating. The composition of the cold developing bath was doubtless altered by the prints immersed in it, but this was allowed for by the addition of a certain quantity of strengthener after every two or three prints.

The President having left, and Mr. J. Spiller taken the chair, he introduced to the meeting a specimen of so-called photography in colours produced by M. Lippmann, and brought to this country by Mr. Lindsay Johnson. It appeared to him (the Chairman) to be rather an iridescent film than a true spectrum photograph.

Mr. A. LAWRENCE said that he understood the slit used was of the width of ten millimetres, with which a pure spectrum could not be expected to be obtained.

Mr. T. BOLAS said that it could hardly be assumed, unless it were so stated, that the red part corresponded to the red in the spectrum, and the green to the green, and there were no other colours to be seen. Captain Abney had been understood to say that each colour required an exposure of a certain proportion to obtain it, and to imply that any colour would give all the colours if exposed for particular times. Looking at the result, the spectrum photograph was nothing like so good as had been shown by Mr. Warnerke at a previous meeting in a print made upon ordinary albumenised paper. Probably most of those present knew that Becquerel obtained results much more suggestive of the spectrum than this which had been obtained by an enormous exposure. Most photographers had got something more like the spectrum from iridescence on waste plates and on the edges of plates. M. Lippmann was a man of science, who had done useful work in chemistry, but the specimen now shown would go no way in convincing us that the problem of photographing in natural colours had been at all advanced by him.

Mr. CHAPMAN JONES said that the chief point in Lippmann's work was that the photograph was fixed; Becquerel's photographs would not bear fixation.

Mr. L. WARNERKE said that it had been stated that Poitevin fixed his colours. He then showed the photograph to which Mr. Bolas had referred, and which he thought had nothing in common with Lippmann's. The most of the colours had been exposed for half an hour, but the red and deep orange required two days to produce an effect. The colours of the image were not due to a mere different amount of chemical action; he had exposed paper under a sensitometer screen giving variety of gradation, but all of a brown colour.

Mr. A. MACKIE inquired whether Mr. Warnerke's photograph was fixed.

Mr. WARNERKE replied that he had not succeeded in fixing the coloured image.

Mr. W. H. HARRISON said that probably the first Daguerreotype was no better than the feeble specimen of M. Lippmann's work exhibited that evening, which their Assistant Secretary had said was given to Dr. Lindsay Johnson with reluctance, as the worst specimen M. Lippman had ever taken. He would ask their Secretary if the specimen had been exhibited to the Photographic Society of Great Britain that evening with Professor Lippmann's knowledge and consent.

The ASSISTANT SECRETARY replied that he did not know.

Mr. HARRISON continued that therefore any public discussion upon it might be unjust to M. Lippman, who had proved the truth of the theory first published by Lord Rayleigh that heliochromes were due to the interference of light, and could be fixed. It was too late in the day to question the genuineness of the discovery, which had been recognised by the members of the Academy of Sciences of Paris and the Photographic Society of France, many of them accomplished men of science, and all truthful and honourable gentlemen, which meant a great deal.

Mr. H. M. ELDER said that there were no less than three distinct methods of producing photographs in colours. Warnerke's method was identical with that of Niepce de St. Victor. Another method was that of Lippmann, who worked on the plan which would be suggested by Lord Rayleigh's paper on *Wave Motion in a Loaded Medium*. The third method was that of diffraction, scattering the smaller particles.

The CHAIRMAN said that they might hope to see something better of Lippmann's work. In the present example there were two colours certainly, but nothing in the shape of a spectrum.

Messrs. C. T. Dent, T. H. H. Harrison, and J. H. Waller were elected members of the Society.

CAMERA CLUB.

APRIL 9.—There was a large gathering to attend the flashlight demonstration given by Mr. Cade (of Messrs. Marion & Co.) The "Slingsby" apparatus was used, and some very successful negatives were taken of the room and the company.

Mr. Stromeyer showed some prints from negatives taken with magnesium ribbon placed in the ordinary pendant lamp of a room, the lamp being in the picture. One of these showed very picturesque lighting.

Dr. Cracker handed round some photographs of medical cases, showing the service rendered by flashlight on such subjects.

On Thursday, April 23, Mr. FRANK HOWARD will read a paper on *Photography in Bye-lanes and Field-lanes*. The paper will be illustrated by the lantern.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 9,—Mr. A. Cowen in the chair.

Further presentations of books to the library from the Hon. Secretary and the Curator were received and acknowledged.

An extract from a recent publication by Messrs. Hurter and Driffield, relating to density ratios and development was read by the HON. SECRETARY. In this paper the previously expressed views of the writers that density ratio could not be varied by development appeared to be so far modified that it was suggested that this might be done by means of a trick.

Mr. W. E. DEBENHAM would like to know why the power of modifying ratio previously denied by Messrs. Hurter and Driffield should now be set down as a trick.

Mr. J. B. B. WELLINGTON remarked that these writers had hitherto said that modifying the density ratio by development was impossible.

Mr. C. H. COOKE proposed that there should be another lantern-slide competition, and this was unanimously carried—the competition to be on the same lines as the preceding one. Messrs. Cowen and Debenham undertook to supply the negatives, which each competitor is to have for one week and send on to the next in turn.

Mr. T. A. FRESHWATER showed a universal lens carrier of French manufacture by Messrs. Clement & Gilmer. The opening to receive the lens was made on the plan of an iris diaphragm, with a tightening nut to fix the aperture when fitting on the lens tube against the shoulder. (This was lately described and illustrated in THE BRITISH JOURNAL OF PHOTOGRAPHY.)

The CHAIRMAN thought it only due to one of the members of the Society (Mr. J. A. Harrison) to say that he had originated the iris lens holder several years ago.

This being a lantern night, a large number of slides were passed through the lantern, including exhibits by Messrs. Park (collodio-bromide), Teape, Bridge, and Freshwater. Amongst the slides shown by the last-named were many of Japanese subjects and others of yachting subjects by Messrs. West, of Southsea.

THE STEREOSCOPIC CLUB.

APRIL 6,—Meeting at Brooklands Hotel, near Manchester,—Mr. W. J. Cunliffe in the chair.

After several new members had been elected and private business disposed of, the Chairman read a letter by Mr. J. A. Forrest, of Liverpool, which was published in THE BRITISH JOURNAL OF PHOTOGRAPHY, March 20, in which the writer called the attention of photographers to the advantages of the Wheatstone stereoscope, on account of the large-size pictures which could be employed.

Mr. W. I. CHADWICK explained the principle and construction of the Wheatstone stereoscope, and, whilst admitting that larger pictures could be used in this instrument than was possible in the Brewster or Lenticular stereoscope, the so-called "advantage" in being able to use large pictures was quite a mistake. A three-inch picture, taken by a five-inch focus lens, and viewed at five inches from the eye, would convey to the mind of the observer the same impression as to size that would be conveyed by a six-inch picture, taken with a ten-inch focus lens, and viewed at ten inches from the eye. One picture would "look" just as big as the other, and by thus observing them at the angle at which they were taken they would each look *natural size*. But if there were any surface reflections or coarse grain in the pictures, which would be manifest in paper prints examined under such conditions, the full effect of size and distance could not be appreciated, and for this and other reasons transparencies on glass were much to be preferred to paper slides, and it is also of the utmost importance that in the backing of transparencies only the finest ground glass should be used.

Mr. Robert Barningham exhibited a few stereoscopic slides from negatives he had recently taken in America.

Mr. James Barningham exhibited stereoscopic slides, and invited criticism. Conclusion arrived at, that the dual pictures were printed too far apart, and not in accordance with the "Club standard."

Mr. Chadwick presented to the Club a table lamp (for gas), provided with a large opal globe for viewing stereoscopic transparencies by.

In a lantern show which followed slides were exhibited by Messrs. Wild, Vos, Whitelegg, Cunliffe, Bowman, Barningham, and the Hon. Sec. As each member's slides were exhibited their method of production was explained. Amongst the best slides shown were those on Thomas's plates developed by pyro and ammonia, and Mawson's plates developed by eikonogen.

Several new members were proposed, and the first outdoor meeting fixed for Saturday, April 18.

HOLBORN CAMERA CLUB.

THE Holborn Camera Club is commencing its fourth year of existence in a very spirited manner, no doubt actuated by the success of the past year, its members having been increased to over seventy. Arrangements for the ensuing twelve months are being completed, and special attention is being given to the outings during the coming summer months. Outings to Richmond and Waterlow Park have already been attended, and during the months of May and June excursions have been arranged to Pinner, Penshurst—near Tunbridge Wells, Purfleet, Hastings, and London—Colney. Arrangements are also being made for a garden party in July. Another special feature of the year's arrangements is a monthly competition. During each of the summer months one print is to be sent in, and during the winter two lantern slides per month. Special subjects will be set by the Committee, and at the end of the two seasons prizes will be given to the members whose prints and lantern slides have received the best average of marks. The Club meets every Friday, and one night a month is devoted specially to the instruction of beginners. Full particulars of membership, &c., can be obtained of the Secretary, Mr. J. E. Smith, 97, Tabley-road, Tufnell-park, N.

THE usual weekly meeting of this Club was held on Friday last at the Club room, 100, High Holborn, Mr. T. C. Hepworth, F.C.S. (President), in the chair, when Mr. J. TRAILL TAYLOR gave a short lecture on *The Art Composition of Photography*, illustrating his lecture by various photographs.

Two new members were elected.

On Saturday twenty-five members attended the Club outing to Waterlow Park, and, in spite of the unfavourable weather, an enjoyable day was spent on this estate at Highgate.

HACKNEY PHOTOGRAPHIC SOCIETY.

APRIL 9,—Mr. J. Hubert in the chair.

The HON. SECRETARY drew the members' attention to their new bookcase, and hoped to receive books from the various members towards filling it.

This being an evening set apart for *Hand-camera Work*, by Mr. Walter D. Welford, some hand cameras were shown, among them being the "Radial," which was explained by Mr. Dickinson, and the "Repeater," shown by Mr. Cusworth. Mr. Gosling showed his, a home-made one, with dark backs.

Mr. WELFORD illustrated the uses of a hand camera by means of the lantern. Nearly 200 slides were passed through, illustrative of various branches of photography, such as architecture, marine, detective work, &c., and were

humorously described by Mr. Welford, who had very carefully prepared a lecture full of wit. The slides shown were far above the average hand-camera shots, proving thereby the ability of Mr. Welford.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

April 7,—Rev. E. Healy in the chair.

Mr. A. P. Wire (Hon. Librarian to the Essex Field Club) gave a lecture upon *The Great Road from Aldgate to Colchester*, illustrated by views in the lantern, many of them being copies of very rare prints. Mr. Wire is brimful of historical, geological, and geographical lore, and had spared no pains in preparing this lecture. The information which accompanies the exhibition of the slides has been gathered from all sources—the British Museum, the libraries of old country houses, and personal investigation—and, in fact, the lecture was a model of what an industrious amateur photographer with a taste for research can do, by doing what all have been advised so often to do, viz., devoting one's energies to some particular subject and following that conscientiously and earnestly.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

April 13.—Mr. G. W. Marchant in the chair.

Mr. Birt Acres lectured on the *Monochromatic Rendering of Colours by Photography*. He said his subject naturally divided itself into two portions, the historical and the practical. He gave a chronological *résumé* of the growth of photography in general and of the researches into colour-sensitive dyes for the photographic plate in particular. The great mass of photographic workers, unless their attention had been specially directed to the subject, had little knowledge of the slow and laborious manner in which the science had been built up. The properties of lenses had been known as early as 420 B.C., a lens having been found in the ruins of Nineveh. From mediæval times till to-day there had been an ever-increasing army of workers adding to the store of general knowledge. He instanced Roger Bacon, Baptista Porta, Kirscher, Newton, Wedgwood, Humphrey Davy, Nicephore Niepce, Daguerre, Herschel, Reade, Mungo Ponton, Faraday, Fox Talbot, and others, briefly pointing out the nature of their discoveries and the dates at which they were made known. The earlier workers had attempted to secure the colours seen on the ground-glass screens in various ways. Some had tried to obtain reproductions of the colours separately and to combine them into a whole, and had used glasses of various kinds to separate the colours. A difficulty met with was the reflection from every coloured object of white light. He then dealt with the colour-sensitive dyes which had been tried—eosine, erythrosine, cyanine, chlorophyll, &c., and said that the addition of ammonia, discovered and patented by Tailfer and his colleagues, had been the factor necessary to secure success. By means of a prism the lecturer projected on the screen a spectrum of the oxy-hydrogen light showing the colours in great brilliancy. He pointed out that the ray which lightens in tone to the eye was yellow, the others following in the order of light blue, green, orange, red, and deep blue and violet. The rays when photographed upon an ordinary plate were more or less reversed, the blues and violets showing brightest. He then interposed coloured screens of various tints, showing how they cut off various rays. A series of monochromatic bands were then thrown on the screen, showing the spectrum photographed on ordinary and colour-sensitive plates with and without coloured screens. The series showed clearly that a very pale yellow screen, necessitating about a triple exposure, gave results in monochrome most nearly approaching the effects of colour as seen by the eye. Copies of paintings, portraits, and views taken in duplicate on ordinary and isochromatic plates were then shown on the screen. The lecturer said that the difference in the cases of the portraits and the copies of oil paintings were so marked that he found it necessary to state that no retouching had been done. The views taken on ordinary plates were so good that it seemed nothing better could be wished for, and when the duplicate taken on the isochromatic plate was shown the improvement was strongly visible.

Samples of plates, instantaneous and ordinary, sent by Messrs. Marion & Co., and samples of Dr. Jacoby's chloride of silver emulsion paper, sent by Mr. O. Scholzig, were distributed.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

April 8,—Rev. L. Macdona in the chair.

The set of American slides were exhibited.

April 25, *Alpha Demonstration*, Mr. J. Howson.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

April 10,—Mr. Horrigan presided.

The American slides were first shown, and evoked much interest, after which voting on the competition slides took place. Each competitor was required to submit one contact slide from each of three negatives supplied for the purpose by Mr. Cembrano, and the result of the voting was to place Mr. Ardaseer first and Mr. Garrett second, while Messrs. Davis and Ford tied for third place.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

April 10,—Mr. J. H. Baldocks, F.C.S., in the chair.

Mr. J. Weir Brown explained and demonstrated his system of producing warm brown tones and sepia tones on bromide enlargements, particulars of which were contributed by him to The British Journal of Photography in January last. He had slightly but not materially altered his mode of procedure since the first publication of the process.

A number of landscapes were handed round, showing both brilliant and soft effects in rich brown and sepia.

The speaker's attention was drawn to a paragraph in a monthly photographic publication, in which it was stated that, if you left a bromide print thus treated for several hours in plain water, you would find the image almost gone.

He said this was very misleading and a most incorrect statement, and might deter some workers from trying the process for themselves. It was true only as regards a print in which the toning had been carried to its extreme point, "a bright red," a colour which he thought would be seldom desired by photographers. That it was entirely untrue as regards prints toned to the warm brown or sepia point, he demonstrated by showing the two halves of a warm sepia proof mounted side by side, one portion of which had been washed in running water for twenty-eight hours without apparent, if any, reduction of the *image*. Prolonged washing after toning was quite unnecessary, and would not be resorted to by workers except by way of experiment. From five to ten minutes in running water was quite sufficient to remove the faint lemon-coloured stain from the high lights, after which the prints *should be carefully blotted off* and dried in a warm room. Prints so treated had been quite unaffected by all the light to which they could be exposed since they were first produced, and Mr. Weir Brown stated his belief that they would withstand the action of the most trying atmospheric conditions to which photographs were subject under ordinary circumstances. If not satisfactory, the tone could be removed by prolonged washing, the print restored to its original colour, and afterwards retoned. The process was put forward for the benefit of those only who wished to make enlargements in tints warmer than the usual black and white of bromide, there being already abundant methods of producing every variety of colour on contact prints. The speaker stated that good results could not be produced on the most rapid papers, and that his success had been obtained on an emulsion of medium rapidity called by its makers "slow."

Mr. W. Low Sarjeant exhibited a novel camera which he has recently made for his own use. The camera measures externally $8\frac{1}{2} \times 7 \times 6$ inches, and is composed of two chambers, the upper one being used for focussing and acting as a view finder, which gives a full-sized view of the picture, being taken in the lower compartment, the picture being seen and focussed at the moment of exposure. The lower chamber, or camera proper, is fitted with a swing back and focussing screen for ordinary work; it is also fitted with a specially constructed focussing eyepiece hood, which entirely dispenses with the necessity of using a focussing cloth. Double backs of very light pattern are used, and the camera has a range of focus from three to twelve inches. A very ingenious shutter is fitted behind the lens flange, giving a range of exposure from extreme rapidity to hours if required, and is pneumatically released, giving an equal exposure to every part of the plate. A novel feature in the shutter is that whatever speed the shutter is set to work at (even at its fastest), at the moment of exposure, without any alteration whatever to it, a time exposure of any length can be given. The camera is also fitted with a black glass reflector for taking clouds, and when not in use folds into the front; a false bottom with arc struts facilitates the necessary tilting angle for cloud photography. The camera, though so small and compact, is capable of doing every class of work.

The next meeting will be held in the old School of Art room on Friday, 17th inst., at eight p.m., when there will be an exhibition of hand cameras.

The first excursion of the Photographic Section of the Club took place on Saturday, April 11, when, through the kind permission of his Grace the Archbishop of Canterbury, Addington Park was visited. The weather being fine some good work was done.

BRIXTON AND CLAPHAM CAMERA CLUB.

April 9,—Dr. Reynolds in the chair.

Mr. Bevins gave a lecture on *Light*, with diagrams and experiments.

The annual Club exhibition of members' work will be held at Gresham Hall, Brixton, on Friday and Saturday next, the 17th and 18th inst. A lantern show each evening, and a concert on Saturday.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

April 8,—Mr. A. R. Dresser (Vice-President) in the chair. Mr. W. J. E. Clarke was elected a member.

The first Society outing was arranged for Saturday, May 9, to Rochester and district.

Mr. R. W. Reffell discoursed his paper on *Lantern Slide Making*.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

April 8,—Mr. Frank G. Pierpoint in the chair.

Mr. Parritt read a paper entitled *Photography, Past and Present*, with notes on the quality of dry plates and lantern slides. He reviewed the practice of photography from the earliest date down to the present time. Lantern plates were then treated, the lecturer betraying a considerable leaning towards the collodion-made slide, some excellent specimens of which were passed round.

OXFORD PHOTOGRAPHIC SOCIETY.

April 7,—The President in the chair.

Mr. A. F. Kerry, M.A., Exeter College, gave a lecture on *Bromide and Kallitype Paper Printing*. It was illustrated by chemical experiments. After some practical work in developing, &c., bromide prints, he described and worked off some kallitype prints. A large number of experimental prints were also shown.

Mr. Claude Rippon (Merton College) and Mr. H. H. Isons were elected members. One name was proposed.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

April 7,—Mr. B. J. Taylor in the chair.

Mr. Alleyne Reynolds gave his lecture, *A Tour Round Iceland*, illustrated by a large number of slides, the negatives and slides being made and taken by himself after having made four trips round that island.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

April 9,—Mr. W. J. Harrison, F.G.S., in the chair. Five new members were elected.

The Hon. Secretary (Mr. A. J. Leeson) exhibited Wray's aluminium-mounted lens fitted with Iris diaphragm. The lightness was remarkable, and in point of finish perfect.

The programme for the ensuing session was read as follows:—April 23, *Exposure and Development*, Mr. W. J. Harrison. May 28, *Stereoscopic Photography*, Mr. Walter Griffiths. June 25, *Cameras and their Management in the Field*. July 23, Conversation meeting and exhibition of survey photographs. August 27, Development competition. September 24, *Lantern Slide Making*, Mr. S. H. Fry.

Mr. J. T. Mousley (Hon. Secretary of the Excursion Committee) read the list of excursions for the year.

The Chairman remarked that he was glad to see the Excursion Committee had arranged for many of the outings to interesting spots in the Hundred of Hemlingford, which would greatly help the Survey Section in that important work. He then called upon Mr. John Howson to give his paper on *Alpha Paper*.

Mr. Howson, in the course of his remarks, said:—With Alpha paper different tones can be obtained, which was a great advantage and help in many cases to enhance the artistic value of a photograph, as one was able to give special tone to any separate subject by different exposure, different length of toning, &c., and also pictures may be made of uniform tone under varied forms of development, &c. After fully describing the process, he commenced to give a practical demonstration of the mode of work, producing the varied tones by different ways of manipulation. He then showed the exposure and development of the Ilford Special lantern slide plate, giving four distinct exposures from the same negatives, and by development in same developing solution obtained exactly same result, thus showing great latitude in development and exposure. The success and ease with which the lecturer obtained very fine results gave great approbation to the members present.

LIVERPOOL CAMERA CLUB.

The second monthly meeting was held on the 8th inst. in the Liverpool College, Shaw-street, when sixteen new members were enrolled.

After the Secretary had read a short paper upon the objects and programme of the Club, a committee was formed to arrange for the afternoon excursions.

Mr. W. Anderson Brown then gave a demonstration of *Hand-Camera Work*, and exhibited his home-made camera, and many of his negatives and lantern slides.

Other members had brought hand cameras and negatives, and these were passed round for inspection.

At the next meeting, on the 13th May, a demonstration on *Contact Printing on Bromide Paper* will be given.

Correspondence.

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

DISCOLORATION OF PLATINOTYPES.

To the Editor.

Sir,—Kindly allow me space in the Journal to state a grievance I have experienced in connexion with platinotypes. The grievance to which I refer is the discolouration that takes place in many cases after the prints have been mounted—a discolouration that renders the prints, in course of time, simply hideous. I have used the words "in many cases" because I have produced other prints, and they are as pure at this moment as the day on which they were finished. I thought at first that the discolouration might be the result of careless work, but I am sure that it is not so. Again it struck me, that the acid bath was not strong enough, and I increased the strength to two ounces of acid to sixty ounces of water. With such a bath I felt sure that the platinum salts would be thoroughly eliminated, and, further, the washing I give the prints is far in excess of the instructions sent with the paper. Notwithstanding the above precautions, the discolouration still continued its fell work. I was driven to think of something else, and at once turned my attention to the mounts. Here the difference I have referred to appeared. The prints remained quite pure while unmounted, also when mounted on the ordinary cabinet mounts, or when mounted on a piece of white board. But the opposite was the result when they were put on boards on which was mounted a yellow tint. The tint is a piece of thickish yellow-coloured paper, and the discolouration of which I complain is the same as that of the tint. I am therefore strongly inclined to suspect the tint as being the author of the mischief. The tint is very porous, and I fancy that the print, also very porous after being mounted, would easily absorb the colouring matter in the tint, and consequently produce the atrocious result, a specimen of which I send you. I have not yet tested the tint, but intend doing so. Meanwhile I state the foregoing facts, and earnestly invite the opinions of others who may have had a similar experience. The matter is one of very great importance. If the tints are to blame, then it is time something else were being used.—I am, yours, &c.,

Stirling, N. B., April 13, 1891. Robert Ferguson.

THE LIBRARY OF THE LONDON AND PROVINCIAL ASSOCIATION.

To the Editor.

Sir,—Will you allow me again to call the attention of those of your readers interested, to the fact that this Association is still taking steps to enlarge its library. So far the Society has been helped in this endeavour by the presentation of books bearing on photography from many friends, as well as a considerable number of volumes from members.

While feeling greatly indebted to those who have already been so generous, the members still think that there are numerous well-wishers who, when once they know of the existence of the wants of the library, would hasten to forward gifts of photographic literature for that purpose. Parcels of such, or single volumes, will be gladly received and acknowledged, if forwarded to the Hon. Secretary, Champion Hotel, Aldersgate-street, or to F. W. Pask, Hon. Librarian, Leyton House, High-street, Leyton.—I am, yours, &c., R. P. Drage.

95, *Blenheim Crescent, W.*

THE MEDALS AT THE LIVERPOOL EXHIBITION.

To the Editor.

Sir,—Although Mr. Walter Johnson's letter in your last may possibly have been intended as an impertinence, I am glad you inserted it, as it gives me an opportunity of explaining to those few photographers who cannot understand how a man can be honest when he has the chance of being otherwise why I consented to act as judge. There was, however, no opening for dishonesty at the Liverpool Exhibition, as will be presently seen.

Knowing that my son intended, at the request of the committee, to be a very extensive exhibitor, I refused to accept office until it was strongly represented to me that I could be of great use to the exhibition, and that no photographer who knew me would suspect any unfairness (the Walter Johnsons were not taken into account), especially as I should be one only of six judges. I went further than this. To prevent any chance of, as I innocently thought, any possible misunderstanding, my son consented to withdraw the whole of his exhibit from competition. This was done before the judging commenced.

It will be now seen that none of these pictures would have been in Mr. Johnson's way if he had been a competitor, which he was not in the name with which he signs his letter, neither did they prevent any one else from getting a medal.

After the judging was over a gold medal was awarded to my son—without consultation with me, and *without competition*—by all the other judges, for what has been acknowledged by all as "one of the most important features of the exhibition."

I don't know if Mr. Johnson is sufficiently acquainted with photography and photographers to recognise the names, but I can assure him that these five gentlemen are not unknown for probity and honesty as well as for knowledge of the art.

Mr. Bhedwar was certainly a pupil of my son's; this is an advantage he has enjoyed with many others. I can only say that exceptional natural gifts were fortunate in meeting with good teaching. I would give a medal to what I, in conference with other judges, thought the best pictures, without feeling that I had been unjust, even if the producer had had the misfortune to take lessons from myself.

Your correspondent suggests a comparison of one of Mr. Lyd. Sawyer's pictures with those to which the Champion medal was given. This is a bad shot. Mr. Sawyer would be the last to take the hint and accuse the judges of unfairness.

In conclusion, let me say that when a successful exhibitor, who has taken medals regularly for over thirty years, gives up the chance of further successful competition and consents to fill the office of judge—a thankless and not always inexpensive one—he does not do so for his own advantage. Yet there are still some, fortunately, who, for the love of the art (which your correspondent will not understand), will undertake it, even at the risk of impertinence from the envious Walter Johnsons of our wicked little world.—I am, yours, &c., H. P. Robinson.

Tunbridge Wells, April 11, 1891.

Sir,—Kindly allow me a small space to enlighten Mr. Walter Johnson on a subject on which he has rushed into print without taking the trouble to ascertain the correct facts. Instead of throwing light on the case, his letter is most misleading. His letter can only mean that a medal was awarded to me unjustly and even fraudulently. Having made this accusation, Mr. Walter Johnson is in honour bound to substantiate his case or apologise. Here are a few facts which it would have been well for Mr. Walter Johnson to have learnt before running the risk in which he has involved himself by the publication of his letter.

If Mr. Walter Johnson will refer to the correct report of the judges, he will find that my pictures were not for competition, and the special gold medal was awarded to me by *five* of the judges, who, I understand, met

specially for the purpose *without my father*. However, if the medal was fairly won, it would make no difference that my father took part in awarding it, and Mr. Walter Johnson's letter distinctly infers that there was injustice in this award. He must, therefore, prove that the five judges who are responsible for it have acted unfairly, or, if he be a gentleman, withdraw his accusation.

I may add that my father retired from business some years ago, and is not a partner, active or sleeping, in my business.

Through the catalogue not making it clearly understood that my pictures were all withdrawn from competition, inquiries have appeared in the photograph press expressing surprise that awards were not granted me in two other classes. But enough, or perhaps we shall have some other busybody accusing Mr. Walter Johnson of giving me the opportunity of a gratuitous advertisement. Besides modesty forbids, and I have said enough to show up Mr. Walter Johnson in his true light.—I am, yours, &c.,

Redhill, April 11, 1891. RALPH W. ROBINSON.

To the EDITOR.

SIR,—The following paragraph, cut from page 41 of catalogue *re Artists at Home*, is a full answer to the remarks of Mr. Walter Johnson.—I am, yours, &c., T. S. Mayne, *Hon. Sec.*

Liverpool, April 14, 1891.

"In consequence of Mr. Ralph W. Robinson's father being one of the judges, the entire exhibit sent in by him was withdrawn from competition at the request of Mr. H. P. Robinson. The remaining five judges, however, unanimously recommended that the Fourth Gold Medal should be awarded to Mr. Ralph W. Robinson for his unique collection of Portraits of Eminent Artists in their Studios, which forms an important feature in this Exhibition."

THE UTILITY OF HAND CAMERAS.

To the EDITOR.

SIR,—R. E. Chesterman, D.Sc., it seems, must have more of our answer to his "effusions" than he has already received. Very well, I will oblige him, and I must ask your permission, sir, to do so at some length. It is difficult to pass over R. E. Chesterman's letter for even a while and consider the original subject only. The first half of the paper in the number for March 6, headed *Hints to Beginners*, I unhesitatingly declare, contains just gas and nothing more, only to be accounted for on the penny-a-line hypothesis. We then come to *The Sphere of the Hand Camera*, &c., and one naturally expects to be told something worth knowing, instead of which we read, 'It is possible in some cases, I believe, to adapt the hand camera to a stand and use it as an ordinary camera, and focus with accuracy, but I do not remember to have come across any arrangement which would allow all lengths of exposure being given. If there is a hand camera combining these three important features of the ordinary camera with those of its own class, then do I recommend the beginner to invest in such a one." What! why, just before the beginner was recommended to choose "the ordinary landscape instrument." I said in my first letter that Mr. Chesterman admits but small knowledge his subject, and, however much it may disturb that gentleman's bile, I reiterate that statement; if he did not know of the existence of hand cameras combining the qualities he enumerates, why on earth did he presume upon a correct knowledge of his subject, and essay to give advice? for they *do* exist, and the enterprising tradesmen to whom Mr. Chesterman magnanimously gives the hint must have smiled indeed if any of them read it.

Farther on we read in a paragraph commencing, "When you have become wiser in photographic lore" (this is almost too much!) "somehow . . . I can generally pick out hand-camera negatives and prints from those made by other means. They lack detail in the shadows. . . . and under-exposure. . . . thinness of image," &c. We are then told the story of a lantern entertainment given in Oxford, at which the slides showed "dark, heavy foliage. . . . want of perfect detail in any part of the picture," &c., and these told the writer "all he wished to know." Exactly. He saw, I suppose, a very poor lot of slides from hand-camera negatives, and consequently all hand-camera negatives are bad! After some more in the same style the writer says: "From the foregoing it will be seen" (will it?) "that hand-camera pictures are not the kind which usually pay for enlarging, or for conversion into lantern transparencies," &c., and then "unfortunately hand-camera workers very often think otherwise," &c. I am one of those who most certainly think otherwise, as far as lantern slides are concerned, "unfortunately" or fortunately you, sir, shall decide, if you please, as it is my intention to send for your inspection, with this letter, some lantern slides I have made from my own hand-camera negatives, and I should be grateful for your opinion.

I have already called its last paragraph in the *Hints to Beginners* paper "misleading;" this also I reiterate. Mr. Chesterman commences his letter, in reply to my criticism of his paper—and because I thought proper to show the absurdity of the greater part of it—in what, perhaps, he considers fair controversy, by an attempt to lead your readers to suppose that my reason for writing was that I was the individual who made the lantern slides about which he was so funny. This does *not* annihilate me; but I tell Mr. Chesterman it would be more honest if he were to say where he saw the slides made with "somebody's developer sent out in quarts," &c.

It would appear that R. E. Chesterman, D.Sc., has on previous occasions found writers "arrogating to themselves" the awful sin of objecting to his dictation; so, notwithstanding the ungentlemanlike and long-winded commencement to his letter, I will reply to that also. He says in his paper, "*If there is* a hand camera combining these three important features," &c.—a certain proof and admission that he was ignorant of the subject, as there *is* such a camera, and more than one; and yet this gentleman says, "I said nothing of the sort," and regrets he is compelled to write in the gentlemanlike and dignified manner he does by "the courtesies of journalism!" and this is the individual who presumes to write about imparting the alphabet of a subject he himself is ignorant of! On speaking of my own hand camera I said, "I possess a hand camera which gives me almost complete satisfaction," and then, in parenthesis, I asked, "When will the makers give us a swing back?" making plain to every one, I should have thought, where I considered my camera was wanting, and yet your correspondent says, "*Apropos de rien*, 'President' asks"—the above question. Surely Mr. Chesterman must have got his idioms mixed up!

I challenge this gentleman to make good his assertion and pick out such slides as they appear on the screen as have or have not been made from hand camera negatives, and this challenge, writing from Banbury-road, Oxford, he evades by saying I am an unfair opponent. This is almost too funny. I defy Mr. Chesterman to prove I have written an unfair word; it is the other way about. He adds: "Besides, he does not give his address;" in my next letter I gave my full address. Now comes the letter of April 3. In this Mr. Chesterman says, in prize-ring phraseology, "to slink out of the ring on the ground that the fist of the man you have challenged comes too straight from his shoulder can be only understood as an admission of defeat." This is one of those truisms that R. D. Chesterman, D.Sc., occasionally interpolates his writing with an apparent hope that may be thought applicable to the subject. Its introduction here is the calmest piece of effrontery it was ever my lot to experience, and as absurd as is the next paragraph.

The whole thing lies in a nutshell. R. E. Chesterman, D.Sc., thinks proper to write to your paper a dissertation in which hand cameras are attempted to be "damned with faint praise," he makes therein assertions I challenge him to prove—he—against my will I make use of his word—"slinks" out of that challenge, and so words his letter that one is tempted to leave such a person unanswered with regret, not on account of the force and power of his arguments, but on account of the manner and language he thinks proper to use. Presuming on this, R. E. Chesterman, D.Sc., again writes to you, and amusingly tries to make your readers think for a week I fear to answer him! We have a lantern night coming on shortly, and it was my intention to send R. E. Chesterman, D.Sc., some tickets, thinking that in his calmer moments he would like to be convinced of his error; for this purpose I asked the postman who serves the whole of Banbury-road, Oxford (the address given by R. E. Chesterman, D.Sc.) whereabouts that gentleman lived? He replied, "There is no such person living in Banbury-road from No. 1 to Pendock-court"—that is the extent of Banbury-road, Oxford. This is curious.—I am, yours, &c., PRESIDENT.

[The lantern slides referred to above as having been produced by "President" from his own negatives, have been received and carefully examined. They are amongst the most perfect and beautiful we have ever seen. This corrrespondence here terminates.—ED.]

OPERATORS' SPECIMENS AT EXHIBITIONS.

To the EDITOR.

SIR,—I have been thinking recently that, if it is possible for operators and retouchers to send cases of their own specimens to exhibitions, such as the one now open in Liverpool, it would add a new feature of interest to the exhibition, and would be an advantage to employers and employed alike, for the masters would find out who were the good men, and it would enable the employed to demonstrate their abilities, be they small or great; and, further, they would obtain the advantage of public criticism, which would be educatory in the highest degree, and I think it would stir up many to attain a higher standard of excellence in their every-day work, so that it may yield results fit for the walls of an exhibition. I think also it would be to workers a real source of encouragement, as many employers are afraid of manifesting their appreciation of work done, and so many a worker gets very little praise, no matter how good his work is.

Another thing, I think it would be a great advantage to workers if some definite information were given about the life of a photographic operator in India, so as to enable such to judge better if the climate would suit them or kill them, and sundry particulars. There seem to be such numbers seeking situations, and at low salaries very often, that I think India and Australia too, where large salaries are given, as sundry advertisements indicate, should be better known, especially as it appears to be a growing opinion that only operators, &c., from the highest class firms are fit to compete for their offered situations; whereas the truth is there ought to be a way of testing a man's work, whether he lives in London or in some country town. The big firms do not contain all the good men; of that I am certain. I have visited many places besides London, and am certain there is truth in what I say.—I am, yours, &c.,

April 11, 1891. THOMAS TOMLINSON.

DROP-SHUTTER EXPOSURES.

To the EDITOR.

SIR,—I will take as little of your space as possible in replying to Mr. Conybeare.

Assuming that we are using a half-plate camera placed with the long way of the plate horizontal, that the lens is a Ross' R.S. 8 × 5 nine-inch equivalent focus, that the hood has been removed, and that the shutter works not more than an eighth of an inch clear of the front lens (in these cases we must be precise in our facts), if we "put stop *f*-64 in the lens, and fasten the shutter so that one-sixteenth of an inch of the edge of the lens is exposed," no doubt "an appreciable amount of *light* will be found to pass through the lens, but no *image* will be projected on to the ground glass; it is merely diffused light, would readily fog a plate, but never produce a picture, and merely shows how almost impossible it is to make and maintain in good order perfectly non-reflecting surfaces.

The whole matter lies in a nutshell. The central ray in every double cone of light passing through a lens is straight, and no image can appear on the ground glass until the shutter has fallen far enough to allow *a straight line* passing through the shutter and diaphragm to reach the ground glass, and it is obvious this must happen sooner with a large stop than with a small one.

A drop-shutter gives a perfectly equal length of exposure to all portions of the plate, but the whole exposure for all portions of the plate does not take place *at the same time*, the image comes on to the bottom edge of the plate first, and passes off from the top edge, or foreground, last; hence, to make a practical test of exposure, we need only select one point in the plate; any will do, but the centre is preferable, as all conditions are there most favourable.

Let us focus the camera upon, say, a wall placard and note three letters, one at the top, one in the middle, and one at the bottom of the ground glass; insert stop *f*-16, and gradually lower the shutter till the top letter is seen at the bottom of the ground glass. It will be found that the shutter has not fallen so low as the top edge of the hole in the diaphragm, but the other two letters are invisible; without moving the shutter change the stop for *f*-64 and it will be found that the letter previously seen is now invisible, and the shutter must fall some distance before it will again come into view; let the shutter continue its downward course till the letter at the top of the ground glass has just been cut off, and now, without moving the shutter, take out *f*-64 and reinsert *f*-16. The letter will be again brought to view, and the shutter must fall still further before this letter finally disappears.

We thus see that the larger stop permits the image to reach the ground glass sooner, and takes it off later, than the smaller one, and that consequently the exposure is lengthened.

If this be so, and experiment proves that it is, I think I have substantiated my statement that "the diaphragm becomes an important factor in determining the *duration* of the exposure."—I am, yours, &c.,

Park-road, Halifax, April 13, 1891. EDWARD J. SMITH.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

Lieutenant Lionel Wells, Devonport.—*Photograph of torpedo being discharged.*

T. Bramwell, Alston.—*Photograph of window in the Alston Parish Church erected in memory of the late Rev. E. L. Bowman.*

John Hodge, Stonehouse, Plymouth.—*Two photographs of sailor field battery, guns in action and out of action. Photograph of sailors "ballying square." Photograph of sailors fencing. Photograph of machine gun in action. Photograph of field gun in action. Photograph of brigade of sailors formed in a square.*

John Stuart, Glasgow.—*Portraits of Professor Thomas Smith, D.D., Free Church College, Glasgow; Professor Alexander B. Bruce, D.D., Free Church College, Glasgow; Professor Thomas M. Lindsay, D.D., Free Church College, Glasgow. Two photographs of Professor R. H. Story, D.D., Glasgow University. Two photographs of William P. Dickson, D.D., LL.D., Glasgow University.*

BEN WILLIAMS.—Willesden paper may be safely used for extemporising developing and fixing trays.

CONSTANT READER.—The streaks complained of are not necessarily inherent to the platinum process. We cannot account for them.

F. R. S. E.—The salt is evidently for use in ceramic photography, by the substitution process. See article in last and previous issues.

M. W. RAMSEY.—Mr. Götz, 19, Buckingham-street, Strand, supplies paper for the different blue processes, with directions for use. Communicate with him; he will give you every information.

S. DRUIT.—Celluloid is scarcely to be recommended for lantern slides. There would be a difficulty, we should imagine, in keeping it flat, and in many lanterns it would be affected by the heat.

W. ANDREWS.—1. Specifications of patents are procurable at the Patent Office (Sale Branch), 38, Cursitor-street, Chancery-lane, London.—2. The number and date will suffice.—3. Yes; we prefer the American style.

G. B. DOBSON.—To cure the over-correction of your lens, flatten the contact surface of the front combination, for it is that which is at fault. This will not give you much trouble, as the lens is your own make.

F. A. BELLAMY.—Sheet guttapercha can be obtained of any of the dealers in indiarubber and guttapercha goods. *Papier-maché* in sheets, we imagine would have to be made to order, but better make inquiries of some of the manufacturers of it.

GEO. FERRIER.—There are various ways of reducing over-printed proofs. That which is most commonly employed is to immerse them in a weak solution of potassium, or you may also try the ferridcyanide of potassium and the hyposulphite method.

MERCURIUS.—A good formula for sensitising albumen paper is a bath of from forty-five to sixty grains of nitrate of silver to the ounce of water, according to the proportion of chloride contained in the albumen. Decomposed albumen is very commonly used, but is not advisable.

J. E. G.—No, your suggestion would not prove practicable, for in order to get even an approximation to achromatism the lens of the "different" glass would have to be a concave. It would be preferable to have both lenses made of one kind of glass, and allow for the difference between the visual and chemical foci.

W. FOX.—The price-list of cabinet and *carte* portraits is about as low as any we have seen: but how is any combination to alter it? Every one is at liberty to fix his own prices. We very much question if dealers would refuse to supply materials to good customers and large consumers simply because they took portraits at an exceedingly low price.

B. W.—White-hard varnish, diluted with methylated spirit, answers very well for negatives, but brown-hard is much better, because it is harder and will bear more rough usage than the former. The basis of brown-hard varnish is shellac; of white-hard, sandarac—a more friable resin. Commercial varnishes of both kinds are of very indefinite composition however.

READING writes asking whether a patent has necessarily to be taken out through a patent agent?—It is by no means necessary to employ an agent as an inventor can do the work himself. However, as a matter of policy, unless the applicant has some knowledge of what is required, it is often desirable to employ an experienced hand to do the work. Many patents are invalid owing to faulty wording.

49.—1. Although we are not acquainted with the lens mentioned, we believe it will answer as well as any other for enlarging. 2. A small bit of magnesium ribbon, ignited at the proper distance from the condenser, will prove much more serviceable than the duplex—we mean serviceable as regards reduction of time of exposure. 3. Allow the print to dry before mounting it, and then use thin glue or strong starch.

RETOUCHER writes:—"I should be glad if you will kindly advise me as to the most suitable magnifying glass for retouching heads varying from half-inch to one inch. As regards the size of it, should it be of four or four and a half inches diameter? Also, what focus do you recommend for the above-sized heads? Should the magnifying glass be fixed say five or six inches from the negative, or should it be used very near to it? I should be glad if you would give me advice in the matter, as lately I have been much troubled with my retouching. I have been using a glass of twelve-inch focus, four and a half inches diameter, fixing it six inches from the negative, and my eyes being six inches from the glass—that is, the magnifier just midway between my eyes and the work—but the result of my work does not please me."—We should, under the circumstances, advise our correspondent to abandon the large lens and use spectacles. He should consult an oculist and tell his want, and he will advise as to what is necessary.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 22, *The Keeping Qualities of Developers*. April 29, Last lantern evening of the season. Visitors invited.

REFERRING to our notice of the large stock of old plates, when alluding last week to Fallowfield's *Remembrancer*, Mr. Fallowfield writes:—"The effect of your reference to my sale of old-stock dry plates was so instantaneous that I had no chance of testing the 'keeping' qualities myself. All were snapped up in a few hours, and in most cases those who bought them wrote to speak of their 'remarkable quality,' and order more. I have been busy returning money and explaining ever since, but space is too valuable now to retain such relics, as I want every inch of room for an ever-increasing new stock."

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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A REVOLUTION IN COLLODION.

collodion could only be rendered as sensitive as gelatine! is aspiration we have many times heard devoutly expressed. There was no inherent reason why it should not be so, only to the present time it emphatically was not *un fait accompli*, l most of our experimentalists despaired of its accomplish- nt. We say "most," happily not all of them. Among the st indefatigable of those who pry into Nature's possibilities, only as regards collodion but other matters, is a gentleman y well known indeed by all who frequent our more advanced ndon technical photographic societies and clubs, Mr. J. B. B. llington, whose *dicta* on practical photographic matters are ays listened to with becoming respect, and for Mr. Wellington been reserved the honour of making a collodion emulsion ch registers 25 on the sensitometer in current use.

We have received samples of this abnormally rapid emulsion e being plain rapid and the other isochromatic rapid), and have before us sensitometer test plates produced both from m and also from the ordinary collodio-bromide emulsion. h this last, the ordinary, the highest number fully visible 4, its energy equalling that of 25 of the "rapid" and 24 of "isochromatic rapid." As regards the comparative merits he two latter, while the lower sensitometer numbers of the chromatic" are of a more pronounced density than similar nbers on the scale of the "rapid," yet from 11 to 15 are y of near accord, while above this the advantage is slightly avour of the "rapid." All this indicates an advance so t as to be entitled revolutionary.

n reply to the query that will naturally arise as to the ils of this new emulsion, these are scarcely yet ripe for ng the public, but we expect they will be published very , possibly through the mediumship of one of our Metro- an societies.

JUDICIAL PHOTOGRAPHY.

application of photography to legal purposes is, apparently, carried out to the same extent in this country as it is at e parts abroad, or perhaps it is not received in evidence with the same degree of credence. From an article in of the foreign journals, an extract from which was given in e pages a few weeks back, it appears that Dr. Jeserich has e quite a study of photography as applied to the detection rious forms of crime, and become quite a specialist in this tion. Some of the instances quoted of photographic evi- e being accepted would, however, have required a deal of borative evidence in this country, as here it is usually ved with a certain degree of diffidence, as, for example, in a case of murder, where a struggle had taken place between the murderer and the victim—a woman—in whose hand was found some hairs. These were placed in the hands of Dr. Jeserich, whose photographic examination is said to have proved that the head from which they were taken must have been partially bald, a conclusion that led to the apprehension of the culprit. Other cases are quoted which show that the learned doctor is an expert of no mean order in judicial photography.

There is no question that photography might, and would, be more extensively employed for legal purposes in England if there were photographers who made it a decided speciality. Even now it is used to some extent, but then the work is generally intrusted to those who have but little knowledge of what is required, or are ignorant of the best methods of securing it. Photography has frequently been used here in the detection of forgery, or the alteration in documents. In frauds of this description it often happens that no difference can be detected by the eye in the colour of the ink used, say, in adding a figure that may convert hundreds into thousands of pounds; but, if a negative were taken by an expert, the difference might be made very conspicuous. Again, in cases of erasure they may pass unnoticed by the eye, but yet be rendered distinctly visible in a negative when the document is illuminated very obliquely or by transmitted light.

Photography is also very valuable in the detection of alterations made in documents by chemically discharging the original ink and filling in with fresh writing. It is seldom that the two inks correspond in photographic value, or that the negative does not show a difference in the actinic quality in the paper itself where the alteration was made, although a visible difference could not be detected. Results of this description when enlarged prove very valuable evidence of fraud in courts of law.

Of course, to get the best and most decided effects requires the aid of an expert in this particular line, and, so far as we are aware, there are no specialists who devote their sole attention to this class of business in this country. Therefore, as we have said, the work is usually placed in the hands of ordinary photographers, with the frequent result that the object sought for is not attained. By the use of orthochromatic plates and plates orthochromatised for different colours, together with various coloured screens, a specialist would be able to obtain conclusive results, where one less skilled in this particular branch might utterly fail.

Supposing, however, there were specialists in this sort of work, it is highly improbable that the photographic evidence on the one side would be met with similar evidence on the other,

as in the case of experts in handwriting. For example, in cases such as those just referred to, widely different effects might be produced if one operator used orthochromatised plates while the other employed plain ones. Again, say in the case of erasure, one would obviously work under conditions such as would exaggerate the effect as much as possible, whereas the other worker would proceed so as not to render them visible at all. Two sets of photographs, so much at variance with each other, as to prove exceedingly confusing to an ordinary English jury, is possible. Here is a case in point.

Some years ago, in a law suit as to the value of an estate, the contending parties each produced photographs. But one lot was taken with a lens of tolerably long focus, the others were taken with a lens that included a much wider angle of view, and these, of course, conveyed quite a different impression to the jury as to the size of the property. With the arguments of the opposing counsel, who knew nothing whatever of the subject themselves, the court became so confused that it was ruled that the photographs were utterly unreliable as evidence, and, as a compromise, it was decided that the jury should visit the spot and judge for themselves.

Here is another case—one of "ancient lights," in which a question of many thousands of pounds damages was involved. The plaintiff's solicitor engaged an artist to photograph the buildings, instructing him to show in his pictures the greatest obstruction of light possible. This astute gentleman managed to secure, late in the day when the sun was very low, some photographs showing strong cast shadows of the new buildings over the windows of the old one. The defendants were supplied with copies of these, and quickly came to terms. Had they, however, employed an expert to take pictures under the reverse conditions, the suit might have ended differently. It has often been said that photography can be made "to lie like truth," and it is, unfortunately, correct that it can be; consequently it is now generally received with a certain degree of suspicion in our law courts.

CARBONATES IN DEVELOPMENT.

The carbonates of the fixed alkalis, especially the sodium salt, have come into such general favour for developing purposes that it is probable they are far more used at the present day than the old favourite ammonia, although there are still many photographers of experience who continue to pin their faith to the old combination of "pyro and ammonia" for the best—or at least—the most trying classes of work. The carbonates have gained this popularity chiefly, no doubt, by reason of the cleanliness of work they produce, and the freedom from the various kinds of fog or discolouration that used to be so prevalent This difference in behaviour was sufficiently conspicuous when pyro was almost alone in the field, and it was intensified by the fact that, with the exception of liquid ammonia, no other of the caustic alkalis was found to give favourable results.

When hydroquinone, and afterwards eikonogen, came as competitors with pyro, the carbonates were found to be actually superior in their action to caustic ammonia; and, though soda and potash in the free state were now discovered to be usable, still the carbonates have been generally preferred for general work owing to the more perfect control that can be exercised over their action. Besides this, carbonate of soda is a material so easily obtainable everywhere in a state of sufficient purity and uniformity, that almost every manufacturer of sensitive films has considered it advisable to issue a formula for its use with the result that it is, no doubt, more generally used than all the rest of the developing agents put together.

While the formulæ issued are followed in their integrity a will go well with even the least experienced photographer pr vided he is endowed with sufficient intelligence to follo instructions with ordinary accuracy; but there is a strong te dency to modify and improve upon such instructions, and th too frequently troubles arise that are set down to any but t proper causes. For instance, there are several formulæ pu lished in which caustic soda is the active agent employed, a this in combination with other ingredients proves to give t happiest results. But the tyro, possibly attributing t excellence of working rather to the combination of *oth materials* than to any special property of the alkali, and p ferring carbonate of soda to the hydrate, as being cheaper a easier to obtain substitutes, the one for the other, arriving some unknown means at what he supposes to be the pro equivalent of carbonate to be used in place of the caustic alk What wonder can there be if the result is altogether d appointing?

In the first place, it is practically impossible to compare t two forms of alkali when considered merely as such; in otl words, it is impossible to substitute the one for the other ir combination without generally remodelling the formula.

To compare potash, soda, and ammonia in the free state, with the other, is perfectly feasible, because it is a sim matter to ascertain with the utmost accuracy their respect alkaline values, and any variation in their subsequent behavi may be set down to the alkali itself; but in endeavouring arrive at any accurate comparison between caustic soda, s and the carbonate as developing agents is a very differ matter, though it is quite easy to estimate the proportion the former contained in the latter. But, in making this e mation, it is not only necessary to dissociate the carbonic a contained in the carbonate, but also to get rid of it enti from the solution; and this, though easy in a purely chem sense, is not so readily effected—if it can be effected at all- the case of the developing solution. Carbonic acid in natural state exists as a gas, but is very soluble in water, when liberated from any of its combinations in aqueous solut a large portion of it remains dissolved in the liquid, the ex only being thrown off with effervescence. To completely rid of the gas held in solution involves the repeated boilin the liquid, an operation which, it is scarcely needful to p out, is a practical impossibility when the developing solu is concerned.

Carbonic acid has been shown to be a restrainer of deve ment, acting in much the same manner as soluble bron This can be easily proved by passing a stream of the gas water until it will take up no more, and using the solutio formed for developing purposes. Bicarbonate of soda—th carbonate of soda *plus* carbonic acid—was, in fact, some y ago proposed as a restrainer, and, as such, under certain ditions, it answers admirably. The precise restraining a of aqueous carbonic acid differs in degree as well as in char from that of soluble bromide or of other restrainers; in it is difficult, if not impossible, to accurately estimate therefore, in attempting to compare the caustic alkali wit carbonate, and to substitute one for the other, we have to on the one side, with the pure alkali; on the other, with the *plus* a restrainer indefinite alike in character and strength.

It will not be difficult to conceive how these facts may

altogether upset the working of an otherwise good formula en one form of alkali is exchanged for the other. The difficulty uncertainty would be comparatively slight if the question of trainers and other added materials were entirely eliminated, t is to say, if a simple mixture of the active developing nt—pyro, hydroquinone, or eikonogen—and the alkali was that was required. In that case it would be merely a tter of employing a more (or less) active "energiser," or at outside of introducing a mild restrainer, the comparative ion of which, in the absence of other complications, would be difficult to arrive at.

But if we take any of the usual formulæ as they exist, con- ining, as they invariably do, sulphite of soda, or some equi- ent, together with citric, sulphuric, oxalic, or sulphurous acid, well as bromide, alkali, and, finally, the real developing nt, the mere substitution of a carbonate for the caustic ali, or *vice versâ*, may, and, as a matter of fact, frequently s, work an entire change in the character and behaviour the mixture. It may even be the case that, though the ali may be changed with comparative impunity in one mula, such a course proves to be wholly inadmissible in ther; as, for instance, where the basis of the developer y vary between pyro, hydroquinone, and eikonogen, all which differ more or less in their behaviour with other redients.

It has long been known that most, if not all, of the pre- vative agents employed to prevent the oxidation of the stock- eloping solutions act more or less as restrainers or retarders development, though bromide is usually the only restrainer ken of as such. Many apparently neutral salts—such, for ance, as the sulphates and nitrates of the alkalis and aline earths, are also found to exercise a powerful slowing ion, while the citrates are specially used as amongst the most erful restrainers that can be used in cases of over-exposure. e acids, of course, act in the same direction, first by virtue heir power of neutralising so much alkali, and so reducing energy of the solution, and further in consequence of the bination so formed. It has also been shown that these ous substances act less powerfully in conjunction with pyro h with either eikonogen or hydroquinone, the last-named g far more seriously affected than either of the others by excess of restrainer.

t is evident, then, that a formula carefully adjusted for , say, must be altogether re-arranged as regards proportions ulphite, bromide, and other materials, if it is intended to stitute hydroquinone or eikonogen, a fact that is too erally overlooked by those who, in changing the active eloping agent, adhere to the same combination of alkali, rainer, and preservative that has previously worked satis- orily.

et us glance briefly at the different developing agents and r behaviour. Pyro, the oldest of the three, is known to ess the strongest tendency to produce stain and fog, and sing this with ammonia it is almost compulsory to employ e restraining bromide, though the use of sulphite is optional pt for preservative purposes. Caustic potash and soda are, lready stated, not suited for use with pyro, but the car- tes may be employed with advantage, and their adoption away at once with the absolute necessity for bromide, gh it is generally employed in reduced proportions. With roquinone and eikonogen, on the other hand, which exhibit proneness to stains and abnormal reduction, bromide, and sulphite, may be altogether dispensed with; though here, again, it is usual to employ one or both in actual working, especially when caustic alkali is used in combination. But the quantities, especially of bromide, must be much smaller than in the case of pyro, unless the time occupied in development is to be very protracted.

When either of the carbonates is used with the two last-named agents the bromide is perhaps altogether better dispensed with for normal exposures, the carbonic acid serving perfectly well its purpose; but sulphite undoubtedly renders assistance both as a restrainer and as a preventive of discolouration. The time of development is not then unduly protracted, which is especially the case if even a moderate quantity of bromide is used with hydroquinone. When, however, the caustic alkalis are used the necessity for bromide becomes as great as with pyro and ammonia, not only in the interests of clearness and freedom from fog, but also to curb the otherwise too great energy of the solution, and it is here where mistakes are chiefly made in altering or tampering with recognised and tried formulæ.

Thus, take a well-known published formula, in which the two solutions consist of hydroquinone and sulphite of soda, with a little citric acid, and caustic soda, sulphite, and bromide respectively. This works well with most plates for what are known as "normal" exposures, developing almost as rapidly as pyro or eikonogen; but if the caustic soda is replaced by carbonate, in whatever quantity, the other ingredients remaining the same, the action will be so slow as to render the developer practically useless. With the caustic alkali the combination forms an admirable one for instantaneous work, for which it is utterly unfit after making the substitution. The additional check put on by the carbonic acid introduced is sufficient to bring out the worst faults of the hydroquinone, and to justify the character that has been given to it by many of being entirely unsuited for quick work.

Many operators now use, instead of sulphite of soda, the meta-bisulphite of potash, a salt that contains the largest possible excess of sulphurous acid. This is an admirable preservative, and well suited for use in conjunction with any of the caustic alkalis, its free sulphurous acid being then converted into neutral sulphite, it being only necessary to allow for the quantity of alkali thus taken up. But, if either of the carbonates be used, the sulphurous acid is converted as before; but in its place is left an equivalent of carbonic acid, which remains in solution in the free state, or what is tantamount to the same thing, and converts a portion of the carbonate into bicarbonate. Even if the necessary allowance of alkali be made, the developer is still altered to the extent of containing a large addition of restrainer. Where meta-bisulphite of potash is used in conjunction with a carbonate, it would therefore be advisable to combine with the latter a certain proportion of caustic alkali sufficient to take up the free acid, and thus avoid over-loading the solution with restrainer.

The same remark applies to all cases where free acid is used for the purpose of preserving the stock solution, for then no great harm is done by the conversion of a portion of the alkali into a neutral and comparatively inert salt. Sulphuric and citric acid both form compounds which, even in small quantity, exercise an appreciable retarding effect, and, if this be supplemented by the setting free of a quantity of carbonic acid that cannot be got rid of, the effect may be disastrous in the case of rapid exposures. For ordinary work the harm done may

possibly cease at a considerable and unnecessary waste of time in development, but for instantaneous work it would amount to loss of time, plates, and results.

PHOTOGRAPHIC ENAMELS.—III.

The development of the image in vitreous powder calls for considerable skill and judgment. Assuming the powder and the brush to be quite dry, and the positive impression freely moist in the precise degree to which it was protected from light, the picture is gradually and evenly built up, the dark parts, the half-tones, and the finer details appearing slowly but regularly just in the manner of a developed positive in silver. It is advisable to remove the colour from the picture occasionally, so as to let the atmospheric moisture have access to the plate for a minute or two, the brushing-in being then resumed. By this means great detail is obtained as well as general force and vigour of image. Over-exposure will cause the half-tones and detail to be lost, while in the opposite case there is a weakness and flatness of image for which there is no really good remedy. In the latter event the effect of breathing on the plate, together with the incorporation of some finely ground moist sugar with the powder, may improve the picture so far as mere density is concerned, but not otherwise, so that as a rule it is better to coat a fresh glass and make another exposure. When development is finished the picture should be fully—in fact, rather over—dense than otherwise.

After the superfluous powder has been carefully removed from the picture it is coated with plain collodion, and when the film has set the plate is soaked in water made just alkaline until the bichromate is entirely removed, is then well washed, and finally soaked in water, rendered slightly acid with nitric acid, for an hour or two. The film will loosen in this solution, and it may then be detached from its support in the way already described for the substitution process.

It will probably have been noticed that we have spoken of the sensitive hygroscopic mixture being flowed on to a sheet of plain glass, and a film of collodion being applied to the developed picture. In this case the picture is floated on to the plaque, collodion side downwards. Some operators, however, not only prefer to coat the glass with a film of collodion, but to bring the vitreous image in actual contact with the plaque, thus leaving the film of collodion uppermost. The latter must then be dissolved off before firing, the last-named operation being done according to the method we previously gave.

The glazing of the picture is conducted in the same way as in the substitution process, repeated firings being generally necessary. Indeed, experienced photo-enamellers will tell you that to this part of the process as much importance is attached as to any other, since the transparency and "bloom" of the picture is due to a great extent to the number of re-glazings and re-firings given. There are various glazes used in this and kindred processes of enamelling, which usually consist, we believe, of mixtures containing borax, red lead, and silicious matter, or cognate substances, melted, dried, and pulverised.

After what we have said upon the essential principles of photo-enamelling processes, we suppose that few of our readers will be unable to see in what respect the carbon printing method may be made applicable; and a similar observation doubtless holds good with regard to the various swelled gelatine processes of printing. On the latter score, however, and adverting to the subject of collography, upon which we had two leading articles some weeks ago, we may pause to note that Mr. Warnerke, at the conclusion of his lecture, delivered before the Photographic Society on the 4th of March last, drew attention to the fact that his simplified collographic printing process had certain capabilities for adaptation to photo-enamelling. Instead of the ordinary litho ink with which the gelatine picture on parchment is "rolled up," an ink composed chiefly of vitrifiable powders is used. A paper transfer is then taken, the surface of the plaque treated with Venetian turpentine, the transfer damped, placed in contact with the plaque, and moistened with alcohol, water, and glycerine. Upon peeling off the paper, the impression in vitrifiable ink is left on the plaque, which is then ready for firing. Mr. Warnerke showed some pictures on porcelain produced by the method.

Perhaps we should here make mention of the fact that most of what we have written as to the production of vitrified pictures on porcelain applies also, almost point for point, to glass as a final support. Thus, for example, in the instance of the powder process, the sensitive hygroscopic mixture could be applied at once to the permanent glass support and development, firing and glazing be performed without the necessity of transferring the picture. Indeed, this was, perhaps, one of the earliest applications of the powder process to photographic enamelling.

We have no doubt at all that many of our readers, particularly those who are unacquainted with the wet collodion process and are loth to go to the trouble of acquiring any knowledge of it, or of the powder process, will be tempted to ask if a tolerable transparency in gelatine would not be suitable for vitrification. We are unaware of gelatine transparencies ever having been commercially employed for the purpose, while at the same time we are not prepared either to admit or to deny the impracticability of so employing them. Gelatine films, we have been often assured, "split" when the plaque is introduced into the muffle; but against this unsupported accusation there is a good set-off in the fact that a vitreous picture in gelatine produced by the carbon method may be fired on a porcelain tile with perhaps hardly less certainty of success than a collodion transparency or a powder image on an organic support. Why, then, should a film of gelatine from a glass plate rest under the suspicion of exhibiting the fatal phenomenon in question? Is it because the preparation and treatment it undergoes, in contrast to that of the pigmented gelatine, imparts to it the property of superior resistance to the heat of the furnace?

We are unable, from our own experience or from that of others, to throw much light on the matter; but the fact remains, however, that thus far photo-enamellers have fought shy of gelatine films for firing. There is, nevertheless, we are confident, a remunerative field of experiment open here, and we hope that those who have opportunity and leisure will put the point to the test. It would be necessary, of course, to detach the gelatine film from the support, which could be easily accomplished by the hydrofluoric acid method so often referred to in our pages. The remaining operations would be precisely the same as those followed in the collodion substitution process. All else being equal, gelatine could hold its own with collodion here, since whatever disadvantage, assumed or otherwise, a picture in the former would have as against collodion in the way of purity and brilliancy, it would, of course, disappear with the destruction of the film in the furnace.

We trust to witness a revival of interest in ceramic photography in this country, as it is a process which ill deserves neglect. All things considered, there is no method of

cing photographic pictures superior to it for the beauty d permanency of its results, and posterity will have a genuine evance against us if its merits are not practically and liberally ognised.

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the last meeting of the Royal Astronomical Society (held on the h inst.), Mr. Isaac Roberts, whose well-known nebula and other ronomical photographs entitle his dicta to be received with the most consideration, entered fully into one class of his experiences photographing stars. He had taken many photographs of the ne stellar regions on nights of different quality, and was not at all le to judge from the appearance of the sky what number of stars was likely to obtain. On some nights he had got 400 stars with exposure of fifteen minutes, where on other nights, exposing for ir times as long, his negative only contained 100. He found that se results were not influenced by moonlight one way or the other.

HAT influence such conditions as these may have upon the results the great project at present filling the minds of astronomers—the otographic chart of the heavens—it is impossible to forecast. fficient trouble was found in hitting upon a suitable time for ex- ure for each plate. The sub-committee appointed to consider the ject recommended forty minutes, a longer time, such as would ice to obtain an image of a fourteenth magnitude star, being con- ered to impose too great a strain upon the observer.

OTHER question greatly discussed is the relation between star gnitudes and the exposure given to the plates. In the Bulletin olished by the Committee M. Max Wolf describes his experiments calculations. He deduces the conclusion that the increase of the meter gets smaller and smaller as the exposure increment is mented. M. Dunér propounds a definition regarding the deter- ation of the photographic magnitude of stars by measurements on atives. "The relation between the light of two stars which er from each other by a photographic magnitude is expressed by factor with which the time of exposure on a given plate must multiplied or divided in order to render the diameter of the image star on the new negative equal to the image of another star on given negative." This is an arithmetical ratio; but the Astronomer al, at a recent meeting of the Royal Astronomical, said that Turner finds that, comparing thirty minutes' and six minutes' sure, the diameter a function of a geometrical ratio, and between cube and square root the 3·3rd power. At the same meet- Mr. Ranyard pointed out that the image of the stars varied the different instruments used for photographing them with, rding to whether the image was at the centre or the edge of the e. Then, again, and most important, one of the resolutions of the -map Committee was that each Observatory chose the best plates uld obtain. How, in face of such a decision, a fixed-time ex- ure was settled upon is difficult to imagine, for, though the various ers now make plates of surprising uniformity, maker by maker, various brands differ to a most considerable extent.

EW process for the preparing of oxygen gas has been discovered M. Kassner, and may prove to be very valuable. It is based on singular properties of a salt known as plumbate of lime, supposed ve the composition of $Ca_2 Pb O_6$. When it is heated with an line carbonate it is decomposed, the result being at first carbonate me and peroxide of lead. Now, this compound is further decom- d when the heat is increased, protoxide of lead and oxygen gas g produced. The oxygen being a gas is easily collected, and the stage is really remarkable. The non-gaseous product, when ex- d to the action of a current of atmospheric air at a certain tem- ture, is transformed into the original mixture the process started . All that is necessary to make the project a commercial success at this to-and-fro process should be capable of indefinite, or, at rate, of frequent repetition. Herr Kassner considers his process rior to the well-known Brin, seeing that the formation of the plumbate is brought about in the course of a few minutes, that its decomposition by carbonic acid is complete, and, finally, that the working expenses, cost of plant, and the value of the material employed are extremely small.

A FRENCH meteorological journal gives a list of plants which, by their behaviour under different atmospheric conditions, enable weather prognostications to be made. Not to weary our readers with too long a list, we may say that rain may be expected when the stalks of clover and other leguminous plants stand upright. The closing of the convolvulus, the pimpernel, the sorrel, the bindweed, &c., indicate rain also; while the opening of the sorrel, the African marigold, indicate fine weather. The opening of the lettuce flower, on the contrary, leads to the expectation of wet weather.

As great effects are sometimes produced by small and ofttimes hidden causes, it may be well to describe a simple method for discovering a possible impurity in a much-used developing chemical—carbonate of soda, the impurity being "hypo"—Herr Musset has recently pointed out that thiosulphate of soda may exist in carbonate of soda, but that it may be readily detected by mixing with a suspected sample one-fiftieth of its weight of calomel, and rubbing the whole with the addition of as much water as calomel. The smallest trace of hypo at once blackens the calomel.

IF it be desired to obtain a sample of iodine free from chlorine, this may be brought about, according to the same chemist, by fusing the iodine beneath a solution of iodide of potassium sufficiently concentrated not to boil at the temperature employed. After crushing, draining, and washing, it is free from chlorine. The same solution may be used repeatedly.

FURTHER NOTES ON ELECTRO-CHEMICAL REVERSALS WITH THIO-CARBAMIDES.

As a postscript to my former paper on this subject, it was stated that an experiment with a pair of silver plates coated with precipitated silver bromide, of which one had been exposed to light and the other not, when connected with a very sensitive galvanometer and immersed in a plain eikonogen-lithia developer, showed a distinct electrical current, the needle deflecting towards the left; but, when a pair of similar plates were immersed in the same way in some of the same developer containing five drops per ounce of Professor Reynolds' compound salt of thio-carbamide and ammonium bromide, the current was reversed, and the needle deflected to the right. It was found that with the ordinary developer the exposed plate formed the negative pole of the galvanic couple, and produces a negative photographic image, while, with the thio-carbamide developer, it becomes the positive pole, and produces a positive photographic image. This reversal of the current has since been successfully repeated with the same kind of plates and developer, and also with a developer containing thio-sinamine.

Silver plates, bromised by immersion in bromine water, have also shown the reversal of current clearly, and I have apparently been able to obtain it on ordinary gelatine dry plates, though in this case the currents are exceedingly weak. There is, therefore, practically little doubt of the fact of the reversal taking place.

With silver plates it was found that the observations were rendered rather uncertain by reason of the comparatively strong currents caused by polarisation, especially after the plates had been used a few times, being cleaned merely by a good rubbing with emery powder and polishing, and therefore more or less impure on the surface. They can, however, be rendered pure by heating to a red heat and quenching in dilute sulphuric acid. It is desirable to do this always before using the plates.

Experiment having shown that it was possible to obtain evidence with the galvanometer of electrical action between the exposed and unexposed halves of a gelatine dry plate during development with ferrous oxalate, various methods of rendering gelatine dry plates sufficiently conductive to show the currents formed during development were then tried. Among the substances used were: (1), Gilt plumbago, which did not answer very well. (2), Silver bronze powder, which is generally a very good conductor, but did not

answer at all in this case; the current from a battery would not pass. (3), Reduced silver in very fine powder, as deposited from mirror silvering solutions. This is an admirable conductor for ordinary electrotyping purposes, and also answers well in this case when applied wet, and polished after drying, so as to give a bright and fairly solid coating. (4), Silver leaf. This answers well, but not quite so well as gold leaf.

The gold leaf seems perhaps the best material to use, because the gold conducts the current without exercising any chemical action with the developer, which might of itself cause currents. It is not so readily attacked by the sulphur set free at the negative pole as silver is, though some action probably does take place.

Either gold or silver leaf can quite easily be applied to the plates. The following method is effective.

Take a piece of stout blotting-paper, rather larger than the sheet of gold leaf; moisten it slightly, so as to leave it evenly moist without being wet, and lay it down carefully over the gold leaf, smoothing it lightly into contact all over. Then lift up the paper, to which the gold leaf will attach itself. The sheet can then be cut into convenient sizes, and the pieces applied to the gelatine surface of the dry plates. A piece of hard, dry paper is laid over the blotting-paper, and well rubbed down with the finger. The blotting-paper will then be found to come away quite easily, leaving the gold leaf attached to the plate.

Another method, which answers very well, is to coat the glass slips with a thin substratum of gelatine and chrome alum; when dry the gold leaf is applied as above. Strips of sensitive gelatine film, which in the case of Wratten's "ordinary" plates, may easily be stripped from the original glasses, can then be transferred to wet blotting-paper and laid down over the gold leaf, much in the same way as the gold leaf itself. This method has the advantage that the gold leaf is not in contact with the developer, and the currents seem to pass quite as easily as when it is outside the gelatine films.

The dry plates used were Wratten's "ordinary," in slips about four inches long and one and a quarter inch wide—the same as the silver plates.

The gelatine offers a considerable resistance to the electrical current. A current from a bichromate cell, which, when passing through a pair of bromised silver plates in eikonogen developer, will mark a deflection of between 80° and 90° with the tangent galvanometer, when passed through a pair of gelatine dry plates faced with gold leaf and immersed in the same developer will mark only 40° to 50°. Consequently, the currents produced by the action of developers, with or without thio-carbamides on exposed and unexposed dry plates, are exceedingly weak, and only just perceptible with the very sensitive suspension galvanometer. With silver plates coated with silver bromide the currents are very much stronger, but, as stated above, the results are somewhat uncertain owing to polarisation currents. In all cases the currents produced with the thio-carbamide developers are stronger than those produced with the plain developer.

It is not yet quite clear how this reversal of current is produced, but some observations by W. Skey, recorded in Vol. XXIII. of the *Chemical News*, throw a good deal of light on the matter. He found that metallic sulphides which have the power of conducting are also capable of generating electricity; and, from a list he gives of the relative polarity of different sulphides, it appears that silver sulphide is positive to silver. In a battery consisting of a sulphide and a metal in acidulated water, the gas liberated is sulphuretted hydrogen, the nascent hydrogen exerting a desulphurising action upon the metallic sulphide, the ultimate effect of which is in some cases to completely reduce the mineral to the metallic state.

This seems to bear out the observation recorded in my first paper of the *reducing* effect of the thio-carbamides in alkaline solution on silver haloids.

Skey also shows that sulphides are capable of performing the function of the negative element of a galvanic couple.

We have seen that the galvanometer shows that with the ordinary developer the exposed parts of a sensitive surface of silver bromide form the negative pole of a galvanic couple, and, consequently, by the laws of electrolysis, they attract the deposit of reduced silver, the alkaline metal, and the hydrogen, whilst the liberated bromine or other acid radical elements and the hydroxyl go to the unexposed parts forming the positive pole.

On the other hand, with the thio-carbamide developers silver sulphide is formed by the action of the developer on the unexposed parts of the picture, which then become the negative pole instead of the positive, and attract the sulphur, the hydrogen, the alkaline metal, and some of the deposited silver formed by the action of the developer on the exposed parts of the plate, which now become the positive pole and attract the bromine and the hydroxyl, &c., the former combining with some of the remaining deposited silver to form silver brom which is dissolved out by the fixing solution, leaving more or residue of reduced silver.

There can be little doubt, I think, that this is, roughly sta probably the correct explanation of the reversals, though m remains to be done in working it out fully, in order to throw n light on the various reactions which take place. A further invest tion might result in finding some method of making the photogra reversals more perfect, and it seems likely that an electrolytic exami tion of various developing agents would afford valuable informa on the general theory of development. The currents produced however, so weak that their satisfactory observation would b matter of some difficulty. The subject is one of which I have little knowledge, but it is to be hoped that the investigation may taken up by some one more competent to deal with it.

COL. J. WATERHOUSE, S.

Journal of the Photographic Society of India.

ON GOLD-COLOURED ALLOTROPIC SILVER.*

Action of Different Forms of Energy on Allotropic Silver.

1. *Action of Electricity.*—High tension electricity instantly verts gold-coloured silver to the ordinary form. When paper cov with a film of gold-coloured silver is held between the conductors Topler-Holtz machine, each spark forms a grey dot of ordinary si A powerful discharge is not necessary; an inch spark from a s machine is effectual, even when the condensers are cut off. Th also a lateral action which is best seen when several slips of such are held loosely together and placed between the conductors. Whe slips are opened a little the lateral branches are beautifully seen, pla through the silver. Their fine emerald-green colour contrasts the purplish shade of the spark. When several pieces are in this held between the conductors together there is a transfer of silver one piece to the other, so that the back of each piece of paper is b ened by silver carried over from the one behind it.

That the branching grey spots in this way formed are normal is easily proved by immersing the piece in a dilute solution of p sium ferricyanide. The part acted upon by electricity is not aff by the reagent, while the rest of the film shows the colour characteristic of allotropic silver. In Plate I. the upper figure s a slip of paper at one end of which electricity has been transmi and the figure below, a similar slip that has been subjected t action of the ferricyanide, showing that where electricity has p the silver has become normal, and is not affected by the reagent.

2. *Action of Heat.*—Allotropic silver is converted by heat to n silver in either the wet or dry state.

Dry Heat.—When films of allotropic silver on glass are place water desiccator, and are kept at 100° C. for eight or nine hour central positions are converted into the intermediate form, wh the edges there is a border of greyish white ordinary silver. In the change to white silver at the edge commences before the c part is fully converted to the intermediate form.

At higher temperatures the change is much more rapid and marked. At 180° C. the first effect is to darken a little (this is u the first effect of heat); this continues about five minutes. Cont the heat for ten minutes more, the slight darkening disappears a film has a bright, pure gold colour, sometimes with a slight s tinge. The change to the intermediate form is now complet film burnishes yellow, and does not react with potassium ferricy It is of interest to remark that the colour reaction persists as l there is a trace of unconverted material, *so that a film may b yellow and yet show a well-marked colour reaction.* This is b most, but not all, of the material has undergone conversion At 200° C. the film begins in about ten minutes to show a white h and in half an hour or thereabouts it whitens completely. In experiments the best support for the film is chemically clean except that for testing the burnishing a film on paper is needed. paper should be very pure.

Allotropic silver in the solid form heated to 180° or 190° for fifteen minutes undergoes a similar change; whereas before easily pulverised, it is now almost impossible to reduce it to p and the powder is yellow instead of being greyish black.

Moist Heat.—A film spread on pure paper, and placed in d water maintained at 99° or 100° without actually boiling, at the half an hour is converted almost wholly to the intermediate It burnishes pure yellow, but still shows traces of the col action.

* Continued from page 230.

better plan of operating is to immerse a film spread on glass in
ed water, and to place it in a desiccator with a water jacket.
keeping for twenty-four hours close to 100° C., the film has
ne pure white. It is not disintegrated by the change, but may
tached from the glass in films exactly resembling ordinary silver

e effects of heat are shown in Plate I., lower pair of figures.

Action of Mechanical Force (*Shearing Stress*).—The slightest
cation of force suffices to instantly convert gold-coloured allo-
c silver to normal silver. A glass rod with a rounded end drawn
ly over the surface of a film on paper leaves a white trace behind
The force sufficient to cause this change is so slight that one might
t its reality were it not for the decisive proof immediataly at
. First, there is the characteristic change of colour; the film is
llow and as brilliant as gold leaf, the line drawn by the glass rod
pure white silver. Immersing the film in a solution of potassium
cyanide the white lines simply change to gold colour, whilst the
surface on which they are drawn passes through a brilliant
ession of colours. (These effects are represented in Plate II., the
rmost figures). For this use, freshly made material should be
oyed, and the film itself should have been freshly spread on pure
r or card, and used within a few hours after drying. This because
s easy partial passage, especially in thin films, to the intermediate
, in which it gives a yellow streak. (See also remarks as to partial
ersion, *ante*.)

hen the experiment is performed under proper conditions the
t is very striking, by reason of the instant conversion of the pure
yellow metal to perfect whiteness without a trace of colour.

an earlier communication to this JOURNAL it was mentioned that,
ng taken with me on a journey several small vials containing
-coloured silver, they were found at the end of the journey to be
onverted into white silver without having undergone any dis-
egation, and retaining the original shape of the fragments. The
e silver formed had the fine frosted white colour of pure silver.
change was attributed to the friction of the fragments against
other, occasioned by the motion of the journey, a conclusion that
confirmed by finding that, when cotton wool was forced into the
ty part of the vial in such a way as to prevent all internal move-
t, the substance could be sent over a fourfold distance without
ation.

was also observed (and this is a matter of special interest)
when a partial change had been effected by friction, this
ation went on, although the substance was left perfectly at
until it became complete. With time, all solid specimens of
ropic silver undergo this spontaneous change to bright white
r, apparently normal silver, even when thoroughly protected
light.

t of over twenty specimens in tightly corked tubes, packed in
x and left in a dark closet for a year, not one escaped con-
on. Spread on paper or on glass and duly protected, this
ge is slower.

Action of Strong Acids.—The action of acids upon allotropic
has been already described, it remains only to add here that
onversion to normal silver is entirely unaccompanied by the
e of gaseous matter, not a bubble can be detected by the closest
vation.

acting on dry films with dilute sulphuric acid it is easy to
the conversion gradual and so to trace its passage through the
mediate form.

ith sulphuric acid diluted with four times its bulk of water
llowed to cool, an immersion of one or two seconds converts a
n glass or on pure paper wholly to the intermediate form. It
n bright gold-yellow, but shows no colour with the ferricyanide
nt. With sulphuric acid diluted with twice its bulk of water,
used while still hot, the action is instantaneous, and the allo-
c silver is converted into light grey normal silver. The silver
ned in this way is very different and gives no reaction with
sium ferricyanide, whereas even ordinary silver leaf gives a
coloured reaction. (See Plate II., lower pair of figures.) The
acid after cooling acts more slowly, the product is more yellow-
wing to the presence of a certain quantity of the intermediate

Action of Light.—When allotropic silver is spread as a thin film
ss or on pure paper it may be preserved for a length of time
ently unchanged. This appearance is deceptive. From the
nt that the film is formed a slow but steady change commences
can be best explained by supposing that a gradual polymerisation
place. Even after eight or ten hours' exposure to ordinary
e light a distinct loss of activity can be detected by careful
g with potassium ferricyanide. The change which occurs is in the nature of a tendency to a very gradual passage into what I have called the intermediate form, in which the gold-yellow colour remains unchanged, while the chemical activity is lost or much diminished. Although a commencement of this change can be detected in a few hours, it goes on very slowly. By exposure to one or two days of summer sunshine (a much longer time is required in winter) the change is nearly complete. The exposed portions are lighter and brighter, and in solution of ferricyanide they colour very slowly. The question naturally arose whether light by a sufficiently long-continued exposure could complete the change and convert allotropic to ordinary white silver. To obtain a decisive answer the following experiment was made:—

At a window having a south-eastern exposure and unobstructed light there were placed films on glass and on pure paper. Some of these were placed in a printing frame under an opaque design. The others stood side by side with the first, but uncovered. The exposure was continued for four months, from the end of January to the end of May. At the expiration of this time the uncovered paper and glass films were still bright yellow. But of those in the printing frame the exposed portions had become nearly white, while the protected parts retained their full deep gold colour. It may at first seem strange that the uncovered pieces were less affected than those exposed in the frame. But this difference was always observed, namely, that if two films were exposed side by side, the one in a printing frame under glass, the other simply fastened to a board, the last-mentioned was always the less affected. The explanation of this seeming anomaly lies in the fact that allotropic silver is always much more easily affected by heat than by light. The glass in the printing frame by exposure to sunlight becomes hot to the touch, and thus the film under it is kept at a temperature many degrees higher than that of the other film that is freely exposed to the air. The higher temperature aids the effect of the light.

Since this was written I find that both Herschel and Hunt noticed an analogous fact in the case of silver chloride, viz., that paper prepared with it darkens more rapidly under glass than when freely exposed, without, however, suggesting the cause, which is the same in both cases. I have observed that silver chloride darkens more rapidly when exposed under warm water than under cold to the same light in vessels side by side.

It appears, therefore, that the agency of light is somewhat similar to that of the other forms of energy, but very much slower. Experiments made for the purpose demonstrated that it is the more refrangible rays that effect the change.

With light, the production of the intermediate form is never very satisfactory. Long exposures are needed, and before the change to the intermediate form is complete the further alteration to white seems to commence. With heat the changes are much better marked. When a film on pure paper has received an exposure of one or two days of summer sunshine under an opaque design, the exposed portions are sufficiently changed to have lost much of their chemical activity, so that when the film is plunged into a bath of potassium ferricyanide the effect given in the lower figure of Plate III. is obtained. The colour represented is one of an immense variety of tints produced by this reagent on the unaltered or active form. The upper figure of the same plate gives the effect of a very protracted exposure (as above described) on pure paper (or glass) under glass. With some kinds of sized paper this effect is produced by a much shorter exposure, apparently owing to the presence of traces of a hyposulphite,* which appears to aid the action of light.

These seem to be not merely new facts, but to belong to a new class of facts. No instance has been hitherto known of an element existing in so great a variety of forms and passing so readily under the influence of any form of energy from one to another of them.

It is evident that a connexion must almost certainly exist between these varied transformations and the changes which many silver salts undergo through the action of light and other forces. This connexion will form the subject of the second part of this paper. The present part will be concluded by a somewhat fuller description of the colour reaction which is especially characteristic of allotropic silver.

The Colour Reaction.—When allotropic silver is immersed in a solution of a substance readily parting with oxygen or sulphur or with a halogen, a film is formed which exhibits the colours of thin plates.

* The behaviour of these varieties of papers led me to make inquiries of an intelligent paper manufacturer, from whom I learned that every sort of paper pulp is now treated with chlorine. As any portion of the bleaching material left in the paper would eventually destroy its strength, it becomes necessary to add hyposulphite in excess to remove it. Accordingly, every specimen of sized paper that I have examined contained hyposulphite; even the purest photographic papers were not free from it, though containing greatly less than most others. Apparently, the only difference is, that with photographic paper more care is taken to avoid any considerable excess of hyposulphite.

Such phenomena are familiar, and are seen in the blueing and yellowing of steel in tempering and the colouring of other metals when covered with films of oxide or sulphide. With allotropic silver the colours are very brilliant, probably because silver is the best of all reflectors for rays having a nearly perpendicular incidence, sending back about ninety per cent. of such. Light, gold-coloured silver gives the most brilliant effect.

The substances which produce these reactions are potassium ferricyanide and permanganate, ferric and mercuric chlorides, alkaline hypochlorites and sulphides, mixtures of potassium bichromate with hydrochloric or hydrobromic acid, solution of iodine, &c.

Potassium ferricyanide in a five or ten per cent. solution is the best of these reagents, because its action is more distinctive.

In particular the blues which it gives are of great purity, and the purples are very rich. Ferric chloride gives beautiful tints, especially a peculiar glittering rose colour. It must be very much diluted, until the solution loses its yellow colour and takes a straw shade. It often happens that the characteristic colour does not appear whilst the film is in the solution, but a bronze shade only, the permanent colour appearing only after the film has been dipped into water and blotted off. Potassium permanganate also gives rise to a beautiful succession of colours on allotropic silver, but is somewhat uncertain in its action.

A ferricyanide is, therefore, the best reagent. As to the substance constituting the film which is formed, it is difficult to say whether it is silver suboxide or ferrocyanide. When potassium ferricyanide is allowed to act on moist allotropic silver suspended in it, and the action of the ferricyanide is carried to its limit, the silver is entirely converted into a yellowish white powder, consisting almost wholly of silver ferrocyanide mixed with a little silver ferricyanide.

Of the many varieties of ordinary silver which exist, allotropic silver is convertible into two only. The high tension spark, heat, and acids convert it to dull grey silver. On this variety potassium ferricyanide has no action whatever, as will be seen by an inspection of the plates. Light under glass and pressure each convert allotropic to bright white silver, and on this form potassium ferricyanide acts slightly, converting the silver colour to gold. It is needless to say that this gold colour has nothing to do with allotropic silver; it seems to be produced in the following way:—When potassium ferricyanide acts on films of allotropic silver, its first effect is to deepen the gold colour to a gold brown, passing rapidly on to other shades. The action on the bright white silver is very slight and apparently just reaches this gold stage, which corresponds to an air-film having a thickness of from 0·000150 mm. to 0·000160 mm.

The succession of colours obtained on allotropic silver with potassium ferricyanide is as follows:—

First order.—Russet brown, brown red.

Second order.—Rich and deep purple, dark blue, bright blue, pale blue green russet, red.

Third order.—Reddish purple, bluish purple, rich green.

The fourth order is not reached, for after this the colours become much mixed. Probably the action is no longer sufficiently uniform. The other differences, besides the absence of the fourth order, as will have been observed, are that in place of the yellow of the second order, corresponding to a thickness of air of 0·000432 mm., there is a green, though of a more russet shade than that of the third order. In the third order there is at no time a pure blue corresponding to 0·000602 mm., but only a succession of beautiful red and blue purples, gradually passing into green.

There are few more beautiful experiments than to watch these changes. Purity of colour, however, depends much on the purity of the paper employed. Want of this purity will often cut short the changes at the pale blue of the second order.

I have endeavoured to give some idea of these colours in the plates which accompany this paper, but it has proved to be a most difficult task. The colours represented are: Plate I., purple and blue of the second order; Plate II., purple of the second order and green of the third order; Plate III., brown red of the first order. It has not, however, been found possible to correctly reproduce the brilliancy and depth of colour of the originals. M. Carey Lea.

PICTORIAL COMPOSITION.*

For a still stronger confirmation of the principle that one object or one feature of interest must not be placed perpendicularly over or under another, Harding refers the student to the next illustration, Plate XIV. As it is a view from nature, and composed of objects whose forms would be readily recognised by those who know, they must therefore be strictly true in kind and relation. Not so, however, the figures, except in costume. These are left to the will of the artist, and we can now examine how far the observance of this principle operates to assist him. Take, first, the leading features, those which come against the sky and strike at the first glance; the church and the two turrets right and left of it, seen over the roofs of the houses, and also the most prominent gables.

If the eye be allowed to travel down the surface of the picture, it will be found there is no object of remarkable interest under any of them, and that the figures themselves have also been thus arranged in relation to each other, as, for instance, the man and the cart in the distance are placed over the space between the heads of the centre group of figures in the foreground. It will also be observed that this the principal group is made to occupy precisely that portion of the scene which of itself—that is, without aid from extraneous features—would possess no interest; for if a slip were cut out between A A and B B, no object of importance would be removed. Hence, then, this is unquestionably the proper and only place for the principal group.

It will also be perceived that these figures are so placed that neither their heads nor their feet are on a level, for what has been said of the principal features is equally true of the subordinate, equally applicable, and attended with a like result—the expression of space. It will also be found that these groups, like all the other features constituting the pictorial beauty of the scene, are of different forms and quality. Now, if these principles be true, it should be difficult to make any change in contravention of them without damage by removing any of the figures or objects; or when applying them, to discover if the composition be perfect or not, then it should be impossible that any change in conformity with them should not make the picture better. Let the student try, for he is not to take these things on trust; conviction of their truth and utility must come from reason and experience.

There is no need to follow Harding in his further illustrations of this subject of composition. Much is, of course, applicable mainly to the painter, but I think most people who have any artistic sympathies will agree with him in some of his concluding paragraphs. He says, "Beauty in pictorial composition is as superior to individual beauty as a beautiful structure is to any of its parts. The richest collection of materials amount to little more than a confused and useless heap unless arranged in graceful order." And, again, "Composition is of the highest importance to the artist as the field for the exercise of his talents in combining and arranging his objects so that each may derive an additional charm by association not belonging to it separately. With all this he must include considerations of the light and shade and colour; for whilst he assigns to each object its proper place to develop a beauty arising from one form operating on another—whilst he places the large in opposition to the small, the dignified against the humble, the near opposed to the remote, the flexible against the rigid, lines suggesting motion and others tranquillity, and the perpendicular against the horizontal, he obtains but part of the beauty derivable from composition if he fail to anticipate and prepare for those effects which he must derive from the aid of light and shade and colour."

In treating of light and shade, Harding says, "In painting the compound termed light and shade—the 'chiaroscuro' of those who prefer a foreign technical term to one supplied by their own language—simply means, when used in reference to an individual object, that relative degree of light and darkness in the colour or colour which causes it to assume the appearance of having the same external qualities of form that it naturally presents to the eye. When used with reference to a group, or groups of objects, it means their comparative lightness or darkness in relation to the whole picture; and in this, again, the light is said to be well managed where all the parts having their proper degree of relief contribute to the production of a good general result."

I propose to show two or three of his illustrations in reference to this subject, and, without wearying you with his long treatment of general principles, quote only his comments on these pictures, which, however, speak for themselves. Every picture produces a different impression upon us from the difference of light and shade, or what is called its "effect," as well as from the difference of subject. All kinds of effects are not suited to every kind of subject; and the various ways in which the light and shade may be thrown or distributed, at the will of the painter, some effects are, or rather must be, better than others. Let the student examine Plates XX., XXI., and XXII., and he will find that they are precisely the same in composition, alike in manipulating, alike in everything but the light and shade. The difference of their effect upon us arises from neglecting or observing an important principle.

* Continued from page 218.

Plate XXI. differs in sentiment from Plate XX., as well as in light and shade; and it is a question to be decided by our own feelings whether the repose of evening be more agreeable than sunshine and showers. In each the several important features are displayed with nearly equal effect.

In Plate XXI. the principal object, the castle, arrests the attention at once, in consequence of it being strongly contrasted with the sky; and, although we are here more sensible of its picturesque contour, we yet lose much of the variety of its different parts in uniform obscurity. On the whole, there is not the same amount of space expressed, because the objects do not generally separate by alternate light and shade, as in Plate XXII., and the trees on the right do not detach from the sky. The monotony which prevails throughout the light and shade would not, however, be felt in colour.

There can be no doubt that, of all the three, Plate XXII. is the least satisfactory, and this is clearly owing to the disregard of placing the most conspicuous object in light. The principal light is on an uninteresting and unimportant feature, namely, on the hill on which the castle stands; and thus, as there is a light immediately behind the group of trees in the centre of the picture, our attention is drawn to them as well as to the castle, the picturesque form of which is all that we see in feeble contrast with the sky. Thus the castle, though of primary importance—for without it the subject has little or no interest—is all but lost sight of in the rivalry of what is insignificant. Nor is this all. The light on the water is immediately under the light on the castle hill, and the light on the rock is also under the light in the sky, and the bridge is nearly extinguished. The whole picture wants space and concentration of interest; and the subject, though good, is reduced in its effect to the level of the commonplace. The value of the principles enforced is here shown by the consequence of their infringement.

Were light and shade only a matter of feeling, as is frequently insisted on, and dependent on the caprice of the painter, there is no reason why the feeling should not have suggested just such light and shade as is here given, the faults of which, be it observed, would be less easily detected in combination with pleasing colour. But are the feelings satisfied with what is done, or can the undirected feelings suggest a change for the better? Is there anything to assure their being nearer the truth in the second effort than in the first?

The successful application of light and shade is but a poor achievement if unaccompanied by sentiment, although the flat surface of the picture be entirely overcome. We demand the magic influence of mid-day, sparkling in abrupt transitions; the mingling shades of dawn and twilight; by the powerful influence of light and shade we crouch at the storm and shiver in the breeze; its poetical influence is independent of subject. In proportion as a subject is poor, compensation must be made by the interest given to the sky. It is the sky which unites the several parts of a landscape into one harmonious whole—it enriches poverty by supplying new forms, or by affording contrast to those which the subject itself possesses. It is to the sky that the landscape painter must look as the great source of pictorial effect worth his recording. Varying for ever in form and colour, its fitful changes are communicated to the landscape, now obscure now bright. *Terra firma* may indeed afford a good subject; but from cloudland we must derive impressive sentiments. Often when the student has roamed far and wide in search of something "worthy of his pencil," he would have done better to have remained at home, and, besides looking to the earth for subjects, have looked upwards to the sky for sentiments in which to clothe them. Without sentiment the painter of landscape would make his mountains high but not inaccessible to all but thought—large, but not immense; his gulfs might be deep, but they would not be profound or terrible; he might paint a storm or a shipwreck, but he would fail to suggest "the remorseless dash of the billows," the "rushing mighty wind," or the "live thunder" from the dark cloud where "Tempest sits enthroned."

Now will somebody say, All you have told us us is very good and distinctly applicable to the arts of painting, but why fetter another form of art with all these restrictions and narrowness of scope? for, if it cannot give all the manifold charms you and Harding desire without so much pains and abnegation, yet photography gives the world something that the most elaborate art has never given—does it not give detail and accuracy of drawing that was never observed before, unless it be in the microscope? The camera may be called the microscope of the field. Verily this is so; and in that sense I would be the very last to fetter photography—it is an invaluable sense; but it must be remembered that this is a scientific sense, and not an artistic one. I am talking of pictorial composition—the science, if you will, of fine art. Harding says, "Individuality or identical imitation is not only absolutely impossible, but is not required; for otherwise, to perfect the charms of sculpture or painting, we must add colour to the one and rotundity to the other. Were identical imitation necessary, we could not stop short of any of the attributes of reality."

(*To be continued.*) P. H. Newman.

CAMERA CLUB CONFERENCE.

In consequence of the pressure on our space this week we are unable to insert more than the opening address, but hope to be able to give the papers *in extenso* in our next number.

CAPTAIN ABNEY'S PRESIDENTIAL ADDRESS.

Owing to the honour done me by the Camera Club, I am again called upon to preside over the annual Conference; and on this occasion, as on the last, I feel that it would have been better had some one else been called upon to take the chair. That the Camera Club exercise a power of doing good can scarcely be denied, both by its weekly meetings and its annual conferences, and I may express a hope that in this one its prestige will not suffer. A President's address, as a rule, is supposed to be outside debate; but I do not wish on this occasion to shield myself from criticism, because what I shall say on one subject will bear discussion, and I shall be glad to hear the strictures or adverse opinions regarding it, as in a matter of this description no Popedom is permissible. I allude to an international standard decimal system of weights and measures for photographic purposes. The first point to be considered is as to whether it is desirable that such a standard should exist; and, secondly, what such standards should be. As I am delegated by the Photographic Society to take part on its behalf at the International Congress that is to take place at Brussels in August next, I am bound to make my observations somewhat under reserve, since, if not, it might be supposed that I should go to such Congress with a mind warped, to a not wise extent, by expressed opinion. Let me say once for all that any opinion I *do* express is only that held for the moment, and may be modified by the arguments which may be put forward by the many eminent colleagues whom one is sure to meet at that Congress. As to the first point, whether it is desirable that uniform standards should be internationally adopted, if it be looked at from a commercial aspect, there can only be one opinion, that it is most advisable. Those English firms who manufacture plates, for instance, must have found not only that foreign markets are in a measure closed against their manufactures owing to the trouble and expense that is caused by coating plates of sizes quite different to those current in the English market, and it would be a boon to them to be able to send sizes abroad identical with those which they manufacture for home consumption. Now, as to what the standards should be raises questions which have been considered by a committee of the Photographic Society, and they have made suggestions which seem to go some way towards the solution of the problem. I believe I am right in saying, for instance, that they have recommended as a starting-point for plates the half-plate of $6\frac{1}{2} \times 4\frac{1}{2}$, and have made most of the other sizes multiples or sub-multiples of these. The nearest size in centimetres is 26×18, and is one which is largely employed abroad, many sizes being multiples of this. If the centimetre were ·4, the plates would be exactly equal; but, as it is ·394, there is a slight difference between the two, but not sufficient to render English half-plates unusable by foreign photographers. It should be noticed, however, that our present whole-plate becomes a size which is not to be found. It becomes $9 \times 6\frac{1}{2}$ instead of $8\frac{1}{2} \times 6\frac{1}{2}$. The former, to my mind, is a plate of more artistic dimensions, the present whole-plate being somewhat squat. The next multiple is 13×9 in. I have long ago adopted 12×9 as much better than 12×10, which is an atrocious proportion. I am inclined to think that 12×9 is better than 13×9, the length being rather too great when the long side is used for an upright view. Balancing the advantage to be gained by uniformity, however, it seems to me that the proposed sizes are better than our present ones, which seem to have been chosen in a purely hap-hazard manner. By a compromise of this kind the worshippers and users of the centimetre system are rendered happy, and the English have the great advantage of retaining, as at present, the British inch, a standard which, to me, is far preferable to the centimetre, as it is a unit involving too large numbers for small sizes.

So much, then, for a happy compromise between English and foreign measures.

Now, as to the weights and volumes employed, is it possible that any compromise can be arrived at? If we were a new nation without a history and without prejudices, and acting simply out of necessity, I am inclined to think that we might perhaps be induced to adopt the gramme and cubic centimetre as the standard of our weights and volume measures, and to use the decimal system. We might possibly also adopt the franc as our standard of money value, for an income of 2500 francs sounds much

larger than one of 100*l.*; but we are not a new, and certainly not an unprejudiced, nation, and although the decimal system has been permissive for some years, and though it has been taught in our elementary schools, yet I have not gathered that any one has adopted it in home commerce, that the farmer sells his wheat by the cubic metre, or the tradesman weighs his beef by the kilo, or sweets by the gramme. In fact, it appears that no impression has been made on our own systems. Under these circumstances, it would appear that the hope that foreign weights and measures would be adopted by the professional photographer is not the most likely thing in the world to be realised, for, although our chemists do *almost exclusively* use the metric system, yet photographers are not chemists as a rule, and I suspect that a book or a formula which talked exclusively of grammes and cubic centimetres would not meet with ready acceptance by them. My own opinion is that the gramme is a less convenient standard for photographers than the grain. The photographer never requires to be more accurate than to a grain, but he must be more accurate than to a gramme. It appears to me that the requirements of internationality would be met by giving all photographic formulæ in parts. Thus a one per cent. solution of pyrogallic acid in water would mean one grain of pyrogallic acid dissolved in 100 grains of water, or equally one gramme dissolved in 100 cubic centimetres, and a one per cent. solution of pyrogallic acid in alcohol would mean one grain of pyrogallic acid dissolved in the same volume of alcohol that the 100 grains of water would occupy. Luckily such measures are not unknown to us. The gallon of water weighs 70,000 grains, and the old septem and decem burette measure was divided into volumes of which the water between two divisions weighed seven grains and ten grains respectively. By adopting the grain as the unit of weight and the decem as the unit of volume we arrive at a practical compromise. The photographer would only have to abandon his ounce measure and take to a decem measure; the five-ounce measure would be of about the same size as that holding 200 decems—*i.e.*, 2000 grains.

Since we last met in conference we have had one valuable piece of work put forward as regards the science of photography. I allude to the researches of Messrs. Hurter & Driffield on the relation of density to exposure to light or to intensity of light. I have to speak in the highest terms of the labour and research expended upon it, although I have had the misfortune to differ as to which is the best way of measuring density, or rather, I should say, as to the accuracy of the method which they adopted and as to the incorrectness of my method. I am happy to say that a meeting between the quondam antagonists has had a happy effect, and, no doubt, an agreement which will be endorsed by both sides will shortly be arrived at, which will end the dispute and prove satisfactory to the lovers of truth, and, at the same time, be a disappointment to those whose idea that the best way to advance science is to quarrel over it. When such an agreement is arrived at, the field will be left clear to verify all the remarkable outcome of the work they have actually undertaken. I think I may claim to have been first in the field as regards the publication of a theory connecting density of negative and exposure together; and I have given a formula which seemed to me to meet the general question. Should the formula of Messrs. Hurter and Driffield prove to be more correct, and to meet the theoretical considerations more adequately, I shall only too gladly discard the first formula and become a staunch adherent to the more exact one. The matter was so important in my eyes before any controversy was held, that, as editor of the *Photographic Journal*, I had it published in full in that publication, for which I have had adverse comments passed upon me. I think, considering the scientific importance of quantitative photography, I was fully justified in publishing anything in full which might prove an advance, and I should do so again. I may finally add that Messrs. Hurter and Driffield are fully convinced of the accuracy of my instrument, as I am of theirs, when naked lights are in question; and I take this opportunity of saying this publicly, as I believe they have done the same before the Society of Chemical Industry, before which body their paper and its strictures on my Sector Photometer originally were brought forward.

Once more we have had an announcement that photography in natural colours was an achieved fact, and, as I pointed out last year, the achieved fact is almost as old as photography; but in this case we have had an assurance that the colours are fixed, in which case it would be a distinct step towards achieving what has so far proved chimerical. Whilst in Paris last week I had an invitation to see M. Lippmann and to investigate his methods, and I found in him a true man of science, as his reputation always has been, and ready to give every detail of his work. I have seen his coloured spectra, and there is no doubt that the colours are due to interference, and are not what I may call true colours, since they vary according to the angle in which the plate is held, and they show next to none, if any at all, by transmitted light.

The process, as described to me, is very simple. Mercury is poured into a box of four sides, the top and front being open. Against the front the film side of the sensitive plate is pressed mechanically, and mercury is poured in from behind. The exposure is made to a bright spectrum, the blue being exposed less than the red. If the relative exposures be correct, and if the development be carried just far enough on fixing, the colours are seen by reflected light, and are unchangeable as far as light is concerned. The development takes place by means of alkaline carbonate development, and intensification by silver. The most successful results are obtained when the plate is prepared as a dry albumen plate on collodion. M. Lippmann stated that, if the plate be immersed in benzine or other such liquids, the interference colours change, and the red part of the spectrum might be seen as blue; but that on drying it reverted to the original colour. Further, he stated that if the exposure were not exactly correct, and also the development pushed exactly far enough, the colours were not apparent.

I am myself satisfied that every statement made by M. Lippmann is correct, and I doubt if he claims to have discovered photography in natural colours. To me it seems a verification of Newton's law of the interference of light, and hardly in the direction of true photography in natural colours. Photography in natural colours means to me the production of pigments, of which the colour is produced by absorption, and which can be rendered permanent when exposed to white light. Becqueret's experiments satisfied the first part, but the second was wanting, and this renders the problem still unsolved. M. Lippmann has succeeded in fixing interference colours, but they are not due to the absorption of certain rays of white light. Further, they must, I should think, be impure colours, and at their best be as impure though as brilliant as the colours produced by polarised light. The fact that the colours depend on proper relative exposure, and on proper amount of development or intensification, makes the process one of extreme difficulty; and, if this were overcome, a picture would always have to be examined by light coming at one angle. This leaves the problem of photography in permanent natural colours very much as it was before M. Lippmann took it up. We have evidence that the excessive fervour of journalists in bringing to public notice a new thing has been detrimental to the discoverer, as in Dr. Koch's case, more being claimed for the remedy by them than by him; and I think that the startling announcements put in the daily press have in this case made the position of M. Lippmann more difficult than it would otherwise have been. I feel that I have already detained the conference too long, but the points I have brought forward had to be mentioned, and I trust that whatever opinions I have expressed may be simply taken as opinions, but that the facts I have given may be considered worthy of the bestowal of some thought by those who are interested in the subject.

CRYSTAL PALACE PHOTOGRAPHIC EXHIBITION.

Since our previous notice of the apparatus in this year's exhibition the whole of the pictures have been received, and the medals awarded to the following:—

Professional.

H. Van der Weyde ..	Gold medal for best alcove.			
W. W. Winter	Silver medal for best screen.			
R. Keene	Bronze medal,	Class A.P.	Sec.	1
R. H. Lord.....	,,	,,	,,	2
F. W. Edwards.....	,,	,,	,,	3
C. Whiting	,,	,,	,,	5
Lala Deen Dayal	,,	,,	,,	3
A. Swan Watson	,,	,,	,,	8
John Collier	,,	,,	,,	9
W. M. Malby	,,	Class C.P.	,,	1
W. L. Colls	,,	,,	,,	7
H. Flather	,,	Dry point working.		
S. B. Bolas & Co.	,,	Reproductions.		
W. Crooke.....	Special award of gold medal.			

Amateur.

Birmingham Society..	Challenge cup.			
Miss Lil Tomkinson ..	Silver medal for ladies.			
J. A. Hodge	Bronze medal,	Class A.A.,	Sec.	1
B. Karleese	,,	,,	,,	1
Rev. Precentor Mann .	,,	,,	,,	2
J. E. Austin	,,	,,	,,	2
C. Court Cole	,,	,,	,,	3
A. R. Dresser	,,	,,	,,	5
Karl Greger	,,	,,	,,	7
J. H. Pickard	,,	Class B.	,,	2
H. Selby	,,	Entire exhibit.		

SCIENTIFIC.

A. T. Stanley Kent .. Bronze medal, Class A.C., Sec. 3.

TRANSPARENCIES.

F. W. Edwards..... Bronze medal, Class A.E., Sec. 1.

LANTERN SLIDES.

G. West & Son ..... Bronze medal, Professional.
J. E. Austin ..... „ Amateur.
W. C. Beetham..... „ „
J. W. Wade ..... „ „
A. R. Dresser ..... „ „
Dr. T. Morton ..... „ „

Before noticing the photographs, we would just call attention to the very successful manner in which the alcoves for this exhibition have been arranged. There is a simplicity and compactness about the whole which is very pleasant for the closer study which so large a quantity of small frames necessitates, and some praise is due to the very great skill and energy shown by Mr. Buchanan Wollaston in arranging so large a quantity of exhibits so as to vary the monotony which would have arisen if all had been placed in one consecutive range of wall space. The alcove system has the great advantage of relieving the vision before it is again required for the next collection.

The first alcove contains some very large photographs. H. Van der Weyde, to whom has been awarded the gold medal for the best alcove, containing a series of well-designed and well carried-out photographs; but it must be stated that there is a large amount of retouching, or rather brush work, which, however effective, can hardly be said to be pure specimens of photographic work. The first picture is a very ambitious one, being a composition designated *Cleopatra*, who has been well posed, reclining gracefully on the vessel which carries her along; and motion has been very nicely expressed by a portion of a sail which, from its position in the picture, at once suggests that the vessel upon which she is partly reclining is in actual motion. This is a very bold attempt at reproducing old historic characters by modern models; possibly such work will become more successful scientifically when the entire production can be realised by photography unaided by the brush. Suffice it to record the attempt, which, so far as it has gone, is really a most interesting production, showing much artistic perception. Then, again, there is an exceedingly well-posed portrait of Miss Edith Chester, who stands with hands clasped behind, her head turned slightly upwards. At a distance this production is very effective, but that has been gained by a considerable amount of brush work. In this alcove are some small original photographs about 12 × 9, which show some exceedingly pure and good photographic work.

Poulton & Son have an alcove of ordinary commercial work, in which are some studies of figures taken at the seashore, evincing an artistic perception which, if persevered in, will eventually result in some very good work.

W. J. Byrne & Co. have also an alcove, which has been ornamented with some golden or rather deep yellow-coloured drapery. Whether this improves the photographs, which are somewhat dark in the shadows of the face, may be an open question. There are also four frames of young girls in Japanese dresses, which form rather quaint and pretty pictures, and, as children's portraits, are very effective. There are two studies of young girls which are greatly in advance of previous pictorial compositions; but one peculiarity of these studies is the fact that, as the foliage in the background is done from painted flats, the shadows of the juvenile models are thrown upon them, which could not be the case in nature.

Boussod, Valadon, & Co.—The very good work here shown by this firm has been seen elsewhere; nevertheless, they are very fine reproductions of the original paintings, and are good specimens of photogravure, where the touch and expression of the painter's brush becomes exceedingly valuable.

E. T. F. Goodwin exhibits some large commercial work with the original small photographs, which reveal a capacity for the production of pictures requiring study, and promise well for future work. Especially is this seen in some studies under the title of the *Princess Ida*, where the young models have been very carefully posed.

W. H. Douglas Pim.—The small original photographs shown by this exhibitor gives promise of good work, and the enlargements from the same are also good, but some portions are slightly dark, which peculiarity is intensified upon looking at the same from a little distance. Generally all enlargements which are worked upon require greater luminosity in the darker shades of the flesh, otherwise they remain too opaque.

W. Crooke, to whom has been awarded a special gold medal, shows some life-sized heads taken direct, which are exceedingly fine in treatment. One point becomes very marked, viz., the detail of the light hair, whiskers, &c., which have been well manipulated. And an especially good qualification to be noticed is the way in which the surface has been managed, appearing as if all the gradations of facial markings had been untouched by any unskilful retouching, the result being a most successful life-sized photograph, without any degradation of the work which the scientific apparatus has so carefully and truthfully rendered. This portrait is most certainly one of the best and finest specimens of careful treatment and executive skill. There is also a series of smaller portraits, with heads about four or five inches high, all showing exceedingly careful studies of the character of each, and so well lighted that the attention settles upon the portrait and nothing else. There is no dazzling of the vision by unnecessary light portions of the object arresting the attention. In another picture there is a very successful attempt at strong effect of light—two ladies by a fireside, from which the light comes, although subjects of that kind are somewhat outside the possibility of photography to render in the most effective manner.

Cameron & Smith exhibit some very good copies from paintings, which evince much care in the treatment of the various styles of manipulation which the originals possess.

A loan collection of photographic studies by the late Mrs. Cameron are most valuable, as showing the great artistic perception she had of what photography can produce when governed by artistic feeling, and also when coupled with the fact that they were executed at a time when the difficulties attending the production of large direct work were very great. However, upon looking at these productions, one never thinks of those matters, but we appreciate and enjoy the motive artistic power which used the then scientific capabilities of photography as a medium. This collection is worth a careful study, as showing that a picture becomes so, not from the way in which it has been produced, but from the use of that faculty without which many photographic productions become mere automatic representations.

A. R. Dresser (No. 297), *A Storm at Jersey*.—A very good result of instantaneous work, with an appreciation of light and shade in nature which has been most carefully photographed.

Miss E. L. Moysly (No. 318).—This is an enlargement from a half-plate negative stated to be exposed to moonlight for thirty-five seconds, the result being most interesting, because the original seems to have plenty of detail in it—a curious result, as showing so much actinic power in the moon.

Herbert Young (No. 407) a frame containing six well-chosen points of view, but which suffer from being all in one frame. We have noticed this matter in previous reviews. The inharmonious close proximity of leading lines do not harmonise with each other. This is a matter which often damages what would otherwise be invaluably well-chosen points of view.

E. H. Thompson (No. 409), *The Locks on the Thames from Oxford to London Bridge*.—The same remarks apply to this collection of thirty-five small pictures. There are marked light portions on each picture, which fight one against the other for some unknown reason, and so damage is done to many of the pictures, which, if otherwise considered separately, deserve some praise.

Rev. Precentor Mann, M.A. (Nos. 410 and 411).—A bronze medal has been awarded to these six photographs of *Old Bits of Normandy*, which consists of well-selected portions of streets and houses very nicely manipulated, showing what effective pictures can be made from these very picturesque remains of old buildings. The points of view are well selected, and are toned to a very effective colour.

J. E. Austin, bronze medal (No. 442), *The Shrimper*.—A small picture, showing much of the skill and artistic taste seen in his work. Such a picture has not been taken without much attention and thought having been bestowed upon the arrangements of the figures on the seashore.

The Birmingham Photographic Society have been awarded the Challenge Cup. All the work they exhibit is good, and especial notice may be given to some flowers by W. J. Harrison and A. W. Wills. These are very careful in execution, but the space which they occupy on each picture might have been larger, which would have assisted their pictorial value. Then there is a photograph by H. W. Southall of *Hungry Hill, Glengariff*, which is exceedingly full of some nice detail, well chosen and well manipulated. Then another *Poul le Gourn*, which has some fine rendering of distant hills full of retiring detail, and the point of view chosen for the composition of the picture is very effective. We have now some work by B. Karleese—two frames, each containing six 10 × 8 photographs—consisting of some pretty bits of scenery carefully manipulated, where the detail has been exceedingly well cared for. Then E. H. Jaques has a frame with six very well-chosen bits of foliage.

R. Keene, bronze medal (No. 689),—Six exceedingly well-chosen views, and we may here remark that the same good taste as when

choosing the scenes has been shown in mixing the collection. They all lead a happy life together, each subject has been well selected for photographic purposes, and they are certainly good specimens of platinotype work. There is an effective power in these photographs which is very pleasant and satisfactory.

T. Scotton has some very good studies, well chosen for pictorial composition, and most carefully executed.

H. Selby. Bronze medal awarded for the entire series of about eight photographs. These are rather small, but show an appreciation of artistic effect which has resulted in some satisfactory although quite different bits of nature. There is a poetic tendency in each little study which promises well for future work, and in the treatment and choice of clouds in some the effects of night and day have been very well studied and arranged.

C. Whiting. Bronze Medal. *The Crypt, Canterbury Cathedral.*—This photograph has the appearance of a very good enlargement, and is really very effective, and makes a good picture. Of course, in scenes of this kind, the merit is mostly scientific, although something, of course, must be said in reference to the point of view, which has been well chosen, and the treatment of the whole has also been very carefully attended to.

West & Son. Five large photographs about 24×18 of sailing vessels.—Enlargements from smaller negatives, which are most certainly very good, although there occurs the same difficulty we have before alluded to, viz., the horizontal line of the distant land being sometimes higher on one side of the picture than it is on the other, which, we surmise, must of necessity arise from the uncertain position of the camera at the moment of taking the vessels. However this may be, we are obliged to accept it; at the same time, from the pictorial point of view, it is not quite satisfactory. However, the good realisation of the boats and the water is as usual very perfect and realistic.

Foreign Notes and News.

The St. Petersburg Photographic Exhibition, which is being held in the two large rooms of the Pædagogic Museum, contains a good deal that is of interest and many items that are novel to similar collections. Among the latter may be reckoned a complete ballooning apparatus as used for photographic purposes and a number of views taken from it, also a collection of photographs of the same scene taken with different objectives for the purpose of affording the public an idea of their different capacities, likewise a number of forged and erased documents, together with photographic enlargements of the same, enabling the original text to be deciphered.

The higher aristocracy is also well represented among the exhibitors. Thus the Grand Duke Sergius Michaelowitsch supplies a number of views of the more picturesque scenes of the Caucasus. The Duke of Leuchtemberg contributes a number of winter and moonlight landscapes; and Count Nostitz, who has frequently been a successful competitor at numerous exhibitions, has sent a number of excellent platinotypes.

We have to report the recent deaths of Herr Franz Werner, for many years President of the Munich Photographic Society, and also of Court-Photographer Herr Edmund Risse, of Berlin. Both were photographers of high capacity and widely recognised abilities.

The Royal Bavarian Meteorological Observatory in Munich intends publishing an atlas of cloud forms, and requests the co-operation of photographers both professional and amateur. It is intended to make use of good selected photographs as groundwork for the reproduction. It is requested that only prints and not negatives shall be sent in for approval. Professional photographers are requested to append their price.

A rather sensational rumour comes to us from Breslau. A book is about to be published in that town under the title, *Who was Rembrandt?* The author—Herr Max Lautner—claims to have subjected the alleged monograms of the painter to photographic enlargement, and to have come to the conclusion that the name of Rembrandt has reached its present reputation owing to forgeries upon the monogram of another and greater master.

A series of new regulations have recently been introduced by the Austrian Government in regard to the practice of photographing corpses. It is proposed to forbid in future the transport of the corpses of children to photographic studios to be photographed, as this practice, it has been proved, frequently gives rise to the spread of infectious diseases. In addition, the photographing of deceased persons in private houses will only be permitted with the consent of the medical man who makes out the death certificate.

The German Reichstag is about to approach the subject of Sunday rest, and the compulsory closing of houses of business on that day.

A good deal of agitation is being got up amongst photographers' assistants and employees in order to draw attention to their claims, and ensure their participation in the expected legislative boon. It will hardly be believed that the benefit craved merely consists in limiting business to five hours on the Sunday; but under existing circumstances photographers' assistants in Germany are frequently kept with their noses to the grindstone till late at night—more especially in summer—on what should be their weekly holiday.

A new design for studios, by means of which the glass roof, which is frequently such a trouble in winter, is got rid of, has been proposed by Herr Eggenneiler, and appears likely to meet with general adoption. Herr Eggenneiler's studio is a room facing north, with an ordinary solid roof, which slopes to the south, while the northern wall, or side, alone is built of glass, and is of about twice the height of the southern wall. The roof is painted white, and a reflector or 'light distributor' is introduced to equalise the top light.

Professor V. Schumann, of Leipsic, has recently published the results of a series of researches he undertook for the purpose of testing the yellow-sensitiveness of Professor Vogel's eosine-silver plates. The result of Professor Schumann's examinations goes to show that the yellow-sensitiveness of the plates in question is less than Professor Vogel maintains it to be.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6261.—"Improvements in Photographic Prints." J. Bickle, jun., T. E. Bickle, and J. B. King.—*Dated April* 13, 1891.

No. 6340.—"Improvements in the Production, by the aid of Photography, of Surfaces for use in Printing in Colours, and in means or apparatus employed therein." G. T. Teasdale-Buckell.—*Dated April* 14, 1891.

No. 6341.—"Improvements in the Production, by the aid of Photography, of Surfaces for use in Printing in Colours, and in means employed therein." G. T. Teasdale-Buckell.—*Dated April* 14, 1891.

No. 6364.—"Improvements in or relating to Hand or Detective Photographic Cameras." W. B. Parker, D. F. Christy, and R. Overton.—*Dated April* 14, 1891.

No. 6514.—"A New or Improved Means of making Direct Vignettes." J. Draper.—*Dated April* 16, 1891.

No. 6533.—"Improvements in or pertaining to Photographic Cameras." R. W. Savage and The Sun Camera Company, Ld.—*Dated April* 16, 1891.

No. 6534.—"An Improved Photographic Shutter." R. W. Savage and The Sun Camera Company, Ld.—*Dated April* 16, 1891.

No. 6571.—"Improvements in Letterpress and Lithographic Processes based upon Photography." E. Albert.—*Dated April* 16, 1891.

No. 6572.—"Improvements in Dark Slides for Photographic Purposes." Communicated by P. Tournachon. J. Y. Johnson.—*Dated April* 16, 1891.

No. 6594.—"Improvements in or in connexion with Photographic Cameras." F. L. Perken, E. T. Perken, and A. Rayment.—*Dated April* 16, 1891.

No. 6618.—"An Improved Device for Washing Photographic Negatives." Sir C. S. Forbes.—*Dated April* 17, 1891.

No. 6672.—"Combined Outdoor Developing Tray and Dark Slide." J. Ford.—*Dated April* 18, 1891.

No. 6715.—"Improvements in and relating to Shutters for Photographic Cameras." Complete specification. H. B. Norton.—*Dated April* 18, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 5742.—"Photographic Plates." Fairweather.—Price 8*d.*

No. 6825.—"Photographic Exposures." Parkinson and others.—Price 8*d.*

No. 12,442.—"Photographic Shutters." Communicated by the Bausch & Lomb Optical Company. Thompson.—Price 8*d.*

PATENTS COMPLETED.

An Improved Method of Actuating Photographic Shutters.

No. 7066. William Gage Tweedy, 8, Athenæum-terrace, Plymouth, Devon.—*March* 21, 1891.

The common photographic drop-shutter consists of a flat slide (hereinafter called "the screen") running in vertical grooves or guides on a base-board and having an aperture about its centre. This is arranged in connexion with the lens of a camera so that when the screen is raised to the top of its run light is

prevented from passing through the leus, the screen being held in this position by a catch.

On releasing the catch the screen falls from rest, and light passes through the lens during the time the aperture is falling across the lens, and is again shut off by the upper part of the screen. The screen is prevented from falling too far by a stop.

My improvement consists first in substituting for the catch a friction spring just strong enough to support the weight of the screen, and actuating the screen by the impact of a falling weight (hereinafter called "the bob") attached to it by a cord (hereinafter called "the tape").

By allowing the bob to fall a definite distance, the screen is caused to start with a definite velocity (as is shown in treatises on physics), and by means of graduations on the tape the length of the drop can be regulated so as to cause the aperture in the screen to pass over the centre of the lens in a definite time (hereinafter called "the exposure"), varying from long to short, according as the drop is short or long.

These times are marked against the corresponding graduations on the tape, which is shortened or lengthened by winding it in or out of a metal case forming the bob.

These graduations are found by calculation from the formula

$$\sigma = m\tau\sqrt{2gs} + \frac{g\tau^2}{2}$$

(hereinafter denoted by (f), in which σ stands for the vertical dimension of the aperture, s for the length the bob falls, τ the corresponding exposure, g the velocity acquired by a weight falling freely from rest for one second ($= 32$ feet per second, nearly enough for our purpose), the unit of space being one foot, and of time one second; m is the numerical value of the fraction $\frac{W}{W + w}$, in which W is the weight of the bob and tape, and w is the weight of the screen. Thus, taking a case: let W be one ounce, $w = \frac{1}{4}$ ounce; then $m = \cdot8$, and if $\sigma = \cdot5$ feet, and $\tau = \cdot1$ secoud, we get by substitution in (f)

$$\cdot5 = \cdot8 \times \cdot1 \times \sqrt{2 \times 32 \times s} + \frac{32 \times (\cdot1)^2}{2}$$

$$\therefore \cdot5 = \cdot64 \times \sqrt{s} + \cdot16$$

which gives

$$\sqrt{s} = \frac{\cdot5 - \cdot16}{\cdot64} = \frac{\cdot34}{\cdot64} = \cdot53125$$

$$\therefore s = (\cdot53124)^2 = \cdot282 \text{ feet.}$$

Hence, if the bob be let fall ·282 feet, the screen will move ·5 feet or 6 inches in ·1 second after impact and give ·1 second (or one-tenth of a second) exposure in consequence.

It is obvious that in the formula (f) we may make σ the variable quantity and s constant, other things being as before. I therefore otherwise apply my iuvention to actuate a shutter having the aperture in the screen variable, and, causing the bob to fall always the same distance, place graduations on the screen so as to show how deep the aperture must be made to give the exposure desired in any given case. Using (f) as before, and giving s the value 1 foot, we find σ.

$$\sigma = m\tau\sqrt{2gs} + \frac{g\tau^2}{2}$$

$$= \cdot8 \times \cdot1 \times \sqrt{64} + 16 \times \cdot01$$

$$= \cdot64 + \cdot16$$

$$= \cdot8 \text{ feet.}$$

Hence, when the bob falls 1 foot, the depth of the aperture must be made ·8 feet to give an exposure of ·1 second, and this time is to be marked against the corresponding graduation ou the screen.

In using both the above-mentioned forms of drop-shutter I prefer dividing the screen horizontally into two separate parts (hereinafter called the upper and lower screens) and connecting them by one or more flexible cords or tapes, either fixed or variable in length, and detaining the upper screen by a friction spring until the lower screen actuated by the falling bob has fallen the length allowed by the connecting tape, wheu the upper screen is snatched down by the impact of the lower.

This arrangement makes the instrument more portable.

Again referring to (f) we may consider the sum of σ and s to be constant $= a$, suppose, and construct the instrumeut with one tape only, placing it on one side of the screens, so as not to come in front of the lens.

To graduate the tape in this case, taking the same values as before for τ, W, w (now the weight of the lower screen only), and supposing $\sigma + s = a = 3$ feet, (f) gives

$$\sigma = m\tau\sqrt{2gs} + \frac{g\tau^2}{2}, \text{ and } \sigma = a - s$$

$$\therefore 3 - s = \cdot8 \times \cdot1 \times 8\sqrt{s} + 16 \times \cdot01$$

whence

$$\sqrt{s} = 1\cdot715 - \cdot32 = 1\cdot395$$

$$\therefore s = (1\cdot395)^2 = 1\cdot947 \text{ feet}$$

and hence

$$a - s = 3 - 1\cdot947$$

or

$$\sigma = 1\cdot053 \text{ feet.}$$

If, then, we put ·1 sec. on the tape at such a spot as will allow the bob to fall 1·947 feet before it snatches down the lower screen (so uncovering the lens), and allow the lower screen to fall 1·053 feet before it snatches down the upper screen, we shall give ·1 second exposure.

In this construction, one end of the tape is fixed to the upper screen, and there is a clip on the lower screen by which it can be attached to the tape at any point, the whole length of the tape being constant, and the bob attached to its lower end. The tape is graduated by means of calculations from the formula (f) in the manner just described.

In all cases the instrument is to be operated by holding the bob against some fixed poiut, from which it can fall the required distance before it brings the tape taut, and thus by impact through the tape snatches down the screen from the hold of the friction spring. The upper screen (in the case when the screen consists of two parts) is similarly snatched from the hold of its own friction-spring, and is prevented from falling too far by a suitable stop or stops.

What I claim is:—1. A photographic drop-shutter with a fixed aperture in its screen, actuated by the impact through a graduated tape of a bob falling a variable distance, said screen being held in place before exposure by a friction spring. 2. A photographic drop-shutter with a variable graduated aperture in its screen, actuated by the impact through a tape of a bob falling a fixed distance, said screen being held in place before exposure by a friction spring. 3. A photographic drop-shutter having two screens connected together vertically by one or more flexible cords or tapes of fixed length, the lower screen actuated by the impact through a graduated tape of a bob falling a variable distance, said screens being held in place before exposure each by its own friction spring. 4. A photographic drop-shutter having two screens connected together vertically by one or more flexible graduated tapes of variable length, the lower screen actuated by the impact through a tape of a bob falling a fixed distance, said screens being held in place before exposure each by its own friction spring. 5. A photographic drop-shutter having two screens connected together vertically and to a bob by one and the same graduated tape of fixed length, the lower screen being clipped or made fast to the tape at variable points, and actuated by the impact through the lower part of the tape of the bob falling a variable distance. The upper screen in turn is actuated by the impact, through the upper part of the tape, of the lower screen falling the distance allowed by said upper part or remainder of the tape; said screens being held in place before exposure each by its own friction spring.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 29	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 29	Burnley	Bank Chambers, Hargreaves-street.
,, 30	Halifax Photographic Club	Mechanics' Hall.
,, 30	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 30	Oldham	The Lyceum, Union-st., Oldham.
,, 30	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 16,—Mr. G. W. Atkins in the chair.

A letter from Mr. S. G. B. Wollastou was read, inviting the Association to send a collection of lantern slides to be shown on a special evening at the Crystal Palace during the continuance of the Photographic Exhibition there. It was decided to form a collection for the purpose.

A notice from the Kew Observatory as to the testing and marking of photographic leuses was received and read.

Specimens of platinum printing on the paper for sepia tone, but developed with the ordinary solution for black tone, were shown, and considered to be very good.

Mr. J. J. Briginshaw had arranged to give a demonstration with the lautern polariscope, but owing to the non-arrival of the oxygeu the demoustration was deferred till the 30th inst.

Mr. P. Everitt wished to draw attention to an announcement advising amateur photographers who might desire to experiment with erythrosine, to take out a licence under a certain patent, and inquired whether, as the claim of the patent was for the joint use of ammonia and eosine, there was any practical necessity to use ammonia. He also wished to know what a patent actually covered.

Mr. C. H. Cooke said that ammonia was certainly not necessary with erythrosine. The latter gave orthochromatic effect without ammonia, and the addition of this substance, if it made the plate any more rapid, did so only in a very slight degree.

Mr. W. E. Debenham believed that one of the conditions of a valid patent was that all necessary information for using it should be supplied. Now Mr. B. J. Edwards had himself stated that ordinary eosine was useless, but that some particular kind of erythrosine was necessary for success; but there was nothing iu the patent to guide one as to the selection of erythrosine at all, much less to indicate the particular kind requisite.

On the question of the keeping properties of commercial isochromatic platss, Mr. W. Coles said that at first they did not keep well, but some that he had a year ago were still good.

A print made by Mr. Weir Brown ou bromide paper, aud subsequently toned with uranium and ferrocyanide, was shown.

Mr. Debenham said that there appeared to be a better separation of the darker toues than was usual with bromide prints. This might be due to the toning; and, if so, that would be a stroug argument in favour of the process. It would be desirable to see prints from the same negative with and without toning.

The Secretary said that Mr. Weir Brown had offered to give a demonstration before the Association, aud this offer was accepted.

Messrs. H. Perrin and P. W. Coghill were elected members of the Association.

CAMERA CLUB.

April 16,—Dr. C. S. Patterson in the chair.

Mr. J. Howson read a paper entitled *Conventionalism in Colour*.

Previous to the lecture the Hon. Secretary handed round some early prints

sent by Messrs. Marion & Co. from the flashlight negatives taken the previous week, also one of Manson's focussing cloths, which are made in convenient form for covering the whole of the camera. Dr. Patterson showed a Bain's mask cutter.

Mr. HOWSON in his paper dwelt on the possibility and desirability of suiting the monochrome colour of the photographic prints to the special subject in each case represented, and he illustrated his points by handing round several prints on Alpha paper.

Criticism and discussion followed from Messrs. Horsley, Hinton, Davison, Gale, Stephens, Bright, and the Chairman.

ON Monday, April 13, there was a special lantern evening at the Club, and one of the largest and most interesting collections of slides ever shown at the Club was brought together by members and friends. The extra meeting was appointed for the purpose of working off the arrears into which the lantern exhibition had fallen, owing to the period of removal into the new premises. Over four hundred slides were shown (almost all new at the Club).

On Thursday, April 30, Mr. J. Traill Taylor will read a paper on *Lantern Optics.*

HOLBORN CAMERA CLUB.

MR. T. O. DEAR presided at the usual weekly meeting of this Club on Friday last, when Mr. FREDERICK BROCAS gave an instructive lecture on *General Hints to Beginners*, dealing with the numerous stumbling-blocks which seem to enter into a compact to frighten a beginner into throwing photography over. He specially mentioned the matter of the foreground. Not only beginners, but those who were fairly proficient in photography, have negatives in which about one-third of the plate consists of an interesting foreground. Under-exposure was also dealt with at great length. Most beginners, he said, always under-expose. It was much better to over-expose, because by judicious development a fair negative may be obtained from an over-exposed plate, but an under-exposed one would never give a good negative.

In the discussion which followed, halation formed the chief topic, it being the general opinion of the members that, although a troublesome job, backing the plate was certainly an advantage.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

APRIL 17.—Ordinary meeting—Mr. Edward Lovett in the chair—when an exhibition of hand cameras took place, amongst the exhibitors being Messrs. Adams & Co., "Ideal" and "Adams';" Mr. Cushworth, "Repeater;" Messrs. Griffin & Sons, "Dines's;" Houghton & Sons, "New Patent Hand Camera;" Messrs. Humphries, "Quadrant;" Mr. Hurst, "Hurst's;" Messrs. Marion & Co., "Radial;" Messrs. Parker & Son, "Companion;" Platinotype Company, "Key;" Messrs. Robinson & Son, "Luzzo;" Messrs. Ross & Co., "Portable Divided" and "New Patent;" Messrs. Mawson & Swan, "Reflex."

The next ordinary meeting will be on May 1, when Mr. D. E. Goddard will read a paper entitled *Elementary Silver Printing.*

Saturday, April 25, half-day excursion to Oxted, for Godstone. Leader, Mr. W. Low Sarjeant. Trains: London Bridge (L. B. & S. C. R.), forty minutes past one; East Croydon, three minutes past two. Take single tickets. Return from Caterham Valley, thirty-five minutes past six and forty minutes past seven.

EALING PHOTOGRAPHIC SOCIETY.

APRIL 16.—Ten names were given in of intending competitors for the prizes offered by the President for lantern slides to be made from negatives to be supplied to the competitors. The evening was devoted to an exhibition of lantern slides.

Messrs. Mawson & Swan sent some slides on their plates which had taken prizes.

Mr. Whiting contributed views in Canterbury and its Cathedral.

Mr. F. H. Williams contributed slides from negatives he had taken in 1866-7.

Miss Williams and others also contributed.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

APRIL 17,—Mr. Jeffrey in the chair.

The subject for discussion was *Intensifying, Reducing, and Retouching*

MANCHESTER PHOTOGRAPHIC SOCIETY.

APRIL 9,—Mr. T. R. Cobley in the chair. Mr. H. V. Lawes was elected a member.

The meeting was devoted to a show of hand cameras and novelties. Miller's Adelphi, the Scott-Devonport, and Bebbington hand cameras were exhibited and explained by their respective inventors; Messrs. W. Griffiths & Co. sent specimens of their productions; Messrs. Marion contributed a new radial camera; Messrs. Taylor, Taylor, & Hobson exhibited a collection of goods, consisting of lenses, &c., the Hawk-eye Detective, and Blair ordinary cameras; other exhibitors were the Thornton-Pickard Company with instantaneous shutters, and the Birmingham Photographic Company, a number of novelties for the dark room.

THE Glasgow International Exhibition Committee have issued their prospectus. The Exhibition is to open on September 1st, and will close October 3rd. Intending competitors will be interested in learning that an immense number of medals are to be given. They should apply without delay to the Secretary, Mr. W. Goodwin, Lyndock-street, Glasgow.

Correspondence.

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

ORTHOCHROMATIC EXPERIMENT.

To the EDITOR.

SIR,—I read a paper on this subject at the last meeting of the Birkenhead Photographic Association on the 9th inst. I wish to call attention to the following formula, viz.:—

Chinoline	1 drachm.
Methylated spirit	16 ounces.

The solution assumes a golden hue, and remains without change at least for a month. I have placed Ilford, Castle, and other makers' plates into a tray containing this solution for *two minutes*, allowed them to dry (which takes an hour), thence into the dark frames, taking care in the drying to keep in absolute darkness. I exposed the plates so treated *equally* with the brands as above, and the result was most striking. I also tried Edwards's orthochromatic plates, and all acknowledged they were quite as good. I would be pleased if any of my photographic friends would try this and report to THE BRITISH JOURNAL OF PHOTOGRAPHY.—I am, yours, &c., JAS. ALEX. FORREST.

Waverley, Alexander-road, Birkenhead, April 21, 1891.

LIPPMANN'S COLOUR PHOTOGRAPHS.

To the EDITOR.

SIR,—I regret not being present at the last meeting of the Photographic Society of Great Britain, when the discussion arose respecting Professor Lippmann's colour photographs, but I was called away before the discussion took place. The photograph in colour which I brought over from Paris was made by one of the Professor's assistants, and presented to me by him, with the distinct understanding that it might be shown to any members of the Society. I think some of the remarks made at the meeting were premature, seeing that no notice of the subject had been given out beforehand. If those gentlemen who criticised the colour negative will only examine it again at the Society's rooms in good daylight, I feel sure they will somewhat modify their unfavourable opinion. The negative exhibited shows the red and green portions of the spectrum very clearly and definitely. Unfortunately, the negative was far too much over-exposed to show the blue and violet colours, but one of M. Lippmann's negatives which he showed me not only exhibited all the primary colours of the spectrum (with the exception of the yellow and orange, which never come out as clearly as the others), but by means of the optical lantern he projected it (by reflection) on a screen with such success as to call forth a ring of applause from all present. And yet I must confess the same negative when examined in the hand was rather disappointing. M. Lippmann has made a great discovery and one which will hand his name down to posterity. And if he can project all the colours of the spectrum on to a screen of such dimensions that every one in the room can see them from every angle, as he has shown that he can do, I am convinced that it will become more than a scientific toy, and that before long it will be possible to show the lines of Frauenhofer with their true relation to colour on the screen before an audience. Some of the critics expect too much; they look to find colours as pure and brilliant as the solar spectrum itself, and because they see nothing of the kind they at once cry out that it is not worth looking at. With all their faults, Professor Lippmann's photographs of the spectrum surpass anything hitherto attempted. They are true reproductions of the spectrum, although often only exhibiting a portion of it. Moreover, they are permanent—more so, perhaps, than his theory, and whatever is the fate of the latter his photographs of the spectrum will remain.—I am, yours, &c.,

G. LINDSAY JOHNSON, M.D.

14, *Stratford-place, Oxford-street, W., April* 21, 1891.

DISCOLOURATION OF PLATINOTYPES.

To the EDITOR.

SIR,—The experience of Mr. R. Ferguson is somewhat remarkable. After a careful perusal of his letter which appeared in your last issue, the only conclusion I can come to is that the fault lies with the tint, seeing that the prints are quite pure before mounting, or if mounted on white boards.

An experience I had some time ago leads me to pen these lines. Having noticed some of my prints were not so pure as others from the same batch, I was at first considerably puzzled as to the reason, but eventually found the mischief was caused by allowing the prints to lie too long in the first acid bath, which, if you have a fairly large batch, becomes highly charged with salts by the time you have finished developing. Hitherto I had been in the habit of simply immersing and letting them lie until all were developed. My method now, whenever I have a large batch on hand, is to change the acid bath when I am about half way through with them, and also to frequently move the prints about in

it. Since adopting this plan I have not been troubled with impure whites.

I quite agree with Mr. R. Ferguson that the matter he has put before us is of prime importance to photographers.

In conclusion, as a lover of platinotypes, I for one should be sorry to see discredit brought upon the process from whatsoever cause.—I am, yours, &c., C. F. Wiggins.

Blackpool, April 21, 1891.

THE LIVERPOOL MEDALS.

To the Editor.

Sir,—I had not noticed Mr. Walter Johnson's communication to you anent the Liverpool Exhibition awards until after I saw Messrs. H. P. & R. W. Robinson's replies to it.

While I cannot very well object to Mr. Johnson's preference for my work, still I regret exceedingly that my name should be coupled with matter in any way disrespectful to the Messrs. Robinson. I cannot myself in many respects appreciate Mr. Shapoor N. Bhedwar's productions in question to the extent of the recognition bestowed on them; yet that the Liverpool Exhibition pictures have been impartially judged by as honourable and capable men as we possess I am fully satisfied. My appetite for medals is about appeased, and, if possible, I do not propose troubling exhibitions much more for, at least, some considerable time; but, should that time come again, I know of no man in whose integrity and capacity as a judge I would rely sooner than that of Mr. H. P. Robinson. I state this advisedly, as an act of justice, in face of my name being mentioned, and after much association with him in his judicial connexions.—I am, yours, &c., Lyddell Sawyer.

Singleton House, Newcastle-on-Tyne, April 20, 1891.

UNCIVIL AMATEUR TOURISTS.

To the Editor.

Sir,—The season has come again; long, clear days and good crisp negatives are the order of the day. Again the coast places are becoming lively, and the amateur (sometimes the pest of the professional) is to be seen stalking along with his elaborate outfit, and I often remark, "There goes another dozen good plates."

However, it is not my intention to say anything about the amateur throwing away his plates; it is to give a piece of advice, like the use of the dark room, "gratis."

Many amateurs forget their manners when they are out view-hunting, and think they are ever so much better than the "pro." in social position, that they ask for the master in a haughty manner, and demand the use of the dark room to change their plates, and sometimes say they would like you to develop a few plates for them, although they should see the reception room filled with sitters.

This is a common thing, and the word "please" is rarely to be found in their vocabulary. Several such demands were made last season. I allowed the use of the dark room, sometimes to my own inconvenience, but it's the last straw that breaks the camel's back. One fellow—I cannot call him a gentleman—with the tourist's cap, knee-breeches, and a fearful squint, wished for the use of the dark room; it was granted, and I went in with him.

"Beastly warm hole this!" he remarked.

"Yes," I said, "a little close."

"A little close, do you say? I never felt heat like this in my life!" he said.

"Oh!" I said, "that is nothing for a warm day." And I screwed up the gas full and closed the ventilator.

By-and-by he began to grope all over the bench. I asked him if he had mislaid anything.

"No," he replied; "but I was feeling if the place was dry before I would risk my slides down. Some of you photographers make such a fearful splashing with water."

"Really, my dear sir," I said, "I'm afraid, if you get water on your slides, it will be your own fault, for it appears to be dropping pretty freely from your brow."

"No wonder; this stifling hole is fearful," he replied.

"Yes," I replied, "but to gentlemen it is quite cool. Be good enough to pack up your slides as quickly as possible, and go."

He glared at me fearfully with his squint, muttered something under his breath, which I did not catch, lifted up his traps, and was soon in the cool, fresh air.

Of course, amateurs are not all alike. I almost weary for the return of my venerable friend, Mr. Forrest, of Liverpool. He is such a gentle, good old fellow, and always in the best of spirits, and an hour spent with him, even in a busy day, is quite refreshing.

My advice is, if amateurs should wish to change plates, they should come at a seasonable hour, and remember the word "please;" it has a wonderfully softening influence on the heart of the professional photographer, who is only human after all, although some mothers don't think so.—I am, yours, &c., Charles Sweet.

Deanhood-place, Rothesay, N.B.

Exchange Column.

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

Wanted, pair of stereo lenses in exchange for mahogany enlarging lantern, complete, five condensers.—Address, Young, 2, Royal-terrace, Paisley, N.B.

Whole-plate lens (Underwood's), Iris diaphragm, *f*-8; would exchange for ferrotype goods.—Address, McCann, Photographer, Kirkpatrick-street, Glasgow.

Wanted, quarter, half, and whole-plate cameras and lenses; exchange new scenic backgrounds of high-class quality.—Address, Potter, 7, Dereham-road, Norwich.

Thirty dozen lantern plates (quite new) by first-class makers, in exchange for portrait lens (cabinet or C.-D.-V.).—Address, F. Norman, 30, Vicarage-road, Willesden, N.W.

Good, strong, fifty-inch bicycle, in good condition; will exchange for camera, lens, studio chair, or accessories. Photograph, twopence.—Address, Gannon, Chelmsford.

I will exchange a series of water-colour drawings of the Thames for a half or whole-plate camera, lens, &c.—Address, G. M. Cook, Artist, 2, South-parade, Abingdon-road, Oxford.

Will exchange cabinet portrait lens, 5×4 camera, tripod stand, and cask, for half-plate rapid rectilinear lens.—Address, S. Austin, 2, Dagmar-terrace, Dagmar-road, South Hackney.

Wanted, good enlarging lantern, not less than half-plate; exchange, pair lanterns as new, four-inch condensers, four-wick lamp, in case, with dissolver.—Address, J. Aston Briggs, Whitby.

Wanted, a large and first-class camera stand for studio use, in exchange for 12×10 outdoor camera and two slides in leather case; adjustment by cash on either side if needed.—Address, Ernest Lambert, Photographer, Bath.

Meagher's 7½×5 binocular camera, three single backs, and Dallmeyer's No. 1 wide-angle landscape lens, for 8½×6½ camera with reversing back, and double backs by same or other good maker.—Address, W. A., 13, High-street, Wexford, Ireland.

Wanted, whole-plate Optimus rapid rectilinear, in exchange for 9×7 box camera, two double dry-plate backs, two single wet-plate backs, and 10×8 single-view lens fitted to the above camera.—Address, G. J. Elphick, 57, Standfield-road, Hastings, Sussex.

Answers to Correspondents.

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

Pro bono (Jersey).—Thin sheets of gelatine may be obtained from Cornelissen's, Great Queen Street, Long Acre.

W. R.—The best method of renovating old gold frames is by regilding. There is no other satisfactory method.

Ignoramus.—A preparation for waxing prints will be found on page 759 of the Almanac for the current year.

A. W.—If you procure the examination papers of the City and Guilds Institute they will give you every information.

L. Hobson (Bolton) would be glad to know of the present address of William Hartley, formerly and recently of Bolton.

Rose.—1. The only way to obtain the portraits is to advertise for them. 2. Obtain prints from the negatives on bromide paper.

A. Thorton.—Point out more definitely where your difficulty lies, and also tell us the source of the material you are using.

W. Headland (Putney).—For the purpose you mention we use L. and M. on your list. Let the focus be anything between 7½ and 9 inches.

Alf. Grant.—The sample of paper enclosed would be quite sufficient to account for all your failure with the Stannotype process, if nothing else were at fault.

P. O'Malley.—Xylonite, or celluloid, can be made of any colour desired. We have seen it of almost all colours and tints. Write stating requirements to the Xylonite Company, Homerton, E.

C. Billing.—You have been misinformed. The concern has not been bought up by the firm named, though we believe it has been by another. The change will no doubt be announced in due course.

Pimlico.—Before purchasing the plates at considerably less than a third of the catalogue price make sure that the seller came honestly by them. Will his employer supply you with the plates at that price?

R. Madewell.—Your difficulty arises from attempting to etch the copper plates with nitric acid, which destroys the gelatinous image. For etching through a carbon image a solution of perchloride of iron should be employed.

Finder.—Binocular field-glasses are made in France and Germany. The presumption is that if the eye-glasses are large, the power is not very great. But it is impossible to give definite information without knowing more of the construction.

Mechanic.—At many, indeed, we believe most seaside places you would not be allowed to carry on the business of taking portraits on the beach without the sanction of the local authorities. At some places itinerant photography on the beach is not allowed at all.

Dora writes: "Will you please inform me how to get albumenised paper to dry flat after sensitising. In my case, after hanging it up to dry, it curls at the edges very much, and sometimes tears in opening. A few words of advice will be esteemed."—All albumenised papers have a great tendency to curl up as they dry, and the drier they are made the more they curl. Highly albumenised papers curl more than those with a thinner coating of albumen. The best plan when the paper is quite dry is to roll it up albumen surface outwards, or to lay it flat under heavy pressure.

GEO. OAKLEY (148, Avenue-parade, Accrington) writes cautioning photographers against Canadian emigration schemes. On the other hand, we have received a preliminary prospectus of one of these schemes from Messrs. Percy Lund & Co. setting forth their objects and advantages in glowing terms.

H. M. writes: "Will you kindly through your paper give me the following information:—Where can I dispose of recovered silver residue to advantage other, than the people who buy photographic residues?"—Any bullion dealer or refiner will purchase the recovered metals with an assay note. Better get an assay made and take the metals with the note to the nearest bullion dealer.

D. J. W. (Liverpool) says he has just bought a large quantity of nitrate of silver eight or ten years old, and the crystals are quite discoloured, and inquires if we should advise him to send the nitrate to the refiners for reduction, or to risk using it for sensitising paper?—Use the silver for sensitising the paper by all means. The salt is nothing the worse for the discolouration.

ZINCO asked which of the metals melt at the lowest temperature? What is known as "fusible metal" may be had that will melt at a temperature below that of boiling water. It also takes sharp impressions in casting. It may be had in small quantities, suitable for experimental purposes, from any of the philosophical instrument makers or operative chemists. Better procure it from this source for the experimental stage

R. G. inquires: "1. Could you give me a hint or two as to the taking of clouds? I have a quarter-plate Aptus aplanatic doublet lens. I have tried from half-second to four seconds, but get no trace of clouds. 2. Could you tell me also what is the meaning of Aptus aplanatic doublet?"—1. Employ a smaller stop, or use much slower plates, and well restrain the developer. 2. Merely a trade name for a lens of the rectilinear type, we presume.

D. OSBORNE puts the following query: "Please let me know where I can get albums of local views printed. I mean albums sold at 6*d.* and 1*s.* If you know of more than one place, please let me know."—The Autotype Company supply these albums. The prints are made by the collotype process. Some of the foreign fancy houses supply varnished lithographs at a cheaper rate, but we believe they will only undertake very large orders of each subject.

R. MATHER inquires: "1. What are the chief advantages claimed for or the peculiarities of the Euryscope lens? 2. In what manner does it differ from the ordinary R.R. lens, *f*-8? 3. Has it not less depth of focus? 4. Is it more suitable for groups than the R.R. lens?"—In reply: the Euryscope has a larger aperture than the R.R., and has less depth of focus when worked with full aperture. If stopped down for groups, it possesses no advantage over the other.

EMIGRANT says: "I am going to Western Australia, landing at Albany. Can I procure photographic materials there, or at what other places can they be got in Western Australia? Thanking you in anticipation."—Perhaps some of our readers who are acquainted with Western Australia will supply the desired information, as from our own knowledge we cannot. There are few parts of the world where photographic materials cannot be obtained, and we scarcely imagine that such an increasing and important part like Western Australia is an exception.

INCOME writes as follows: "Could you enlighten me upon the following? A. bought goodwill and negatives, &c., of a photographic business, made a balance-sheet at end of the year, and entered same as part of capital invested, but added nothing for the negatives taken during the year. The income-tax surveyor now demands that a value be set upon them and added. Now, sir, can you tell me how the trade generally value negatives, say, by the hundred?"—Perhaps some of our readers who have had to do with captious income-tax surveyors can enlighten our correspondent. We should imagine that the depreciating value of the old negatives was not more than compensated for by the addition of the new ones, which, by the way, have already figured in the returns.

A. L. R. writes: "I enclose a sketch of a studio I propose building, as I am about to open one of my own; I should like you to pass your opinion on it, if you will do me that favour. I intend having it built of corrugated iron, and, as I wish to use both ends, I propose covering it three feet from either end. I hope you will answer me at your earliest convenience."—The design for the studio is very good. If it is for professional work, a greater length would be desirable, if space will permit. Twenty-one feet, when standing figures or groups are required, is a little too short; four feet longer would be much better. The light might be increased a foot or so with advantage; so might the width.

E. M. W. says: "I am suffering, I believe, from hydroquinone poisoning, and my medical attendant does not know how to treat it. As I think I remember having seen a letter in your paper about twelve months ago on the subject, I think you may be able to tell me what I should do. I shall be very much obliged if you can tell me of an antidote, or of any doctor who understands the treatment."—We give publicity to this letter, as we are personally not aware of any authentic case of evil arising from the use of hydroquinone. Possibly some of our readers can throw some light on the subject. It will be interesting if our correspondent will give full particulars of his case, whether it is a cutaneous eruption, or what form the evil takes. It might elicit a remedy.

NOVICE says: "I have been trying to take 'glass positives' by the old collodion wet-plate process, but with very unsatisfactory results. Is there no more modern method by which such work can be done? If there is, and if you have already given particulars of it in a former paper, and do not care to repeat, please send me the number in question. If dry plates are to be had for this kind of work (they would be preferable), please give name and address of the best manufacturers."—There is no better process than the old wet-collodion process for taking direct positives, and it is capable of producing the finest possible results. Probably more experience with the process will make our correspondent proficient. Dry plates have been put into the market for positives, but all that we have seen have been far inferior to collodion. We are not aware that such plates are now made.

SPERANZA.—1. You will find all the information in the back numbers of JOURNAL and at the Patent Office. 2. Test your slides by leaving a plate in them for a lengthened period. 3. Send us particulars and we will let you know whether or not your invention has been anticipated.

ERRATUM.—In the report of the meeting of the Croydon Microscopical and Natural History Club (Photographic Section), *for* "A misleading and *a most* incorrect statement," *read* "*almost* incorrect statement."

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 30, Demonstration on *The Polarisation of Light*, J. J. Briginshaw. May 7, *Toning Bromide Paper*, J. Weir Brown. May 14, Last lantern night of the season.

DEATH OF JOSEPH BECK.—We regret to learn of the death of Mr. Joseph Beck, one of the partners in the firm of R. & J. Beck, Opticians, Cornhill. He died, at the age of seventy, on Saturday last. He was a member of several of the City Guilds.

PHOTOGRAPHIC CLUB.—Wednesday, April 29, Last lantern night of the season. May 6, *Outfits for Landscape Work.* Outing on Saturday next, April 25, to Brentford. Train from Broad-street (*vid* Kew Bridge) at twenty-five minutes past two.

MR. J. R. GOTZ has devised a magazine dark slide for films that is capable of containing upwards of fifty films. By means of a sleeve, through which the hand is inserted, the films are transferred in rotation to the exposing plane which is faced with glass, and retained tightly against it by a backboard, capable of being pressed forward or withdrawn at pleasure. When withdrawn, the film is lifted out and transferred to the back of the pack, another taking its place. It is ingenious, and is well made.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—April 28, Discussion on *Animal Photography.* The following gentlemen have promised to exhibit prints or lantern slides:—Messrs. T. J. Bright, H. Dixon & Son, A. R. Dresser, F. Haes, L. Medland, W. Wainwright, and F. York. May 12, M. Leon Vidal will read a paper on *Photographic Methods of Obtaining Polychromatic Impressions.* May 26, Discussion on *The Influence of Development on Gradation.* June 9, Mr. L. Warnerke will read a paper on *A New Sensitometer.*

R. E. CHESTERMAN, D.Sc., sends a further communication on the subject of difference between "President" and himself, but, the correspondence being closed, we publish no more of his letter than the following extract: "I am indebted to you, sir, for having to-day, when I called at your office on my passage through London, shown me the box of slides sent you by "President." I sincerely and cordially endorse your opinion of these. Both technically and artistically these charming views of cattle, 'strong men,' river bits, and Brighton corners (how well I know all these last two series!), are such as 'President' may well be proud of. They have, too, a most pleasing variety of tone. I gladly admit 'President's' photographic skill."

MOST of the friends of Mr. F. A. Bridge, the Hon. Secretary of the Photographic Club, are aware that with him music goes hand in hand with photography, and that during his musical career he has been the recipient of several testimonials from the members of the various societies and classes which have studied under his direction. These have included such unconsidered trifles as clocks, vases, lamps, Dresden china, electro-silver tea-services, volumes of musical works, framed testimonials, &c. The collection was further augmented last week by the members of the St. John's Choral Society, which has been under Mr. Bridge's conductorship since its formation. At the final rehearsal of *Elijah*, on the 16th inst., he was presented with an elegant silver-mounted bâton in morocco case, bearing a suitable inscription. This must have been very gratifying to friend Bridge, but, as a more welcome surprise still, must have been the "torrent of eulogistic eloquence" which was poured on his devoted head on the occasion by Mr. A. A. Tindall, who made the presentation.

ACTION AGAINST THE CALEDONIAN COMPANY.—On the 15th inst. the Caledonian Railway Company were sued by Messrs. M. & T. Scott, photographic artists, 36, George-street, Edinburgh, for 4*l.* 19*s.* 6*d.*, the value of a Florentine picture-frame destroyed on the 24th December last, while in the company's charge for carriage from Aberdeen to Edinburgh. It appeared that the frame was sent in a box which the pursuers, on delivery, had forwarded to another place where empty boxes were kept. A few days after the box was opened, and the frame found to be seriously damaged. The company maintained that the damage was not done while the box was in their hands. Sheriff Rutherfurd, in deciding the case, said he rather thought that the injury must have been caused at some prior stage in the transit of the box from Aberdeen, and with regard to what had also been urged for the defence, viz., that the delivery sheet had been signed "in good order," there was no doubt that the man who signed it at the time believed it was in good order. His Lordship did not believe that the party was precluded from suing, if in point of fact it was afterwards found that it was not in this good condition. He thought the onus lay with the railway company to show that the injury was not done while the box was in their hands, and that this they had not proved, while it had been shown that the box had been carefully treated while at the place for "empties." He accordingly discerned for the pursuers, with expenses.

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THE BRITISH
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SOME OF THE DIFFICULTIES OF COLOUR PHOTOGRAPHY.

)TOGRAPHY in natural colours is the especial province of the
n of science rather than art; at least, such is the popular
a; yet we do not hesitate to say that, if previous experi-
nters in this region had possessed some art training, their
rgies might have been directed to a less sterile issue.
sing lightly by Professor Lippmann's *ex post facto* theory for
production of colours by iridescent effects as one with,
haps, the greatest probability of success if only it were
cticable, we may glance at some conditions necessary to be
illed before what is ordinarily looked for in photography in
ours can be realised. Every one knows how an artist makes
ainting. He has a number of reservoirs of colour of various
ds, and he uses one or another or mixtures of various
ours, and lays them on the surface he is painting upon, by
sh or knife, in such manner that seems to him suitable to
duce the effect he sees or feels. What is looked for in the
cess of the future is primarily a chemically prepared surface,
ch, when acted upon by the light of a camera image, shall
e such a chemical or molecular rearrangement of its consti-
nt particles that the surface, when illuminated afterwards by
te light, shall reflect such rays only as it received, and do
n a manner that will effectively represent the scene before
camera. Secondarily, a more modest scheme is to take a
es of negatives, a screen of a particular colour being
loyed for each till all the colours of the spectrum are indi-
ually utilised, and then to print images, one from each
ative, in exact superposition and in the particular colour
nging to it. This idea is modified by using not each
ur of the spectrum, but a selection of those colours which,
nixing in suitable proportions, are capable of producing on
eye the effect of the greater number of spectral colours.
et us return to a consideration of the artist's palette. We
to begin with, that some of his pigments produce their
ts when spread upon the ground he employs by apparently
tly reflecting just the particular colour that characterises
n; others behave in a different manner entirely, and they
ninety per cent. of the effect obtained by their aid to the
cting power of the ground they are laid upon. These two
es of colours may be broadly termed "opaque" and
nsparent." Vermilion may be looked upon as a type of
former; a comparatively thin coating painted upon a white
black surface will look a beautiful red. Crimson lake is
al of the second class; a thin coating laid upon a white
ce will show a rich crimson colour, while a coating of the
thickness on a blackboard will not give the faintest indi-
n of crimson, and, in fact, if a coating an eighth of an inch thick were laid on with a medium to make it cohere, it would but look like a deep reddish brown. The scene painter gets over this difficulty by mixing opaque white paint with some of his transparent colours, and so each layer carries its reflecting surface in lieu of one white ground within its own body, each particle of white so acting. And here it must be pointed out that, though we have just spoken of comparatively thin coats of opaque pigments, their actual substance is far in excess of any silver image, for example, hitherto produced, not, of course, referring to the medium employed to hold the chemicals. Which class of pigment, then, is the photography-in-colours experimenter to utilise? If the one-direct-image process, he must be prepared to get a very thick film or body of chemical, or else to aim at an image formed of transparent colours. By leading up to this point in the manner we have done, the difficulties have been partially minimised, but the crucial point has now to be faced. Again, referring to the artist's palette, let us ask how does he proceed if he wishes to represent a red object in shadow? Does he put a greater amount of red—a thicker coating? No; he degrades the colour by mixing another pigment with it, or painting it upon a ground darkened in the particular region. But can anything analogous be done in photography? Supposing, for the sake of argument, a process to be invented which should give a picture of the spectrum in pure colours, how would the shadows be represented? To put it concretely, how would a bright tartan plaid trimmed with black velvet thrown over a man's shoulder be represented? There is a further phase of the same difficulty to be encountered, and this we will leave for a future article.

TRANSMISSION OF IMAGES, SEEING AND PHOTOGRAPHING BY TELEGRAPH.

Those who have followed our two previous articles will readily perceive that a relay will often be required between the transmitting organ and the line wire, at any rate where electromotor cells, in which light initiates a current, are used; and for the purposes of telephotography in gradated tints the relay must be one in which the new current is either directly or inversely proportional to the initial electromotive force. A form of relay described by Professor Minchin in his recent communication to the Camera Club, and also figured in its essential features in M. Liesegang's book (p. 129), appears likely to serve the purpose if slightly modified, and seems specially adapted for use with photo-electric-motor cells, as the circuit of the cell is never closed. The arrangement in question was used by Minchin in connexion with aluminium and selenium cells, made by spreading selenium on a strip of aluminium an inch

long and about a twentieth of an inch wide, and opposing this to a strip of plain aluminium in a bath of acetone. According to Minchin the photo-cell is connected with a Thomson's quadrant electrometer; and passing vertically downwards from the needle of the electrometer is a light glass tube, which carries the contact pieces for closing a relay circuit. In order to make this system suitable for producing proportional effects in the line circuit, Professor Minchin's contact pieces would have to be modified somewhat after the following fashion. To the bottom end of the vertical glass tube, joined to the needle of the electrometer, is attached a small horizontal disc, A (fig. 1),

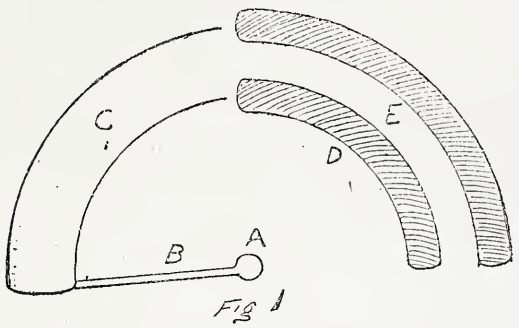

Fig 1

bearing a light arm, B, and a carbon filament made as a curved fork, C. D and E represent hollowed-out portions of the base of the apparatus, these containing mercury, which must stand up over the edges, as in the commutator of Ritchie's rotating electro-magnet. The position of the carbon fork must be so adjusted that it skims on the surface of the mercury, and its thickness must be adjusted so as to give in the line circuit—which is completed as soon as the mercury troughs, D and F, are connected—a current proportional to the electromotive force of the photo-cell. Another arrangement, but one, perhaps, better adapted for use where a separate battery supplies the current, and an ordinary selenium cell is the organ through which light controls the current, is an adaptation of Roget's spiral, the arrangement being capable of modifications in several ways; but we give the following as an example. The current of the transmitter passes from A to B (fig. 2), through

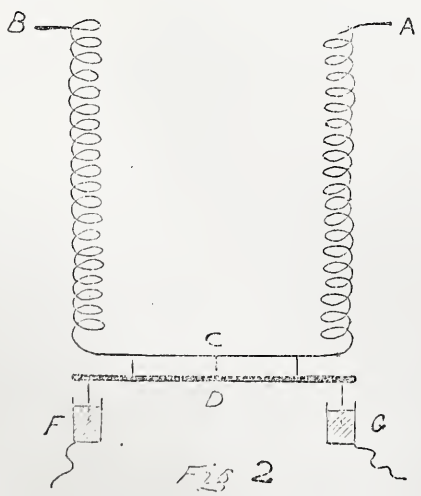

Fig 2

the hanging spirals, which are connected by the link C, only the spirals would have to be made much more delicately than might be supposed from our rough sketch; the spirals, as they contract on the current passing, lift the conducting bar D, which is connected to, but insulated from, the link C. At F and G we have two adjustable resistances, culminating in a break when the spiral is drawn up to its highest, these resistances being, of course, placed in the line circuit. The resistances may be carbon threads working in mercury cups, or metal wires working in a high resistance liquid, such as a mixture of alcohol and water. It is obvious that this relay will give a current in the line inverse to that of the transmitting organ, *i.e.*, the relaid current will be at its maximum when the initial current is at its minimum. The important matter, however, would be to so adjust the apparatus that the currents shall be proportional; whether inversely or directly proportional would merely determine whether a positive or negative image was to be transmitted. Two inverse relays, one at the transmitting station and one at the receiving station, would, of course, if properly adjusted, give a current having a direct proportion to the initial current.

We now come to the problem of reducing the number of line wires. As we have already pointed out, when sufficient time can be allowed for the transmission of a camera image, a single wire may serve; but in the present state of physical knowledge no method seems open by which a considerable scene with figures in motion can be transmitted without numerous wires—a matter we touched upon in our first article; where we stated that, in the case of the mosaic system of simultaneous transmission, the number of wires might be reduced for square groups to twice the square root of the total number of organs, or, speaking generally for rectangular groups, the number of wires will be the sum of the organs along two consecutive sides. M. Liesegang's method is available with photo-electric cells in which the plates are immersed in a liquid, or with such an electromotive selenium cell as that of Uljanin, referred to a fortnight ago (page 243), and possibly in other cases. Its principle is very simple, and can be illustrated as follows:—

Let A B C (Fig. 3) be three strips of the platinum coating

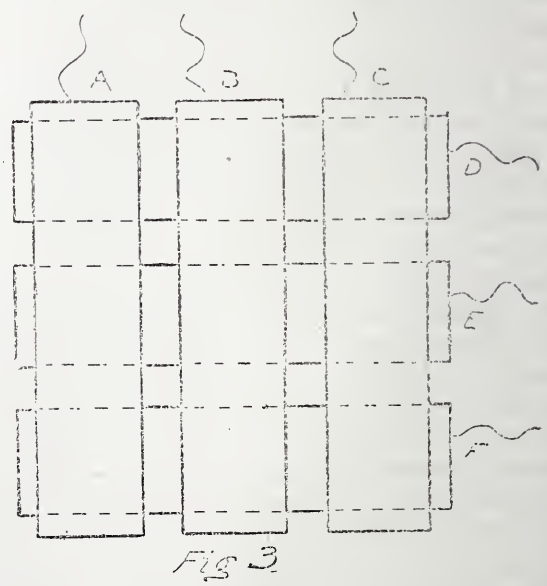

Fig 3

on platinised glass, the remainder having been cleared away by suitable means, or perhaps it is simpler to suppose that only these parts of the glass have been platinised, and to each strip is attached a conducting wire, as shown. On a similar piece of glass are three similar strips, D E F, each with a wire connected as before. The two plates being now placed face to face with the strips crossing, and a film of selenium between the platinums at every place where they cross, we obtain a group of nine selenium electromotor cells of Uljanin's pattern. If, now, the light shines on any one square, let us suppose that formed by the intersection of F and A, a current will circulate between these plates. We need not here consider the several ways in

which Dr. Liesegang's principle can be carried out, it being obvious enough that with suitable alterations of structure it may be made as a photo-electric battery with metal plates and an intervening liquid in suitable partitions, the exposed plates being perforated to admit the light.

A quite analogous system of cross-strips may serve as a receiving system, the strips of metal being connected at each intersection, let us suppose, with an incandescent lamp set in the right position, either with or without the intervention of a relay.

We have said but little about the choice of receiving organs, but many possible arrangements are described in M. Liesegang's book. We may refer, however, in passing, to the somewhat crude and hardly practicable proposal of Senlecq (1877), to provide a number of rather soft pencils, each of these being controlled by an electro-magnet, which causes it to press more or less heavily on the paper, according to the intensity of the light shining upon the corresponding part of the transmitting surface. A far less crude arrangement, and perhaps the most promising of all, is that touched upon by Professor Minchin, at the recent Camera Club Conference, and reported on p. 233 of our issue for April 10th, in which a film of collodio-bromide emulsion spread on a silver plate and placed in an electrolytic bath takes a developable impression when connected with the negative terminal of a battery. Assuming the silver basis upon which is spread a collodio-bromide film to be earthed, and opposite it in the electrolytic bath we have ranged a multitude of closely packed platinum wires, each insulated except at the top, and each bringing the positive current from the corresponding part of the transmitter, we have an arrangement which should rapidly impress the plate, and the amount of blurring would probably not be great if the wires terminated close to the film. Professor Minchin has found that the current from one photo-electro-motor cell will impress the collodio-bromide film in an electrolytic bath; so, considering the smallness of the area to be affected by each organ, one may perhaps hope for the construction of a tele-photographic system on this basis, without battery other than the photo-cells, and without relays. It is, perhaps, not easy to at once say whether, in this case, it would be possible to adapt Liesegang's system of reducing the number of wires by cross-connexion, but it is conceivable that the problem may be solved by dividing the base so as to form one set of strips, and making the cross-strips of platinum, this cross system being supported immediately in front of the film. Lateral conduction in the fluid, however, would have to be reckoned for, and might disturb the results to a considerable extent.

In dealing with the problem of telephotography we have not by any means followed closely the matter of M. Liesegang's book, nor have we touched on more than a fraction of the interesting points contained in it, and therefore all interested in the subject should obtain the work; indeed, we should be pleased to see an English translation.

Among the matters we have not dealt with are Nipkow's proposed arrangements for reproducing simultaneously several points of light by the use of a single line wire, the persistency of vision being taken advantage of; neither have we been able to find space for an account of the chapter on the various forms of Radiophone.

THE specimen of M. Lippmann's photography in natural colours shown at a recent meeting of the Photographic Society of Great Britain did not, in the opinions of those present, bear out the encomiums passed upon it by some of the daily press. Be that as it may, professional photographers are being continually applied to for portrait in natural colours by sitters who refuse to believe that the thing is as yet an impossibility, because they have read so much about it in the papers. Not only this, but they have seen exhibited at railway stations what are purported to be photographs in colour; a title that certainly conveys a *misleading* idea, inasmuch as the pictures in question are only photo-mechanical prints in colours, produced by several printings with the different-coloured inks after the style of chromo-lithography or chromo-zincography.

MANY amateur photographers will do well to take to heart the letter that appeared in our last issue, entitled *Uncivil Amateur Tourists*. The letter is but a type of scores of others we have received during the past year or two. Some amateurs seem to consider that the professional's time is of no more value than their own, and feel justified in taking up as much of it as they think fit, simply because they happen to know something of photography. When they require the loan of a dark room to change their plates, they generally demand to see the principal, however busy he may be, and will state their business to no one else. Under these circumstances, is it to be wondered at that the use of a dark room is sometimes refused?

A WELL-KNOWN provincial photographer informed us some little time back that he looked upon the modern amateur as a "pest." He said that he generally came in the busiest part of the day, and if he was told that he could not have the use of the dark room for an hour or two, or until after the press of business was over, appeared to consider himself ill-used. Sometimes he said he had even been abused and called "churlish, like all professionals." He detailed an instance of an amateur calling and asking for the use of the dark room to develop a trial plate, saying he would only occupy it for a quarter of an hour. He was told he could have it for twenty minutes, but not longer. He was furnished with the stock bottles of developer and the fixing bath, and then bolted the door. It was over two hours before admission to the room could again be obtained. To repeated knocks the reply came, "Shan't be long now," and when the room was entered it was found that most of the stock of the developer was used up, much of it on the floor and bench, and the hypo splashed all over the place. The benches had to be thoroughly cleaned before work could be resumed. Instead of an apology for the inconvenience caused, this amateur remarked, "You are in a deuce of a hurry, ain't you?" From this and many previous experiences, our friend now steadfastly refuses the use of the room either as a favour or by payment, though he said he should always be glad to see any of his amateur friends of old, who were of quite a different stamp from the modern amateur. Tourists should do well to remember on which side the obligation lies in the loan of a dark room.

THOSE who desire to secure studies of spring effects need be on the alert. We have now entered the month of May, and up to the present time the cold winds have sadly retarded vegetation. The trees are all ready to develop their foliage, which they will rapidly do with a short spell of warm weather. Under the prevailing conditions, judging from former years, a very short spring must be anticipated. Therefore those who desire to secure the beauties of spring effects should be prepared when they make their appearance.

RUMOUR says that the old-established business of the Woodburytype Company has now changed hands, it having been bought by a large and well-known firm of London printers.

APROPOS of the article last week on judicial photography, we were, a few days ago, in the offices of an estate agent who avails himself largely of photography for depicting property for disposal. The photographs appeared to be of two classes. The one, evidently by the indications of fading the older, were all taken with lenses of ordinary foci, whereas the newer ones were all taken from a near standpoint with

wide—in some cases very wide—angle lenses, the consequence being that the perspective in these was very violent, with the result that the nearest object, *i.e.*, the house to be disposed of, appeared far more important to the ideas of some persons than the adjoining ones. On our commenting upon the inartistic appearance of these photographs, as compared with the apparently older ones, we were informed that the photographer who took the latter was not now employed, because the present one always displayed the property to so much greater advantage. Moral: In commercial photography first ascertain what the customer requires, and act accordingly, for it is not always that the highest class picture is best for business purposes.

The annual report of the City and Guilds of London Institute, comprising something like a couple of hundred pages, has just been published. The Institute has an extensive array of Officers. There are over two hundred Governors. There are no less than seventy-eight Members of Council, and some fifty or so Members of the Executive Committee. According to the balance-sheet the expenditure for the year was between twenty-eight and twenty-nine thousand pounds. With this large outlay, and with the long array of Officers, Governors, Councillors, and Executive Committeemen, it is the opinion of many persons that much more should have been achieved. These remarks apply equally as well in the photographic as in other directions.

The Bill to amend the Merchandise Marks Acts of 1887, to which we directed attention a few weeks back, has virtually passed. It has reached the House of Lords, and was there read a second time and reported, without amendment, one day last week. Some photographic dealers will do well to keep this Act in mind, for there is no question that it is often infringed because individuals do not care to prosecute. Now the Board of Trade are empowered to undertake the prosecutions.

We have on two or three occasions lately called the attention of photographers about to visit the Franco-German frontiers to the rumoured relaxation of the stringency of the passport system, and again to the contradiction to the rumour. Now, however, it seems there has recently been some concessions with regard to its stringency. Foreigners who intend to stay more than eight weeks in Alsace-Lorraine, and have taken the "residence card" necessary for that purpose, need not now show *viséd* passports on recrossing the frontier. In this respect they are put on the same footing as Germans.

Once more we would say to photographic tourists in these districts, Have a care where you plant your cameras. Over-zealous officials can, and often do, cause serious inconveniences to unsuspecting travellers; more particularly is this the case in the districts referred to. As we have several times said, photographers in these regions will do well to consult the local military authorities in a respectful way before commencing operations. It may often avoid after inconvenience even if the regulations have been inadvertently transgressed.

CLEAR NEGATIVES.

Bad habits are notoriously difficult to eradicate, and of none, perhaps, is this more true than of the neglect of those little niceties of manipulation which go so far to aid in the production of perfect negatives, or negatives as perfect as the attendant circumstances will permit. Without for a moment declaring in favour of what has been termed "pretty" negatives—*i.e.*, those which, from their brilliancy and clearness, form more presentable pictures than the prints obtainable from them—there can be no doubt that clearness of the deepest shadows is at least a desirable quality in a theoretically perfect negative. Without this quality there can be no true gradation from absolute black to pure white, for the presence of any veil where there should be clear glass must necessarily degrade in a corresponding degree every other step in the scale.

It is true, perhaps, that few, if any, of the subjects submitted to the camera present even in their deepest shadows absolute blackness, for more or less light is reflected from every object in nature; but at least those portions of the plate which are protected from the action of the light by the rebate of the dark slide should be quite free from deposit, and yet how seldom is this really the case. The fault may lie in the plate itself, or it may be due to the employment of too much light in the developing room, though these are by no means the invariable or even the most general causes. Rather should the fault be traced, in the great majority of cases, to carelessness on the part of the operator, and this carelessness takes many different forms.

A writer in a recent volume of the Almanac, in the course of a series of admonitory platitudes, says: "Never rest satisfied with negatives in which the edges behind the rebate are fogged, but test the camera and slide and find out the cause." It seems, however, difficult to explain how those portions of the plate that are protected "behind the rebate" of the dark slide can be fogged by any leakage of light into the camera, unless it is supposed that the light passes through the film and is reflected from the back surface of the glass, in which case the other portions of the film would be far more seriously affected and in a way would be attacked from both front and back instead of the latter only. Leakage of light *in the camera* may, therefore, safely be dismissed from the list of possible causes.

If the plate itself or the illumination of the developing room be suspected, a simple test will settle the matter. Let a plate be taken from its original package, and with as little delay as possible placed in the dark slide, and with the shutter drawn exposed for, say, ten minutes in the dark room, at the same distance from the window as during development. Let it be then quickly plunged into the developing solution and covered over for the period usually occupied in bringing out an average exposure, and then after careful washing and fixing in fresh hypo solution (before exposure to light), if any deposit appear upon the plate, it will be easy to judge whether either emulsion or light is in fault. Presuming the plate to be all right and a "normal" developer to have been used, the film should be practically as clear as the glass itself. True, some kinds of gelatine themselves show a slight appearance of opalescence, but this is scarcely worthy of notice as affecting the printing quality of the negative.

The most frequent cause of fog or veil is, no doubt, over-prolonged or forced development—assuming, of course, the negative has not been over-timed. In the latter case, if over-exposure alone is to blame, the margin will still be clear, though all other portions of the film may be veiled; but forced development will act on every part of the film equally. By "forced" development is understood the too hurried or too free addition of alkali in working up an under-timed exposure, and in such instances the fog or veil will be usually coarse and granular in character and dark in colour.

Another prolific source of the evil is, as has been often pointed out, the removal of the plate into daylight or strong artificial light before fixing, especially if the films have been imperfectly or carelessly washed. It has been alleged that if a negative be thoroughly washed—whatever that may mean—after development, it may be exposed to daylight with impunity before fixation, and that any visible discolouration that may be caused will disappear in the fixing bath. No greater fallacy, no more absolute untruth, can well be imagined, and those who support such a view must be very easily satisfied in the matter of clearness. But in the case of an imperfectly washed plate, if taken into a strong light unfixed, it must be obvious to the merest tyro that development must continue, for the plate is being exposed and developed simultaneously; slowly, no doubt, the action proceeds in comparison with the action of the solution of full strength, but still the effect of the diluted developer still remaining in the pores of the film is sufficient to produce a very decided and obnoxious fog, in this case fine in grain and of a lighter hue than that resulting from forcing—in fact, bearing the character more of a stain.

How persistently the developing solution clings to the film may be tested by changing a plate after development into successive batches of clean water at intervals of two or three minutes, and examining the colour of the liquid in a clean glass, or, better still, in a porcelain dish. Probably very many operators would be surprised at the number of times the water has to be changed before it ceases to ex-

tract colouring matter—especially when pyro is used—from the thick layer of gelatine. In many cases a soaking of half an hour in water changed half a dozen times fails to entirely remove the developer, and this is certainly more than the majority of negatives receive before fixing.

Even when the plate is fixed before removal from the dark room, another and perhaps unsuspected cause of veil or stain remains, especially when the fixing solution has been much used. The hypo bath, as soon as it has commenced to perform its fixing duties, becomes a silver solution, that is to say, it holds a salt of silver in solution. Soluble salts of silver, as is well known, are precipitated from these solutions by pyro, or, indeed, any of the agents employed as developers; and consequently if any developing solution remain in the film through insufficient washing, as soon as the plate is put into the fixing bath the unaltered bromide is dissolved, and at once reduced by the developer still present. But fortunately the injurious effect is not so great as might be expected, since the action set up is chiefly one of intensification; in other words, the reduced silver is mainly attracted by the exposed portions of the film, comparatively little of it going to the shadows.

More than one intensifying process has been based upon the addition of minute traces of solution of silver in hypo or other solvent to another of a reducing agent, but in this case a minute trace of the reducing agent remains to co-operate with an excess of silver solution. The result, however, is similar, though in addition to the intensifying action a very decided stain is produced on what should be the clear portions of the negative.

The moral to be derived is, wash the negative very thoroughly, and fix in the dark room. W. B. Bolton.

COLOUR.

[Lecture by W. E. Debenham at the London and Provincial Photographic Association.]

It seems strange, considering the universal recognition of colour as distinguishing various objects, and the amount of gratification which is afforded by the variety of colours of natural objects, that so many ages have passed by with so little investigation of the subject. Indeed, what has to be told concerning colour is the result of quite modern investigation. We need go no further back than the time of Newton, who found that ordinary light, analysed by a prism, was compound in its nature, and he divided the colours into which light may be resolved into seven—violet, indigo, blue, green, yellow, orange, and red. It is not easy to see why indigo was included as a distinctive colour, unless it was to make up the magic number seven, possibly because there are seven days in the week, or perhaps from analogy with the science of music, because there are seven notes in the diatonic scale. It is quite possible, however, for a reason which will be given later on, that indigo as a distinctive colour may eventually be endowed with more than its original importance.

The colours of the spectrum owe their variety and their characteristics to the different wave-lengths of the rays of its different parts. When white light is analysed by passing through a prism, a band of colours is seen which does not exhaust the whole of the rays passing, but only indicates what our eyes are fitted to observe. Starting with the less refrangible rays, we see a full set of gradations from red, through yellow, green, and blue, to violet at the other end. Beyond both ends of the visible spectrum are rays of longer or shorter wave-length which are not visible to us. Beyond the red end are heat rays, and beyond the violet are rays which can be recognised by their powerful effect upon photographically sensitive compounds, and can also be rendered visible by fluorescence.

It has been a common observation that by mixing pigments of certain colours other distinct colours resulted, and, as it was found that with transparent red, yellow, and blue, all other colours could be represented or approximated, these three were naturally supposed to be primary colours. This was, and perhaps in some places still is, taught. Strictly speaking, every spectrum colour is primary. Each has its own wave-length, fixing its place in the spectrum, and indicating characteristic properties of heating or chemical effect. To understand why some colours have the effect of being compounds of others we must turn our thoughts from the colours themselves to the consideration of the human eye, the instrument for perceiving them. According to the doctrine first put forth by Thomas Young at the beginning of this century, and now generally accepted, there are in the eye, distributed over the retina, three sets of nerve fibres, one sensitive especially to red, one to green, and one to blue or violet. Each set is sensitive over a considerable range of the spectrum: thus the red and the green fibres are both sensitive over the yellow region, whilst the green and blue sensitive nerves respond to what is between them, and the blue or violet set is sensitive from the extreme end of the visible spectrum. Each set is thought to be sensitive more or less to a great length in the spectrum, but to have a maximum at some particular place in it, corresponding in one set to red, in another to green, and in the third to blue or violet, or a point between them. Maxwell gave blue as the colour to which this set of nerves is most sensitive, but the experiments of Helmholtz confirm those of Muller, which give violet as the colour to which the special set of nerves particularly correspond. Abney considers the place as that of the spectrum line G. The reference made in the beginning of this paper to the possible reinstating of indigo as a primary colour was suggested by the idea that that place might perhaps be eventually decided upon as the maximum of sensitiveness for the blue or violet set of nerves, and the name, which is neither blue nor violet, but is distinctive, might be conveniently adopted. Helmholtz, however, said that the precise tint of the maximum of sensitiveness cannot possibly be known by experience. This is not very important. We know approximately the range of sensitiveness of each set of nerves, and pretty nearly the place of maximum sensitiveness.

As to direct anatomical proof of the existence of these three sets of nerve fibres corresponding to the primary colours none has yet been found in the human eye, or in that of mammals, and this, perhaps, because of the exceeding minuteness which must characterise them in order that we may see minute objects of various colours all over the retina without distinguishing the separate areas for the various tints. In the eyes of birds and reptiles however, Helmholtz tells us that Schultze found rods or tubes of three kinds, one filled with red oil, one with yellow, and one set colourless. The red would obstruct blue and green rays, whilst the yellow would obstruct the blue, and the colourless rods permit all rays including blue and violet to pass.

Primary colours then, have no existence except with regard to our sensations of colour, and these are three, violet-blue, green, and red. These three are the primaries, and from them we may compound a sensation answering to any part of the spectrum. The yellow of the spectrum affects both the red and the green sensitive nerves, and it is the combination of sensations transmitted to the brain by these two sets of nerves that gives the sensation of yellow. It should, therefore, be found that green and red simultaneously acting on any portion of the retina will produce the effect of yellow and this is actually the case. I throw on the screen an image of a green disc from one lantern, whilst with another a red image is projected upon the same spot. The effect, it will be seen, is yellow. It must not be expected that with the colours available for the purpose the compound tints will be perfectly pure and brilliant. In the first place I have not been able to obtain dyes which let through only one particular spectrum ray and exclude all others. Any one who has worked with the spectroscope will know that almost all the colours procurable are far from pure, that is to say, that they let through light from a considerable range along the spectrum, and sometimes from two widely different parts. Aniline blues and greens, for instance, generally allow a good deal of red to pass. Farther, we judge a colour very differently according to the presence of other colour wherewith to contrast it. To quote Helmholtz once more, "We know in a general way that candle light is yellowish compared with daylight, but we only learn to appreciate how much the two kinds of illumination differ in colour when we bring them together at the same intensity, as, for example, in the experiment of colour shadows. If we admit light from a cloudy sky through a narrow opening into a dark room, so that it falls sideways on a horizontal sheet of white paper, while candle light falls on it from the other side; and if we then hold a pencil vertically upon the paper, it will, of course throw two shadows, the one made by the daylight will be orange and looks so; the other, made by the candle light, is really white, but appears blue by contrast. The blue and orange of the two shadows are both colours which we call white when we see them by daylight and candle light respectively. Seen together, they appear as different and tolerably saturated colours, yet we do not hesitate a moment in recognising white paper by candle light as white, and very different from orange."

There are various other methods, besides that of using several lanterns, of combining the effect of various colours. A very usual lecture experiment is to revolve a disc at such a rate that its various parts appear homogeneous. The disc is divided into sectors, variable in size and each of some distinctive colour. Thus, if blue, red, and green occupy the proper proportionate spaces, and the disc is revolved

whilst a bright light is turned on in front of a dark background, the effect is to produce white. Helmholtz also gives the following method:—Lay two discs of the colours to be combined upon a horizontal surface. Then hold a glass plate vertically so that the reflected image of one disc appears to cover the other disc looked at directly through the glass. This method gives us the opportunity of increasing the effective power of one or other colour according to the greater or less angle at which the plate of glass is observed. The discs should be laid on a dark or black surface; if surrounded by white, they look dark and dingy. Another method which I propose to show to-night, and which has the convenience of demonstrating composition of colour by a single lantern, is to have the colours in alternate stripes, and show them in the lantern first as the two colours distinct, and then, by throwing the image very much out of focus, allow them to blend. If the lens cannot be sufficiently thrown out of focus for complete blending, a piece of white card or paper can be held so near the lantern as to intercept the rays, and be so completely out of focus as to ensure blending. The grating of red and green now shown in the lantern gives a sharp image on the screen, but by moving the lens or holding a piece of card on the screen, and advancing it to the lens, the lines of the grating disappear, and are substituted by a general yellow.

These methods depend upon the colours to be combined falling upon the same part of the retina. I find, however, that it suffices to allow them to fall upon corresponding portions of the retina of the two eyes. The frames now handed round contain a film of green in the opening for one eye and of red in the opening for the other eye. If a light be looked at through these spectacles, it will not be seen of the colour of either film, but as a yellow, a greenish yellow. If there were as convenient a way of modifying the illumination to either eye as there is of lowering the light in one of a pair of lanterns, it might be so arranged that the yellow should not be found to incline either to the green or to the red. In another set of these spectacles I have made the film for one eye red and for the other eye it is divided. The lower half is of the same green as before, and the upper half of a bluish green. On looking at a light through the red and blue green, it appears white, but a slight shifting, so as to bring the other green into use, gives yellow.

Blue and yellow have been called primary colours, and by mixing these in transparent pigments a good green may be compounded. They do not, however, give green, but white, when their effect is produced simultaneously on the eye. This will be seen by allowing the blue and yellow discs now in the lanterns to overlap on the screen, also by looking at a light through the blue and yellow spectacles shown, and in other ways.

White, which generally speaking is a compound of all the colours, may be produced to the eye by compounding two colours, and any two colours which compounded produce the effect of white are said to be complementary to each other. Starting from the red end of the spectrum, we may take any colour from that to a yellowish green, and we shall find another colour in the spectrum towards the violet which, compounded with the first, will give the effect of white. These whites are to the eye indistinguishable from one another and from ordinary white light, but may be recognised by analysis with the prism, or by holding coloured screens instead of white paper in the path of light. Thus, in the white compounded of greenish blue and red, violet loses its brightness, whilst red comes off badly in the white composed of violet and yellowish green. Green, not inclined to yellow or blue, requires a colour not to be found in the spectrum for its complementary, viz., purple, a compound of violet and red.

If we consider what colours appear to be related and what opposed, we find that a circle may be arranged, commencing with the spectrum violet and going through the series to red, which may be made not quite to close the circle, but may be blended into the violet by purple. In fact, the red and violet, although at the opposite ends of the spectrum, do not strike the eye as being the most opposed in character, nor do they act as complementaries to each other. In the colour circle now shown, I don't think any one unacquainted with the spectrum would select the place between the violet and red as the starting-point in particular any more than that, say, between the yellow and red or the yellow and green.

This approximation in visual character of the two ends of the spectrum, the most contrasted in wave-length and in physical characteristics, may be due to the fact that the violet is approximating in the wave-length to half that of the red, and in rapidity double. A little beyond the violet of the visible spectrum this simple proportion holds good. Now, as each colour sensation acts not only at a definite point, but over a considerable portion of the spectrum—recognising wave-lengths that is, that are anywhere near its maximum of sensitiveness—it seems possible that, as we approach the relation of double rapidity such as exists in the musical octave, that sensation nearest to that of double rapidity may be excited to some extent, and thus the relationship of violet and red as approximating to one another instead of striking us as the most opposed may be accounted for. On the other hand, the fact must be remembered that the vibration of actual half wave-length of red is invisible.

The slide next thrown on the screen illustrates the essential difference between combinations of colour sensations, such as have been shown, and combinations of coloured films or pigments. In the first case we have proceeded by additions of sensation, in the present case we proceed by subtraction. In this slide three discs of yellow, violet, and greenish blue respectively overlap, all three at the centre, and in twos for a space along each side. Here, where the blue-green and yellow overlap, we have full green, the yellow and violet transmit red, and the violet and blue-green give blue. In the centre, where all three overlap, is darkness. The explanation is that the violet and yellow films are both transparent to red, the violet and blue-green to the blue, and the blue-green and yellow to the full green. Where all three overlap, as the third film obstructs the particular light passing through the other two, we have darkness. A mixture of pigments is somewhat similar. Here each pigment absorbs some of the rays that would be allowed to pass by another pigment, and the result to the eye is what is left after the absorption by the constituent pigments. With transparent pigments, therefore, of complementary colours we obtain black. A very good water-colour black may be obtained by mixing lake, gamboge, and transparen blue.

The different effect of colours seen as blended by their separate effects on the eye, and blended by being mixed, may be illustrated by making a small stipple of blue and yellow, compared with a wash of a mixture of the same colours. In the latter case the effect is green; in the former, when looked at at such a distance that the separate dots are no longer noticed, the effect is that of a low white or grey.

The three colour sensations existing in most eyes are not in all cases complete. There are some persons who appear to be deficient either of a green or red sensation, and who are therefore to a great extent colour-blind. The sort of vision of colours experienced by the green colour-blind can be approximately understood by holding this sheet of coloured stripes—coloured red, yellow, green, blue, and violet—in the light shown by two lanterns, one of which is furnished with a blue, or violet-blue, disc, and the other with a red disc. Here the green strip appears almost black, and the other colours somewhat different from what they appear in a white light. The position of the person who is red colour-blind may be estimated by holding the colour strips in a light compounded of green and blue. Here the red is black; the general effect rather inclined to monotony. It has been stated that as many as four per cent. of males are colour-blind. The proportion of females is considerably less.

CAMERA CLUB CONFERENCE.

PHYSIOLOGICAL ASPECT OF SOME PROBLEMS IN ART.

By Rev. F. C. Lambert, M.A.

It may be as well to admit, at the outset, that the title of this note is open to some measure of objection on the ground that it is not strictly accurate, even if not somewhat misleading. It would be pardonable to suppose that I were about to *explain* some profound problems or mysteries, the peculiar property of artists. That I do not at this present stage of inquiry propose to attempt, but rather my object is to stimulate inquiry among experts in physiology and other kindred branches of science, so that they may explain to us certain things which we are somewhat prone to lay aside as beyond the domain of inquiry.

"There is no accounting for taste," most people say, and they more than half *believe* what they say. But, even were it an unthinking assertion, it is no more than an echo of the older words, "*de gustibus non est disputandum*," a dictum which is chiefly remarkable for its antiquity. To him who is satisfied that "what is and has been is to be," any attempt at an inquiry in this direction will come as little less than rank blasphemy, while to the irrepressible scientist it is a "matter of course," and requires no apology, seeing that he is trained to hold that "there is a reason for everything, can we but find it." It must be admitted that the attempt to find a philosophical basis for our likes and dislikes is, to say the least of it, an adventuresome stroke, seeing that it necessitates a previous acquaintance with certain other branches of knowledge. For instance, we of this nation are fairly unanimous in preferring that general

type of mouth and form of lips to which the poet has applied the epithet, "Cupid's bow." The contemplation of the flow of the contour lines, the modulating surfaces and colour, all combine in producing in us a complex æsthetic sensation or impression. Upon inquiry we soon find that other nations differ materially from us in our estimate of both form and colour.

Again, the bright colours and emphasised form of the nursery pictures presently lose their attraction; colours and forms more refined are preferred. However, not to take up time by multiplying instances which are abundantly familiar to all, I think there will be little or no difference of opinion regarding the assertion that in order to account for tastes we must bring to bear upon the subject some knowledge of *ethnography* (or the science of man, his habits and customs, likes and dislikes), of *physiology* (so far as the organs of sense and the sensory nervous system are concerned), and of *psychology* (so far as the actions of the mind are concerned and connected with stimulation of the sensory nervous system).

Nor can we at all ignore the knowledge of art work, its tenets and objects, not of one nation only, but of all who value for their appearance or power of pleasure-giving any object or work. We might, for want of a better name, call this branch of study comparative æsthetics. There is also a branch of research which has strong kindred relations with this subject, viz., that which regards the connexion between the reception of an outward stimulus and its reflex expression, a branch of study to which painters are perhaps not sufficiently alive, and with which have been especially associated the honoured names of Bell and Darwin. Furthermore, a little thought will show that there is good grounds for the hope that some light on these complex problems may be gathered from the study of (1) early rise of art in *savage nations;* (2) the earliest indications of art perception in *children;* and (3) the abnormal development of allied mental functions in the *insane.*

It would seem as though the foundation-stone of this inquiry, viz., the scientific basis of art, were laid already in the general agreement upon the fact that the stimulation of a nerve not only affects its electrotonic state, but also its chemical condition—changes which, though in an infinitely smaller degree, are yet analogous to those which accompany stimulation and contraction of muscle fibre. This fact at once tempts us to jump to an explanation of exhausted sensation, a sensation with which all are personally familiar, either in the case of the eye, the ear, or the palate.

For my own part, I am satisfied that there is a good ground for hoping that success will attend the effort of trying to find an explanation why we prefer certain forms to others, why certain arrangements of light shade correspond to and call up certain preferred mental conditions, and why certain colours and groups, or combination of colours, are pleasing and harmonious, while others are raw, harsh, and irritating. There is reasonable hope that these things may be done at least in part, although time does not permit me to state my reasons at length.

One word, however, about the perception of form. It is a fact which does not seem to have received attention at all proportionate to its suggestive importance, that the optical apparatus of man receives a share of cranial nerves which quite outnumbers any other sense organ. Without taking count for a moment of the optic or second crania nerve, the apparatus of the eye has the fourth (trochlear) and sixth (abducens), which are each consecrated to just one muscle each, and not only that, but the third (oculo-motor) is an eye-muscle nerve, and finally the outworks of the organ—lids, brow, lachrymal glands, and conjunctiva—come in for a share of the fibres in the fifth (trigeminus). This altogether unique supply of muscle-controlling nerves, without any further inquiry, is more than suggestive of the refined muscular organization of the eye. In fact, it is not unreasonable to think that there will be presently shown to be an oculo-muscular sense such as would clear the way at once towards some philosophic ground for our perceptions of form. Further consideration, however, along these lines is not likely to interest a gathering of photographers.

There is, however, in connexion with this matter a question which never seems to flag or fail to interest photographers, viz., that of the correct focal length of lens to use with any given size of plate. To this query several answers may be offered. Firstly, we may take as our limits those which bound the movements of the eye-ball. Foster gives the field of vision (by eye-ball movement) at 260° horizontally and 200° vertically. Power gives much smaller figures, and his measurements are the more likely to commend themselves to photographers. For the right eye they are:—

(38°–40°)	Upwards 43°	(47°–50°)
Inwards 45°	+	Outwards 45°
(45°)	Downwards 50°–55°	(47°–50°)

Now, taking 38° as the minimum meridional limit, we may imagine a circular picture subtending at the eye 76°, and this would include nothing which could not be seen by the moving eye; while, by taking the maximum, 55°, we should in the same way get a circular field subtending 70° at the eye, including all that could be seen, and also parts beyond the range of the eye-ball movement.

Again, we may consider the optical, or rather visual, axis of the eye as fixed, and map out the sensitive area of the retina. This has been done by Aubert, Förster, McHardy, Priestly, Smith, and others, using various forms of the instrument known as the perimeter. This usually consists of a quadrant revolving about a fixed point, and thus generating a hemisphere. While the eye is fixed upon the point about which the quadrant rotates, the sensibility of the retina is mapped out by sliding variously coloured discs along the quadrant in its various meridional positions.

As will be readily conjectured, the sensibility of the retina varies for different colours. That for white being greatest, then blue, next red, and green the smallest. The numbers given by Landois and Stirling are, in degrees—

Externally	white	88	green	40
Internally	,,	60	,,	40
Upwards	,,	55	,,	30
Down	,,	70	,,	35

Hence, taking a minimum limit for the landscapist, with his green trees and fields, we shall get a possible angle of 60°. This has for long been the traditional limit with painters.

Foster states that the red area is smaller than the green, and that in all retinæ there is some measure of peripheral red blindness. This is probably the more correct view, and would account for the unconscious practice of centralising the reds in pictures.

There is yet another aspect of this question. It is well known that the yellow spot *macula lutea* is the area of best vision, and that the *fovea centralis* is the best part of this region. Moreover, whenever special information is required about any particular point in its visual field, the visual axis is directed to that spot, so the focussed rays fall into fovea. If, then, we draw lines from the circumference of the fovea to the nodal point of the lens, we shall arrive at an angle which bounds the region of exact vision.

It is found, upon drawing two fine short parallel lines distinctly and close together on a piece of paper, and gradually moving them away from the eye, that presently they will blend when they do not subtend at the nodal point at least 60 seconds of angle—this corresponds to a retinal image of about ·004 mm.—a size practically that of a single cone. Hence, it would seem that the parts between the rods and cones are insensitive to light; also, that a cone is not able to carry two separate stimuli without blending them. Any two or more points which subtend any angle less than 60 seconds are not separately distinguishable. This may be practically stated thus—that the smallest pair or group of objects which can be seen separately at a distance of two feet from the eye must not be nearer together than $\frac{1}{125}$ inch.

Hence, in a large photograph which is not intended for examination at a short distance, it is trouble thrown away to strive after the finest optical definition because there is a point at which this refinement becomes lost to the human eye.

The discrimination of small differences is closely connected with another subject, viz., *Irradiation.* It has long been known that a white object appears larger than a black object of the same size. Hence, black lines on white paper seem narrower than white lines of the same width or thickness on a dark ground.

Now, in those productions which are at present known as pinhole photographs—and here we are approaching delicate ground—we frequently have some lines which are rather thicker than we are accustomed to see in photographs produced by means of a lens. When the former, *i.e.*, the pinhole pictures, are examined at a near point, this blurring produces a larger retinal image, and is therefore with normal eyes very distinctly perceived; but when the picture is removed several feet away the retinal image is smaller, and probably the increased illumination coming from the surrounding white parts assists in reducing by irradiation the thick or blurred lines. This is, however, merely a tentative suggestion on my part.

There is suggested in connexion with these pinhole pictures another question. It is generally admitted that the two retinal pictures coalesce and form (usually) one mental impression—which is, by the optical necessities of the case, of varying degrees of distinctness, the most favourable being the case where the objects seen are disposed in the horopter. Now, the impression conveyed by a pinhole picture to the normal eye is that of a picture which is evenly out of sharp focus all over. Or, to

re-state the matter, the normal eye, when looking at a natural scene, sees a small part distinctly and the rest of the picture is received on the retina more or less out of focus, according to various circumstances of the case, while the eye, when resting on a pinhole picture at fairly close distances, fails to produce any sharp image from a picture which is fuzzy all over.

It may be urged that in any case we see (though perhaps do not pay attention to) double images, and that it is not so much a question of double images or diffusive circles as the question of the struggle for the prevailing impression. But it must not be forgotten that the normal eye is always adjusted for some small area which produces a distinct retinal image on the yellow spot. When the eye is opened suddenly, after rest, the passive or negative accommodation is usually for objects at a distance, so that the normal eye has some part of the retinal image sharply defined in any case. Considerations of what in the human eye corresponds to what photographers generally term depth of focus would carry us too far afield for the time at our present disposal. These questions, together with others connected with the horopter, stereoscopy, and other questions of perspective, are well worth mental analysis, and also examination from a physiological point of view, and will more than repay the student for any time and pains he may expend upon them. More than this I will not now say, lest the more patient of my hearers, even, should find difficulty in sustaining further an interest which has, I fear, been already sorely tried.

PICTORIAL COMPOSITION.*

I HAVE already said I have nothing new to tell you; and, as I have already notified your Society that better than my own teaching would be at this lecture to give other people's ideas, I shall make no excuse for quoting now from an essay on *Imitation in the Fine Arts*, by Qatremère de Quincy. He says: "Do we remark that there is matter in the masterpieces of sculptor? Do we wish for the addition of colour? or the step nearer to verisimilitude which it might bring? Do we in paintings regret that the beautiful scenes are presented to us only on one side, or that their figures are motionless? What, then, would we have? Are shrieks wanting to the torments of the Laocoön, or the accents of lamentation to the anguish of Niobe? It will hold good as a general remark that, according as the imagination is more active, we possess in a higher degree the necessary capability of supplying the kind of deficit common to every work of art, and the better, also, are we contented with the specific illusion. In fact, the pleasure of illusion arises, more than we allow for, from a sort of working of the mind by which itself finishes the work of art.

"In imitation which is limited to the senses, in the choice of its subjects, and its mode of representing them it may fairly be asked what its images can teach me, restricted as they are to the gratification of the eye? What do they show me more than I already know? What do they put me in a position to receive over and above their model? What impressions depending on art do they communicate? What new acquisition can such imitation promise me or give me reason to hope for? It does not carry my imagination beyond the confines of reality.

"I shall be told it gives me what nature—whose portraiture it is—gives me. I answer, No. It does not give it precisely because it is only a portrait and because a portrait is only a part of the resemblance of the natural object and presents only a single aspect. Wherefore should I wish for a copy? what need have I of the appearance of things whose reality I am indifferent to? What worth can I attach to the image, when I hold its model in contempt—more especially since there is nothing beyond to compensate for the absence of all those properties which nature denies me?"

It seems almost needless for me to add that he means that which a picture often supplies, but unassisted nature rarely.

We might carry this further, and indeed its application, I am sure, comes home to everybody in this room when they think of past suffering. What weariness has overcome them while contemplating an album—nay, how one almost shudders at the word—and what tortures have been endured in visiting the local photographer and inspecting his views, those deadliest of dead seas, and his none the less veracious valleys—valleys of the dry bones of nature without a scintilla of art in their bald presentment to redeem them; irredeemable indeed, and hopeless, because matter without spirit is, and must be, hopeless.

What this spirit is that may redeem, irradiate, and warm the bleakest landscape, I have endeavoured to put before you this evening, not in my own feeble language, but from the text of another, who in his turn has learnt and compiled from the teaching of the past. I have told you nothing new, he has told you nothing new; art is the next oldest thing perhaps to the hills, and its canons are the outcome of the very nature of things, and as irrevocable. Nothing is more talked about to-day and of nothing is there less to say; it cannot be taught, it may be learnt; it is much more likely to be felt after long patient years of study, felt imperceptibly at first, than in a flash and in full revelation. Perhaps a picture, perhaps a dream, a sonnet, or a sympathetic voice, or a swell of mighty music, who can say; it will depend on your idiosyncrasy when and how you are capable of analysing that which to the multitude is beyond analysis.

* Continued from page 265.

What have I told you? Pictorial composition is the art of putting picturesque things in a picturesque way; that is, not putting them absolutely side by side, or immediately one on top of the other, nor at equal distances, nor four square, nor putting the least important thing in the most important place; if you can do this and can arrange the lighting to get contrast without patchwork or spottiness, and obtain a breadth of effect conducive to the prominence of your principal object, you will be carrying out in photography what is aimed at in painting; and while satisfying yourself and your beholders, you will be doing much to lessen the flood of bad photographs that are giving your ignorant brethren the basest ideas of art, and doing not a little to lift it out of the mire to its proper place again. In art, as in all things, history repeats itself. The refined æstheticism of ancient Greece was debased by the Roman architects, and even Greek artists of the late imperial times were employed, and prostituted their glorious traditions by travestying them in the luxurious villas of Herculaneum and Pompeii. It required that art should die and be born again in the last throes of the empire at Byzantium, and be inspired by a new faith, and a northern fervour in the Gothic periods, before it was fit to be married to the sleeping beauty of the centuries, the bride of the Renaissance, who bringing in her train, and as her dowry, the new learning, the perfumed breath of the garden of the intellect, the Greek and Latin classics, to add the graces of refinement to the life of the fifteenth century. This marriage we know was fruitful in an abundant family of great names—masters in every form of art, and whose works remain to us now, for the most part unrivalled. Then within a century or two this mighty offspring we see dies down, and art appears again to be entering a chrysalis state as taste declines in the times of the later Louis of France, and assumes utterly monstrous forms in the Rococco and our Georgian periods.

Who, then, shall wonder that in these days art has to make enormous struggles, and, half-blinded by what she has passed through, her true path is not distinctly traced before her? Who shall wonder if sometimes she staggers with uncertain step, and lifts up an uncertain voice? Who shall wonder at her calls for æstheticism, on the one hand, or her clutches at realism on the other? None. No, we should rather wonder and be thankful in a materialistic age that she is alive at all; and let us, trusting to those clear lights that have burnt for our guidance through the ages, do what we can to assist art to take her stately way again, and keep its even tenour.

To do this as it behoves us to do, unless we would be branded by posterity with puerility, and stigmatised as blind guides, if we pretend to make pictures, or play with art in any way, it should be in no careless and selfish spirit, but for the ennoblement of the race. Pictorial composition is a great power to this end; and if, at the risk of weariness, I am earnest in pressing upon you the importance of its study and comprehension, it is, gentlemen, because I feel and know its eternal truths will, as they should be, be paramount when those passing fancies whose experiments, as futile as they are frivolous, have passed away.

P. H. NEWMAN.

CRYSTAL PALACE PHOTOGRAPHIC EXHIBITION.

MISS LIL TOMKINSON, silver medal.—Four well-chosen pictures, where, in selecting the scenes, the lines formed by the trees have been duly considered. In these studies the correct usage of the optical resources has been most carefully attended to. Another picture, also included for the medal, is exceedingly well arranged in composition, the subject being: *The little old woman had so many children she didn't know what to do*—a little girl attending to some dozen patient dolls of all sizes. Just one little matter to notice—if the exposure of the lens had been quicker, the photographic result would have been improved; there is, however, much artistic perception about the work in both these frames, to which a medal has been justly awarded.

C. Heginbothom (No. 329 and others).—A series of photographs, which suffer from having been under-exposed. The subjects, *North Devon Scenery*, also necessitate very careful attention to the point of view, otherwise distant objects appear to be near, which can only be set right by some strong foreground. These pictures otherwise show some good practical work.

T. C. Kirby (No. 566), *Simplicity.*—A well-executed study, where good detail has been secured, although a strong light prevails.

F. W. Edwards, bronze medal (No. 578).—A large direct photograph of the Houses of Parliament, a class of work of which this exhibitor has made a speciality, and is a fine specimen of the good results which arise from extreme carefulness in working and a masterly usage of the optical means required for the work.

J. H. Pickard, bronze medal (No. 497), *Grapes.*—The arrangement of the lighting is very effective, showing rotundity. The picture is a simple affair—only a bunch of grapes—but yet treated with some intention in the design.

J. A. Hodges, bronze medal (No. 732), *Near Brendon.*—A good bit of near and distant foliage nicely and carefully treated, resulting in a very pleasant picture.

J. H. Faulks (No. 634), *Pilot Race.*—In this picture great care and skill have evidently been exercised in selecting the moment when the vessels, whilst in motion, formed a pleasant composition, and then good manipulation has produced a very satisfactory and pleasing result. This exhibitor has many other photographs, landscape enlargements, evincing taste in the selection, but in some specimens the enlargements seem to show that the original negatives have not been so carefully manipulated as they might be. A small photograph will often look better than an enlargement, owing to any blemishes becoming increased and intensified in the larger work.

T. Glazebrook (Nos. 860 to 868), *Cloud Studies.*—Very good, but not quite choice enough in the form of the clouds, which are straggling, and all such attempts at strong expression of cloud light and shade must always be procured at the expense of the landscape portion of the scene, which induces unreality of representation. There is a form of beauty in these strongly lighted clouds, which requires much study and selection of the most perfect combination of form to render at all pictorial.

S. G. Buchanan Wollaston (No. 813 and others).—Some very good photographs of peculiar models, being taken from rare fungi and ferns. They are very cleverly manipulated, the light and delicate portions having been very tenderly treated.

B. Karleese, bronze medal (No. 536).—Some well-chosen bits of scenery, which, with the other pictures, show good taste in selection of subject matter with good photographic work.

F. G. Smart (Nos. 460 to 464).—Some results at picture making with figures introduced, which promise exceedingly well for future work in this direction, and, like many other exhibits, serve to record favourably the ability for such work, which, with close and thoughtful study, will ripen into better productions.

These remarks apply to many other attempts in the same direction, where the scientific record is in advance of the pictorial.

T. R. Allinson (No. 816), *Altar Piece, Church of Stalshund.*—A photograph of a most difficult subject—a painting on the altar of a church—very well manipulated. Scientific skill has been utilised to produce the result. An exceedingly large number of figures have been introduced into the original, which are most carefully reproduced on the negative. Whether the original colours are rendered correctly or not, the photograph presents a very good effect, not having any of those dark portions which are generally seen in copies of similar paintings.

W. H. Hitchin (No. 648), *Doorway, Exeter Cathedral.*—A very good photograph of old sculpture on a doorway, where delicacy of treatment has resulted in every bit of detail being very soft and like the original stonework. This is seen in the Cardiff Society's alcove, and there are many other very good specimens of work.

Karl Gregor, bronze medal (No. 852).—A frame of six studies of landscapes, including cattle and sheep, where evidently much attention has been given to the animals so as to form good combinations, the result being some very pleasing pictures, which, although small, really suggest the idea of being larger than they are. The colour of the toning, a warm sepia, considerably aids the effect, as also must be noticed the concentration of the highest lights in each picture, which must have taken time, thought, and study so as to be in the right place. This reveals an artistic perception which has been carefully carried out by the agency of photography.

R. H. Lord, bronze medal (No. 990), *An Idle Moment.*—Although the design is very scattered, yet the effect is good. A man ploughing has stopped his horses, whilst he leans against the plough to hold a conversation with a female who is standing against a tree. The arrangement of the group is rather wide in design, so that the figures, including the horses, are consequently rather small for the rest of the picture, which is one-half sky and one-quarter foreground, being a ploughed field. Despite this peculiarity there is a certain amount of charm in the picture, partly arising from the careful way in which the clouds have been introduced.

Lala Deen Dayal, bronze medal (No. 992), *Views of some Indian Temples.*—These photographs are full of detail, such as would be expected in Indian architecture. All this has been managed exceedingly well, and shows the power of good instruments in recording such a quantity of carved work as is shown in these pictures, as also the very careful attention which must have been given to the production of the negatives.

Alexander Ayton, jun. (No. 841), *A Medical Class.*—This is a group of about 200 in number. The faces, about one-half inch in size, all exceedingly well photographed, showing command over the optical instruments, which, in work of this kind, is the primary consideration. No. 843, cabinet portraits. Very refreshing to look at after the overshaded work which is so plentiful in these days, when discretion in the proper usage of light and shade seems to be almost an unknown commodity.

W. W. Winter, silver medal, for best screen. A series of ladies' portraits.—There is no affectation of mannerism about these studies, which all show an equality of production very praiseworthy; it must, however, be noticed that the variety of coloured tones which are seen in this collection are somewhat unsatisfactory to the sight, producing a disquietude which would not be felt were each photograph seen by itself.

Fred Downer has several exhibits, one or two called the *Battle of Flowers;* a good subject, but rather spotty in the quantity of light-coloured flowers which fill the pictures. A concentration of this scattered matter would have been more effective. Another study (No. 888) is a girl looking at a new picture. The arrangement of the leading lines is very good, and the photographic rendering of some white drapery has been very nicely managed.

George Bankart (No. 1147), *A Saxon Doorway.*—A beautiful subject for photographic work; requires a closer study of the position of the light before being taken. In these advanced times, the production of such fine work as seen in this doorway required greater softness of treatment. There is another picture of a doorway, Ludlow Castle, but the two are redolent of extreme heat, with no repose.

H. Dudley Arnott (Nos. 1159 to 1162).—Four very good studies of vessels in motion, which have been carefully waited for until they assumed a good pictorial position. The photographic work has been very carefully attended to, the result being some very soft and well-defined studies, showing artistic perception.

W. N. Malby, bronze medal (No. 1107), *Art Studies.*—Very clever work, showing a great amount of artistic merit in what may be called photographic sketches, where possibly some of the good seen in the original models has arisen from the presence of local colour, which is not recognised when rendered in ordinary black and white. There is much from this point of view which requires the most careful consideration when pictorial results are attempted. There are in this one frame twenty-one pictures of all sizes and subjects mixed up together, and yet they justly gain a medal, showing that the artistic faculty can subjugate many apparently unpromising objects to some good effect.

A. Swan Watson, bronze medal (No. 1000), *Sunset Studies.*—Fourteen very good studies of sunset effects, which have been well arranged for the skies, but the other portions of the scene suffer by being under-exposed. Here, again, colour is wanted to complete the poetry of the matter, which, despite all these drawbacks, are still very pleasing and effective studies.

John Collier, bronze medal (No. 1100), flashlight portraits.—Some very good specimens of what can be done under conditions which require artificial light to produce quickly and well some good manipulated photographs. In these studies considerable attention has been given to the accessories which have been arranged for each picture.

J. Reynolds (No. 1181), *Iceland.*—Some interesting specimens of the apparently barren region of Iceland, which show rather too violent contrasts of black and white to be pictorial. Here, again, possibly local colour may govern the scenery, which becomes lost when photographed, however good the work may be.

A. R. Dresser, bronze medal (No. 1071).—Seaside photography very cleverly chosen for showing the subject matter, which consists of breaking waves, exceedingly well manipulated.

C. V. Shadbolt (No. 1091), *Street Scenes in Jerusalem.*—Rather delicate in treatment, but conveying a vivid notion of what the place is, with its overwhelming sunlight, and consequently intense shadows, which have been very carefully photographed.

J. S. Hodson (Nos. 371 to 374).—Four frames of small bits, which show an advance in the work previously done by this exhibitor.

M. Paulussen (Nos. 1175 to 1180), photogravures after the originals by C. Scolik.—These are figure subjects, and have been exceedingly well executed, and at first glance have all the appearance of good direct photographs.

— Terris (No. 1187).—A study showing too much of the literal, being a man without his coat on reading a newspaper. Some attention has been given to the arrangement, but the subject matter, which is a mere truthful rendering of property, will not always aid in producing a pictorial work. The play of light and dark portions have been skilfully arranged, but the whole work is too sadly realistic.

S. B. Bolas & Co., bronze medal (Nos. 951 to 962).—A series of phototype specimens, which are very good examples of reproductions, containing nice half-tone, and sufficient power for the class of work shown.

Bemrose & Sons (Nos. 895 to 902).—Photo-mechanical process. Some very good specimens of photographic reproductions by this process, which seems admirably adapted to commercial purposes, where no pictorial necessity exists.

Henry Flather, bronze medal (Nos. 965 to 975).—A medal has been awarded this exhibitor for his treatment of the photographic print. Other specimens have been previously seen in the City and Pall Mall. They are very interesting, as showing how an artist can, by certain mechanical means, subdue much that may be objectionable in an ordinary photograph, and impart to it an effect which confers upon it a distinct quality, which, although having no connexion with photography, is exceedingly good in result. The progress of the manipulation is shown in some specimens, which, with the original idea, are entirely the work of the exhibitor.

There are a great many other exhibits which do not require individual notice, but which show promise for the future, and, although we miss the work of many well-known names, there is still a large amount of good pictures shown, which have this year given the Crystal Palace Exhibition a distinct character for introducing to public notice many fresh aspirants for photographic fame.

NOTES FROM NEWCASTLE.

It is doubtful whether anything on earth will ever stimulate the photographer to make his own "dry plates." The recent article in this Journal should not be without its effect. Professionals will not now care to make plates for negative purposes while they can buy excellent goods at a reasonable price; but there's no reason at all why they should not coat their own *opals*.

Ten years ago, when I experienced many difficulties in the coating and drying of gelatino-bromide dry plates for ordinary purposes, I never had the same trouble when preparing opals. The latter ready coated cost, I venture to say, far more than they should do, even after considering the price of opal and its liability to breakage; the saving to be effected in this particular item may be of importance in many houses.

For opals and lantern plates I preferred a plain bromide emulsion (cold emulsification). The defects so often met with at that time in home-made plates did not show when the sensitive compound was spread on opal, and nowadays, when the gelatine is so much more reliable than it used to be, such troubles as uneven coating and drying (in slight degree) would make no great difference, particularly where the opal, as is most often the case, is intended for a vignette, the above-mentioned defects generally showing themselves at the edges of the plate. It may interest you to know that one man at least in Newcastle, a semi-professional, has for the past eight years, to my knowledge, made his own dry plates, and another invariably coats his own paper for bromide enlargements.

The annual meeting of the local society was held recently—by the way, the annual meeting should be held in January, I believe—and the treasurer managed to show a fair balance. After a formal discussion a "society competition" was decided upon for which two gold, silver, and bronze medals respectively were promised by two of the members present. Some years ago, I remember, this method of leaving to private individuals what should be done by the society as a body got to be felt so much out of place that the then council in solemn conclave assembled (the president only being absent) discussed the matter and decided unanimously *against* any further acceptance of such offers. This being done, rules for a competition were being drawn up, when in walked the president; hearing that a society competition was to be held, he immediately offered to provide prizes for the successful exhibitors. Alas for consistency, not one of the gentlemen who had a few minutes before so eloquently pleaded against such a practice opened his mouth; needless to say, the president's offer was accepted with thanks; the look of dismay and embarrassment on each face (except the president's) was, I am told, very comical. I think the principle by no means a good one, and the idea of giving gold medals in private competitions, and possibly for quarte-plates prints even worse. Give a prize if you will of a piece of apparatus, say, but keep your medals for open competition, when to win them will mean honour.

During the short Easter holidays I paid a visit to Mr. Parry's new studio at South Shields. This gentleman is, as we all know, the premier photographer, *facile princeps*, I may say, in this part of the country for shipping and engineering photography, the fine quality of his work, and the excellent display he made at the Newcastle exhibition of 1887 was a subject of much remark at that time in photographic circles. For my own part, in this particular line, and comparing it with similar work to be seen in London, Leeds, Edinburgh, and Glasgow, I have never seen any results quite equal to Mr. Parry's. It is not therefore surprising that he found himself compelled to move to larger and more commodious premises. Mr. Parry has found what he wanted at Ogle Terrace, South Shields. Though of secondary importance, there is a capital portrait connexion; consequently we find a roomy and comfortable studio, more like an ordinary drawing-room as regards furniture, and quite unconventional in the way of colour and the arrangement of blinds. Leading from this are dark rooms and a private studio, for Mr. Parry is, in addition to being a phototographer, no mean artist, and several frames testify to his skill as a painter in oil and water-colour. Below the studio, on the ground floor, are sensitising, printing, and workrooms, lofty, healthy, and comfortable. Mr. Parry sensitises his own paper, uses only the best and most reliable lenses and apparatus, Mawson plates—though he has, so far as I know, no prejudice against other makes—uses a sulpho-pyrogallic developer, and spares no pains to get the very best results. Add to these many years' training and experience, and success is not to be wondered at. Mr. Parry has received nearly a score of medals for his work—architectural, interiors, instantaneous, shipping, &c.—and has a case of specimens at the present Liverpool Exhibition, not for competition.

Capital accounts are to hand with reference to the new "Climax" detective camera, to be brought out shortly by Mr. Watson, of Grainger-street. It is said to be, by some who are excellent judges, *the* "detective" of the season, but we shall, I expect, hear more of it by-and-by.

D. D.

Foreign Notes and News.

The last meeting of the Berlin Practical Photographers was rendered especially interesting by a communication of some length by Dr. Miethe on the results obtained in the application of photography to astronomical research. The speaker dwelt at a good deal of length on the difficulties involved in the short exposures required in taking impressions of the solar disc, which are as short as $\frac{1}{2000}$ of a second. One of the results of this short exposure is that the atmospheric movement due to heated currents of air, &c., distorts the image considerably, and renders accurate measurements of the transit of Venus very difficult. On the other hand, it would be hardly possible to over-estimate the services rendered by photography in photographing the fixed stars, the number rendered visible by this means amounting to 100 times what the eye, though assisted by the most powerful telescopes, could ever perceive.

In the pages of the *Photographische Mittheilungen* Professor L. Weber describes a new method of measuring daylight photometrically. He employs glazed Stolze bromide paper (F), a sheet of which is placed in a suitable frame, one half being covered and the other exposed. This half is then covered with the other half exposed gradually by drawing out a slide to the light of a normal candle at the distance of a metre. At length a point is found where the precipitate produced by the candle and that produced by the daylight equal one another, and a calculation then enables the local photometric intensity to be estimated in metre-candles.

M. Brunel Paul recommends the following for a platinum toning-bath, which he says is stable and keeps for a length of time:—

Chloroplatinite of soda	2 parts.
Chloride of sodium	2 ,,
Bitartarate of soda	1 part.

Dissolve in 1000 parts of cold water. The bitartrate has the effect of rendering the bath slightly acid, which is necessary for effecting the toning. This bath keeps good for a long time, and gives a very fine effect. The prints first washed in water may be immersed in it directly. The first tones are purple, purple-brown, and finally of the black of Indian ink. After toning, the print is passed through a bath of hypo-sulphite of soda twenty per cent. and thoroughly washed. The tones are absolutely unalterable and particularly suited to landscapes.

M. Canfyn, of the Association Belge, recommends a method of preparing lantern slides for drawing on with pencil. This glass is first coated with a "matt" varnish of the following composition:—

Ether	100 parts.
Sandarac	2 ,,
Mastic	2 ,,
Benzine	20 ,,

After the drawing has been made upon the surface so prepared, it is covered with the following varnish:—

Ether	100 parts.
Sandarac	3 ,,
Mastic	3 ,,

This varnish dries brilliantly smooth, so that the slide appears perfectly transparent, and may be used well for lantern projections.

Our Editorial Table.

Whyte's Vignette Glasses and Registered Vignetting Frames.

Marion & Co., Soho-square.

In the Almanac for 1890, we took occasion to speak of the vile atrocities which some photographers foist upon the public as vignettes, and stated that a blurred edge-line of demarcation between a figure, a bit of its often dark background and a pure white surrounding, is not a vignette, and that the sooner this sort of thing was abandoned the better it would be for the art. We have in our collection of portrait photographs some which in this respect are so discreditable as to make one feel sick, although endorsed by good names as their producers, and we have not unfrequently exhibited them publicly as examples of what to avoid. What is the remedy for this state of matters?

If vignetting glasses are to be used, it is evident that something other than the harsh abrupt-edged ones must be employed, and we are pleased to find that Messrs. Marion & Co. have enabled this to be done by the introduction of *Whyte's New Vignette Glasses and Registered Vignetting Frames*, of both of which we have received examples. The former of these have a very softly graduated edge, by which vignettes of great delicacy can be obtained, even when the mask is in close contact with the negative. The vignetting frames are especially adapted for using with the glasses. They fit into an ordinary printing frame, the next size larger than the negative for which it is made, and are so constructed as to permit the mask to be adjusted to suit the requirements of any special negative. It is ingenious and well carried out.

Fallowfield's Film Carriers, for Sheaths or Dark Slides.

Mr. Jonathan Fallowfield, Charing Cross-road, London, has just brought out a device by which negative films can be used with great facility in the ordinary metal sheaths, now commonly employed with so many forms of hand cameras. It consists of a very light frame, formed of thin steel or hard rolled iron, the size of the negative film. To this is hinged, at one end, and by means of a flexible fabric, a full-sized plate of the same thin metal. The film is laid upon this, face up, and the frame being folded down upon it keeps it quite flat. In this state it is now inserted into the sheath, just as if it were a glass plate. The samples that we have got are quarter-plate size, and we find on trial that they answer their purpose remarkably well, being inserted and subsequently detached in a very brief period of time, even in the sombre light of the dark room. Mr. Fallowfield, however, informs us that he is having them made in all sizes. Of course sheaths are not a necessary concomitant of their employment, as they can also be placed in the ordinary dark slide just the same as glass plates. They will prove very useful.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6762.—"Proceeding and Apparatus of Half-tint Decomposition for the Production of Photographical Netting Plates of Half-tint in Hatching and Grain for Clichés of High and Low Pressure." F. Schraivogel and M. Hering.—*Dated April* 20, 1891.

No. 6800.—"Improvements in the Binding of Photographic Albums, Pattern Cards, Music Sheets, and the like." T. B. Sloper.—*Dated April* 20, 1891.

No. 6838.—"The 'Bellolux' or Tourists' Collapsible Dark-room Lamp." J. Pettingall.—*Dated April* 21, 1891.

No. 6845.—"Improvements in Photographic Roll Paper Holders." Complete specification. G. Jones.—*Dated April* 21, 1891.

No. 6864.—"Improvements in or connected with Focus Finders, chiefly designed for Photographic purposes." T. R. Dallmeyer.—*Dated April* 21, 1891.

No. 6921.—"Improvements in Photographic Mounts." Complete specification. H. Kuhn.—*Dated April* 22, 1891.

No. 7057.—"Improvements in Photographic Shutters." J. Parkinson.—*Dated April* 24, 1891.

No. 7186.—"A new Developing Dish with Cover for Photographic Plates and other Sensitive Material." H. Wilkinson.—*Dated April* 25, 1891.

No. 7201.—"An Improved Shutter for Photographic Cameras." H. M. Wilson.—*Dated April* 25, 1891.

SPECIFICATION PUBLISHED.

1890.

No. 8372.—"Detective Cameras." Dines.—Price 8*d*.

PATENTS COMPLETED.

Improvements in Photometers.

No. 4622. William Friese Greene, 92, Piccadilly, London, and Frederick Henry Varley, 82, Newington-green-road, London.—*March* 25, 1891.

This invention relates to an improved photometer, wherein both the standard light and the light to be measured are placed at the same distance from the screen on which they are to be balanced, and are simultaneously projected through separate variable apertures made in opposite rotating discs, which can be adjusted during rotation until the amount of light from the one source passing to the screen through one of such apertures balances that from the other source passing thereto through the other of such apertures, the comparison being made by the respective lights reaching the screen, or by shadows cast by such lights thereon, such lights or shadows (in consequence of the standard light and the light to be measured being placed at the same distance from the screen) being of equal size, so that the luminosity or density thereof respectively, when balanced, is the same for equal areas; and wherein, when the lights are thus balanced on the screen, the angular values of the respective apertures determine the respective values of the lights, and are respectively directly indicated, and can be directly read off.

In the improved photometer, two opposite rotary discs or shutters are used, one of which is, or both of which may be, peripherally graduated, and each of which is formed with separate apertures at different radial distances from its axis of rotation, such apertures preferably being two in number, each semicircular in extent, and arranged with their diameters at right angles to each other. The discs are mounted side by side, but not in contact, on separate shafts, with their axes of rotation coincident, and their respective apertures in opposite or coincident pairs as regards their radial distances from said axis, but so arranged as that one of such coincident pairs of apertures is open to its full angular extent (say, a semicircle, as aforesaid) at such times as the other of such coincident pair of apertures is completely closed.

The aforesaid discs are combined with a pair of collimators, funnels, or other suitable means of projecting the lights to be measured on to the screen upon which they are to be balanced, such devices being so arranged relatively to the said discs as to project the lights respectively through the said different coincident pairs of apertures on to the screen.

The aforesaid discs are also combined with means for rotating them at differential speeds, or at the same speed, at the will of the operator, in the former case for the purpose of causing one of such discs to advance on the other an equal amount at each revolution, whereby both such opposite or coincident pairs of apertures are caused simultaneously to have constantly varying angular openings admitting the passage of the respective lights alternating with constantly varying closed segments preventing the passage of such lights, the one of such angular openings increasing or decreasing in the ratio of the decrease or increase respectively of the other thereof, while the following dark or closed segments respectively correspondingly decrease and increase, or increase and decrease, in the like ratio.

The discs are driven at such a speed as to cause the said angular openings of their said apertures to appear (owing to the phenomenon of the persistence of vision) when light is passing therethrough as concentric luminous bands, the relative luminosity of which is dependent upon the amount of light passing through the respective openings, which amount is dependent upon the relative angular extents of such openings of the following closed segments, so that, when the apparatus is driven at such speed by the aforesaid differential gearing, such bands will appear of constantly differing relative luminosity due to the constantly varying amounts of the angular openings of said apertures and of the following closed segments; thus the amounts of light projected, as aforesaid, from the said sources of light through the said collimators, funnels, or other equivalent apparatus, which pass through the said apertures to the screen, will be directly proportional as the angular extent of one of said openings is to that of the other.

The apparatus is continued in motion until the lights or shadows projected upon the screen are balanced, when the differential gearing is disconnected from the discs, and the motion of the apparatus is stopped. The angular openings of the said apertures at such time are directly indicated by the said peripheral graduation of one or other or of both of the discs, and indicate the relative intensities of the lights, and can be read off in the form of a simple fraction, say, for example, $\frac{100}{400} = \frac{1}{4}$, indicating that the one light is four times more intense than the other.

When the differential gearing is disconnected from the discs, the motion of the latter may then (if required) be continued at the same speed without altering the relative angular openings of their said apertures for continued comparison of the said lights or shadows projected upon the screen.

Improvements in Registering Apparatus for Photographic Exposures.

No. 6825. Joseph Parkinson, South Regent-street, Lancashire; Samuel Fawcett, Elm House, Meeting House-lane, Lancashire; and Charles Frederick Parkinson, South Regent-street, Lancashire.—*March* 28, 1891.

Our invention, which is particularly applicable to "roller slides" or "roll holders"—containing a flexible support for the sensitive coating—consists of

using a pinion having only one tooth, gearing into a wheel—which we call a registering wheel—having teeth equal in number, or any proportion of that number, to the maximum number of exposures the "roller slide" or "roll holder" will contain. Or, we use a pinion having one more or one less tooth than a multiple of the teeth of the registering wheel.

On the face of the registering wheel are numbers to indicate the number of exposures made. Or we use, in place of the registering wheel, an endless chain or band having links or projections corresponding in number, or a proportion of that number, to the teeth of the above-mentioned registering wheel. On the face of the chain, band, or registering wheel, the numbers may be arranged as to indicate the number of exposures that have been made; or, they may be so arranged as to indicate the number of exposures remaining. The invention is applied as follows:—Where the measuring roller is equal in circumference to the length of film required for one exposure, the single-toothed pinion is fixed to the spindle of the measuring roller, and the registering wheel rotates on an independent stud. The teeth of the registering wheel and the tooth of the pinion are so adjusted in relation to each other that, for every revolution of the single-toothed pinion, the registering wheel moves a distance equal to a gap between any two of its teeth. A brake may be used to prevent its being moved more than that distance except when actuated by the single-toothed pinion. If, instead of using the single-toothed pinion, we use the one having a tooth more or a tooth less than a multiple of the teeth of the registering wheel, the numbers on the registering wheel will not be consecutive, but will "step" a distance equal to the number of teeth in the pinion.

In cases where the measuring roller is less in circumference than a length of film required for one exposure the pinion is fixed to a wheel, which, being geared to a pinion on the measuring roller, rotates once for a length of film required for one exposure.

When using the chain or band, the gearing as before is so arranged that for every revolution of the pinion, which actuates the registering wheel, chain, or band, the registering wheel, chain, or band will indicate that another exposure has been made.

In cases where it is necessary we make use of an annular registering wheel.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 5	North London	Wellington Hall, Islington, N.
,, 5	Holmfirth	
,, 5	Sutton	Sutton Scientific Society's Rooms.
,, 5	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 6	Coventry and Midland	The Dispensary, Coventry.
,, 6	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 6	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 7	Bolton Photographic Society	The Baths, Bridgman-street.
,, 7	Leeds	Leeds Mechanics' Institute.
,, 7	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 7	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 7	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 8	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

APRIL 28.—Technical Meeting.—Mr. T. Bolas in the chair.

It had been announced that the evening was to be devoted to the question of *Animal Photography*, and M. Gambier Bolton was expected to open the discussion, but the Chairman read a telegram stating that that gentleman was detained at Windsor Castle, and unable to be present. Letters from Mr. Dresser and M. Marey were also read, regretting inability to be present.

A number of slides from negatives of animals, taken by Mr. F. Haes, in the "sixties," were shown in the lantern. Amongst these was one of a quagga, which had been stated to be extinct, or nearly so. As a matter of fact, however, Mr. Haes had received a letter from Mr. Selons, a well-known hunter, stating that he had seen many of them in Mashonaland. The negatives were mostly taken in the Zoological Gardens, and the exposure had been made with a double flap shutter on wet collodion plates.

The CHAIRMAN said this was a most interesting collection, made not with the advantages of modern rapid plates, but a wet collodion, involving in addition to the longer exposure, necessity of preparing each plate as required. He called particular attention to a picture of a lion, which he thought would compare well with more recent representations.

Slides by Mr. H. Sandilands were then shown. These were mostly of horses in motion and at rest.

Mr. R. Wainwright's slide was next put through the lantern. The slides were made on ordinary bromide plates by reduction in the camera from 7 × 5 plates, and were followed by some slides by Mr. Bright, mostly of dogs and other domestic animals, and a slides of swans by Mr. T. E. Freshwater. The gradation and excellence of the photography of the last-named picture elicited much applause.

Mr. Lewis Medland showed a number of slides of animals, followed by a set made from earlier drawings of similar subjects, including one of a lion from Buffon's *Natural History*, to illustrate the idea given of the form of wild creatures before the photographic era. The slides were all upon collodio-bromide plates.

The Chairman invited discussion, and

Mr. W. E. DEBENHAM said that it was remarkable the influence that photography had had upon the representation of animal life. If the illustrations of thirty years ago representing hunting and racing scenes were compared with those of the present day, it would be seen in the former case two or three conventional forms supposed to represent a horse in motion were reproduced again and again. Since Muybridge and others had shown what the attitudes of running and jumping horses really were, the old stock conventionalities were no longer tolerated. The same thing was noticeable in paintings, particularly in modern French battle pictures, where the instructive influence of photography could easily be traced.

Mr. HAES said that he had gone through Muybridge's series, and though some of them were very useful, there were many that were useless on account of their very ugly positions.

The CHAIRMAN supposed that by ugly Mr. Haes meant untrue, untrue in the sense that the represented positions which the eye never saw on account of the rapidity of the movement. The eye saw and recognised the resultant of many positions.

Mr. HAES said that the positions were perfectly true, but useless to artists. There was an extraordinary action of the pastern joint that was not represented by artists. If a galloping horse were closely watched, it would be seen that the legs were doubled up under it. It was also noticeable that the fore feet of a horse were never in advance of the head, although they had often been so represented in paintings. There was a curious thing with respect to the proportions of a horse which he did not find had been stated. There was a generally accepted proportion with regard to a man as to the number of head-lengths required to make up his height. With a horse this was also the case, and he thought it would surprise most people to hear that the height of the withers from the ground was less than three heads—about two and three-quarter heads. He thought that animals should be photographed stereoscopically, and in front of a background marked with a scale, so that the proportions could be studied.

The CHAIRMAN was glad that Mr. Haes had spoken in favour of stereoscopic photography, an application that had been a great deal too much neglected. As to proportion, people were very liable to be deceived. In the case of the tower at the Crystal Palace, many people imagine that it is about twelve times as high as it is broad, whereas the real proportion is about six diameters.

Mr. SANDILANDS thought Mr. Debenham was rather severe on the artists of the past. He had been in the habit of painting animals from a boy, but had now given up the brush for the camera. It would, he thought, be difficult to produce better pictures of horses and pictures more true to life than those in some paintings he remembered to have seen.

Some slides by Mr. Chang were then exhibited, and the meeting closed with thanks to the exhibitors of the pictures that had been shown and to Mr. Mackie for presiding at the lantern.

It was announced that at the ordinary meeting on May 12 Léon Vidal would read a paper on *Methods of Producing Polychromatic Impressions in Photography*, and on the 26th there will be a discussion on *The Influence of Development on Gradation*.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 23,—Mr. A. Mackie in the chair.

Slides made by the members for exhibition at the Crystal Palace were brought for selection, which was done by running them through the lantern at the conclusion of the meeting.

Mr. A. Cowan brought several negatives in order that three might be selected as those from which the members entering for the lantern slide competition were to print.

The Chairman then called upon Mr. W. E. Debenham for his paper on *Colours* [see page 277].

Before reading the paper, Mr. DEBENHAM said that as this was the first of a series of lectures not directly photographic, although delivered at a photographic society, a few words of introduction might be desirable. In the first place, it might be observed that it was expressly set out in the constitution of the Association that it was formed for the consideration of photography and other kindred subjects, and it might well be thought that the time for the other kindred subjects to have a turn must have arrived. More perhaps to the point is the fact that those photographers who attend meetings of societies are for the most part of the turn of mind disposed to investigate the phenomena that pass before their eyes. It was also to the point that one is in some respects better prepared for the investigation of photographic problems when one has an understanding on the subject of the light, which is one of the essentials of photographic operations. Some acquaintance with the principles of colour—the subject of the present lecture—will be found useful in two directions to which modern photographic research has been and is applying itself. Of these, one is what is called orthochromatic photography, or the rendering of colours on the plate with something like their illuminating power to the normal human eye, another is the problem of photography in natural colours.

At the conclusion of the lecture and demonstration, Mr. T. BOLAS said that he was especially interested in the ingenious theory of the approximation to double rapidity at the violet end of the spectrum accounting for the approximation which that colour possessed to red as appreciated by human vision. Mr. J. W. Henderson had at that Association some time since suggested that the spectrum should be shown as a circle, with the violet end brought round to meet the red. He doubtless merely meant to indicate the idea that the two ends approximated in character.

Mr. C. H. COOKE asked whether Mr. Debenham suggested that the mixture of pigments by the painter produced the effect of colour mixture which he had shown on the screen.

Mr. DEBENHAM replied that pigments did not when mixed show the effect of their separate colour sensations, but of what particular ray was left unabsorbed by the mixture. When the method of stippling was adopted, then the combined effect was such as had been shown on the screen, but always of a subdued or darker character by contrast with the lighter parts of the picture.

Mr. P. EVERITT thought that the analogy between light and musical tones, suggested by Mr. Debenham's theory to account for the approximation of red and violet, did not hold good. In music, as the octave was approached the discord became most violent, as would be found by striking a note and its seventh.

Mr. DEBENHAM said that in musical sensations the closer two near tones approached, so long as they were in scale, the less would the vibrations correspond and the greater the discord. In the eye-sensation there was the essential characteristic that each sensation spread over a considerable range, and was not limited to a particular point. Two colours, as blue and green or green and yellow, might be blended by insensible gradations, as they were in the spectrum, and none of those gradations were harsh or discordant, as a close musical subdivision would be.

Mr. A. HADDON said, in relation to the similarity of a sound with its octave, it was very difficult to decide, when a tuning-fork and siren were sounded together, whether they were in unison or one an octave higher than the other. He would urge other members to give lectures and demonstrations, and if one felt that he scarcely knew enough of a subject, to lecture on it, the mere fact of undertaking to do so would compel him to study it so that he would himself be a gainer as well as the Association.

Messrs. L. Sargent and W. D. Gower were elected members of the Association.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

APRIL 24.—Meeting held at the Photographic Society of Great Britain's rooms —Mr. A. Mackie, chairman. Two applications for grants considered and assisted. Messrs. F. Cherry and E. Hobbs elected subscribers.

CAMERA CLUB.

APRIL 23.—Mr. Frank Howard read a paper entitled *Amongst Bye-paths and Field-lanes with the Camera.* Sir George Prescott occupied the chair.

Previous to the lecture Dr. Patterson showed some binding strips for lantern slides which he said would stick. They were produced by Schweitzer, of New York.

Mr. HOWARD in his paper dwelt on the charm of wandering amongst the beauties of the country and studying, with and without the camera, the picturesqueness of rustic people and rural scenes. He gave a few hints as to the most probable way of dropping upon the out-of-the-world picturesqueness which was so fast disappearing. The lecture was illustrated by about eighty slides.

Slides were then shown by Messrs. Austin, Bright, Gale, Hussey, Patterson, and Seyd.

On Thursday, May 7th, Mr. Willis will give a paper entitled *Clam-Chowder.*

HOLBORN CAMERA CLUB.

APRIL 24.—Monthly lantern evening.—Mr. T. O. Dear (Vice-President), presided.

A number of slides of the Paris Exhibition, lent by Mr. Merne, were exhibited, followed by some from Messrs. Mawson & Swan, showing the various colours, ranging from red to black, obtainable on their lantern plates. Slides by Messrs. Chang, Ebsworth, Gay, Miller, and Thompson, members of the Club, were also shown.

The prize for the best "group" taken at the last Club outing, presented by Mr. Brocas, was awarded to Mr. Dear, who announced that he would give a similar prize for the best "group" taken at the outing to Pinner on the 9th of May.

HACKNEY PHOTOGRAPHIC SOCIETY.

APRIL 21,—Mr. J. O. Grant presiding.

Various books were announced as having been presented to the library.

The Hon. Secretary showed the "Itakit" camera, by Messrs. Matthews, of Birmingham. It was made to take twenty-four plates, lantern size. Mr. Grant showed some work on Fry's naturalistic paper.

Mr. J. A. SINCLAIR read a paper, with demonstration, on *Lantern-slide making*, after which there was a lantern display of members' and others' work.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

APRIL 25,—Mr. J. C. Leman in the chair.

A lecture and demonstration on the well-known Alpha paper was given by Mr. HOWSON. He called attention to the great advantage possessed by Alpha paper and plates in enabling the operator to adapt the tone to the subject—a point very often overlooked—and passed round a number of fine specimens. The whole process of developing and toning was then practically shown, iron developer and a combined toning and fixing bath being used.

Several other short practical demonstrations by the members followed.

Mr. FAULKNER, having exhibited an ingenious piece of home-made apparatus for printing papers and plates, by its aid printed and developed with pyro an excellent half-plate transparency on ground glass, describing the process to the uninitiated.

Messrs. W. and G. E. MARTIN then developed about one dozen whole and half-plate platinotype prints, hot bath process, describing at length the permanency, simplicity, and beauty of the process.

May 9th.—Excursion: Esher and district.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

APRIL 23,—Mr. G. T. Lyndon in the chair.

The CHAIRMAN congratulated the Society on again winning the National Challenge trophy.

Mr. W. J. HARRISON, in a paper on *Instantaneous Photography*, announced that Dr. Norris's new dry collodion plate would be on the market about midsummer. A new factory was being built for its manufacture at Stechford. He explained the working of Decondun's and Watkins' exposure meters, and also Messrs. Hurtes & Driffield's, which he had used for the past twelve months with considerable success. Warnerke's sensitometer was exhibited and explained with examples which had been tested. In working, he preferred to take Place's & Underwood's shutters for use instead of using a lens cap. He advised members to use *boiled* distilled water when making up their developing solutions, and not to hurry development. Should a plate be known to have been over exposed, it is well to first soak it in a weak solution of bromide of potassium, and if under exposed, in a very weak bath of ammonia. Latitude of plates, he said, was often over-rated, and there is generally greater latitude for over exposure than under. After some other remarks the lecturer developed half a dozen plates he had exposed in a hand camera in the streets of Birmingham that day, the whole of them coming up wonderfully well. The developers used were Thomas's hydroquinone, pyro, and ferrous oxalate as put up in their travelling cases. He then took several flashlight pictures of the company present.

NEW SOCIETY FOR BIRMINGHAM.

AT a preliminary meeting, held at the Colonnade Hotel, New-street, on Wednesday night, April 23, it was resolved that a Photographic Club or Society be formed, and a Provisional Committee, consisting of Dr. Leech (Chairman), Dr. Hall Edwards, E. Morton, C. R. Lunn, Dr. Mabberley, and Walter D. Welford (Hon. Secretary), was appointed to draft out a code of rules and make the necessary general arrangements to be placed before a general meeting for adoption, to be called at an early date. The ideas of the Provisional Committee are that the name should be the Midland Camera Club, and that the platform of the Club should be as follows:—

The advancement of photography in all its branches, and the promotion of social intercourse between all photographers:

1. By the holding of periodical meetings for lectures, papers, discussions, practical demonstration, and friendly competition in photographic subjects.
2. By the provision of club rooms, with dark rooms and other conveniences for the use of members.
3. By the promotion of intercourse between this and other societies.

It is proposed that the work of the club be divided into the following sections:—Scientific, Archæological, Lantern, Cycling and Touring, Ladies, Instruction of Beginners. Each section to hold their own meetings and appoint their own officials. General meetings will be held monthly probably, on Tuesday or Friday nights. The Committee think that much detail work could be done by the sections, leaving the general meetings free for lectures, lantern exhibitions, &c., and in this respect the new Club will go outside its own ranks to other societies, and thus promote friendly intercourse.

Club rooms have already been secured in a central part of the town—one of fair size for meetings, and two smaller ones attached for dark rooms. For lectures and lantern exhibitions a large hall, holding 200 to 300, will also be at their service.

These plans are, of course, not definite as yet, being subject to a general meeting, but they convey the ideas of the promoters.

SHEFFIELD CAMERA CLUB.

APRIL 22.—A lecture was given by Mr. W. LAMOND HOWIE, F.C.S., of London, his subject being *To Ober-Ammergau and Back in* 1890. Mr. G. T. W. Newsholme (President of the Club) occupied the chair. The lecture was illustrated by 120 photographic lantern slides, which Mr. Howie was enabled to take on his way to and from Ober-Ammergau, and also during his stay at that place, including some scenes from the Passion Play, and in alluding to these the lecturer assured the audience that there was no foundation for the rumour that the play would not be repeated in the year 1900.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

APRIL 21,—Mr. J. P. Gibson in the chair.

Arrangements were made for a series of competitions, confined to amateur members of the Association (particulars of which will be announced shortly), and for five outdoor meetings during the season, which are as follows, viz.:—Ripon and Studley, Seaton Sluce and district, Bellingham, Wooler, and Stocksfield.

Mr. J. HEDLEY ROBINSON read a paper on *Carbon Printing*, and practically demonstrated the process.

Mr. GIBSON, in proposing a vote of thanks to the demonstrator, rather fell foul of what he called the leatheriness and dulness in the shadows, which, he said, were characteristics of the process.

Mr. ROBINSON, in his reply, vigorously defended carbon, and made out a very strong case for his favourite process.

The meeting concluded with a show of members' slides.

LEEDS PHOTOGRAPHIC SOCIETY.

BROMIDE PRINTING AND ENLARGING.

ON Monday evening, the 20th inst., a paper on the above subject was read by the Hon. Secretary (Mr. S. A. Warburton). In the absence of the President the chair was occupied by Mr. J. W. Reffitt.

In introducing his subject Mr. WARBURTON pointed out the advantages of the bromide process, the chief of which were that the process can be worked independent of daylight, the rapidity with which prints can be produced, and the close resemblance that a good bromide print has to a platinotype picture. In describing the manipulation of the process the various classes of paper in the market were referred to, the "slow, rough surface" being the one which

seemed to yield the best results. The great secret of obtaining pure whites in the prints was a liberal use of the acid solution after fixing, and for this a one-per-cent. solution of sulphuric acid was the best. A method of printing in skies from cloud negatives was explained and illustrated. In dealing with the subject of enlarging the kind of apparatus for use both with daylight and artificial light was described, the former giving by far the best results and being less expensive to construct; indeed, any amateur, at a cost of a very few shillings, could make one for himself. A number of enlargements and bromide contact prints were exhibited, as were also the enlarging apparatus for use with daylight and artificial light, and, in conclusion, Mr. Warburton developed before his audience a fine enlargement make on Ilford slow, rovgh-surface paper.

At the conclusion of the paper an interesting discussion followed, in which the Chairman, the Rev. E. S. Palmer, Mr. G. H. Rodwell, Mr. Herbert Denison, and others took part.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 20.—Closing monthly meeting for the session, Mr. John Morison, jun. (President) in the chair. Five new members were elected.

The PRESIDENT gave a report on the International Photographic Exhibition, to be held in the Fine Art Institute in September.

Mr. John Stuart (Buchanan-street), showed his system of taking photographs by means of the flashlight. He also exhibited some very beautiful work done by this means.

Mr. Stuart then photographed five of the members of Council in a group, and the negative was developed and shown to the meeting.

The meeting closed with the usual display of lantern slides by members.

AN outdoor meeting was held on Monday, April 13, and was eminently successful, especially considering how early it was in the season. Fifteen members turned up, and travelled by train to Ayr, where a brake was in readiness to convey them to Dunure and Maybole. Some excellent negatives were secured, and a number of lantern slides from some shown at the monthly meeting.

Correspondence.

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

LIPPMANN'S COLOUR PHOTOGRAPHS.

To the EDITOR.

SIR,—Dr. Lindsay Johnson's letter in your issue of to-day calls for some remarks. I carefully examined the so-called spectrum photograph by bright daylight, but cannot agree with Dr. Johnson that it "shows the green and red portions of the spectrum very clearly and definitely." To my perceptions there is not much more than a faint suggestion of these colours. Moreover, the green and red—such as they are—come close together, and there is green *each side of the red!* Dr. Johnson speaks of critics who "look to find colours as pure and brilliant as the solar spectrum itself, and because they see nothing of the kind at once cry out that it is not worth looking at;" but he gives no clue as to where he has met with a critic who either took the first view or cried out as stated. It is difficult to suppose the case of any person who has used a spectroscope expecting to see the colours of a solid either as pure or as brilliant as the solar spectrum; and, with respect to the other matter, there was a general feeling at the meeting that the so-called spectrum photograph was worth looking at, as the relative positions of the faint suggestions of red and green conclusively showed that they did not arise from exposure to the green and red of the spectrum.

Dr. Johnson speaks of having seen a Lippmann spectrum which, according to him, showed "all the primary colours of the spectrum;" but all the primary colours may mean anything between three and seven, according to the view of the writer, and, moreover, he subsequently qualifies his "all the spectrum colours" by a parenthesis, which reduces the "all" to *all with the exception of two.* In quite the same sense, the example shown at the meeting may—if we accept the faint suggestions of green and red as actual green and red—be described as showing "all the primary colours," and the qualifying parenthesis need not in this case, as in the other, contain more than two exceptions, provided that we take an appropriate view as to what are primary colours.

Before the results of Professor Lippmann will be accepted, to use the words of Dr. Johnson, as "true reproductions of the spectrum, though often only exhibiting a portion of it," we may reasonably expect that those portions which are reproduced shall appear in their correct relative positions.

It is remarkable to find Dr. Johnson referring to the results of Professor Lippmann as being real and indubitable, and implying doubt as to the theory; while, after the meeting, a very "scientific" gentleman, who had expressed strong views favourable both to Dr. Lippmann's results and his theory, was forced to admit that the results were not very convincing. He, however, fell back on the absolute truth of the theory, both mathematics and high science making it indisputable. Thus, one authority rejects the theory, and accepts the results; while another accepts the theory, but rejects the results.—I am, yours, &c.,

Chiswick, April 24, 1891. THOMAS BOLAS.

PROPOSED NEW SOCIETY IN TAIN.

To the EDITOR.

SIR,—I am forming a Society of Amateur Photographers, and would be greatly obliged by your giving publicity to this letter.

The objects of the Society are the circulation and criticism of prints (the work of members) and the interchange of ideas and experiences.

Fuller details would occupy too much of your valuable space, but if any reader would care to join us I will gladly furnish them on receipt of stamped envelope.—I am, yours, &c., DONALD M. ROSS.

Moorfarm House, Tain, April 24, 1891.

THE PROFESSIONAL ASSISTANTS' ORGANIZATION.

To the EDITOR.

SIR,—Will you give me space for a report from the supporters of the proposed professional organization of photographic artists and assistants?

Some of our friends are under the impression that we are on the high-road to success, while some of our opponents are jubilantly asserting that we are defunct. They are all mistaken; we have both succeeded and failed—succeeded in securing numerous applications for membership, but failed to secure the class of workers we want. We started this movement with the object of drawing into a business combination all the best in every way of the photographic artists, and we would sooner give up the movement altogether than secure for ourselves a false importance with imperfectly skilled members. It stands to reason that, if we expect the countenance and co-operation of the employers generally, we must offer *quid pro quo;* we must be in a position to guarantee that they shall not have duffers and frauds forced on to them by our organization. This guarantee we strove to effect by instituting qualifying restrictions on membership, but, out of fifty applications sent in, not more than eight could satisfy our technical requirements. A similar report has been sent by the provincial secretaries. What does this show? Not only that there is a large number about of useless members of the profession, but also that the worthy artists persist in standing aloof from our scheme.

We are now simply *in statu quo;* we cheerfully and confidently await the day when the professional artist will arouse himself from lethargy and seek in judicious and temperate combination a remedy for the encroachments which threaten the position of his profession both from above and below. What are his objections to our proposed society? Briefly, as follows:—

1. "Combination with the object of securing improvements in salary and hours of business has been associated with so many debasing incidents in the recent history of the country that the professional should hesitate to stoop to similar means."

2. "The programme, rules, manifestoes, speeches, and general tone of the proposed 'Union' were of too aggressive, bitter, and vulgar a character to commend themselves to professional men."

A thousand other details have been raised by those who should rather have aided the improvement of our movement by suggestions of a practical and sympathetic nature. For instance, there were objections to the financial estimates of the organization; but I will only deal with the above criticisms:—

1. If any of the methods of unionism have been low and degrading (though it would be hard to prove to the poor, ignorant workman that he is degraded by the shorter hours and extra cash obtained thereby), is it necessary that all combinations must be carried on on the same lines? A coal-porters' strike is probably not the most refined of class struggles; but does it follow that a demand for (say) increased salary by lithographic artists or clerks (who are also organized) will be anything but a dignified and gentlemanly negotiation?

2. If our proposed rules and our methods of giving them publicity seemed aggressive, it must be remembered that all new movements have the unfortunate habit of over-estimating their own importance. If one reads the reports of early meetings of the new master-photographers' organization he becomes conscious of the same aggressive egotism. This is not always intentional; and I repeat here that our object always has been, as our motto says, "Defence, not Defiance," and that it shall never be otherwise.

Again, if the professional workers disapproved of any of our proposals, they could have abolished or amended them by joining the organization. The objects, rules, and working methods will always be entirely subject to the opinion of the members, in fact, will be formulated by them.

One objection has been forcibly urged in face of the most persistent explanation. Our scale of wages has been denounced as being far too low; whereas in reality it was not intended as a schedule of fair wages, but as a notification that nobody would be admitted as a member who earned less than those wages. As events have proved, the scale was too high rather than too low for the majority of applicants.

There is no doubt that the time is approaching when the increase of competition will drive home our policy with sterner logic than any arguments of ours possessed. The time is not so very distant when the position of those who earn their living by photography will become incomparably worse than it is now, and I am sure that then they will make a resolute and spontaneous attempt to unitedly improve their lot. I do not doubt that even then there will be a few who will persist in clinging to their old shibboleths of "gentility," preferring to starve in the odour of professional sanctity rather than risk by organization the appellation of "workmen." Let us take care that we do not defer our activity until the wave of competition becomes irresistible. We shall continue to agitate and educate. We are now considering a scheme of amalgamation with the lithographic artists, which would result in a large accession of strength to our movement from the services of their organizers. The present year will be spent in putting in our foundation.—I am, yours, &c.,

ARTHUR FIELD, *Hon. Secretary.*

Maidstone, April 27, 1891.

RE "CIVIL" AMATEURS.

To the EDITOR.

SIR,—In your issue of this week you publish a letter from a Rothesay photographer, which, being somewhat *personal* in its character, I trust you will allow me to reply to. *I* am the amateur referred to. I squint, and I *can't* deny it. It is my infirmity, not my fault. But as to having behaved in the ungentlemanly manner imputed to me by the "Photographer" (whose name *sadly* belies his nature) while in his dark room, I emphatically deny. I am glad to say that Rothesay contains other photographers than one, and that *their* treatment of the "Squinting Amateur" was, to say the least of it, gentlemanly.

The Liverpool gentleman named by our Buteman I have known personally for a quarter of a century, and as to his manner of comportment, which you know is that of the polished gentleman, if imitation is the sincerest flattery, then I am proud to be conceited enough to *think* that I flatter him. The northern photographer would do well to make him his Gamaliel. Apologising for troubling you—I am, yours, &c.,

April 25, 1891. SQUINT.

AMATEUR-FOTOGRAFEN-VEREENIGING TE AMSTERDAM.

To the EDITOR.

SIR,—The following are the officers in our Society, which I do not find mentioned in your last ALMANAC. *President:* H. v. d. Masch Spakler.—*Treasurer:* J. Bispinck.—*Librarian:* David C. Ruth.—*Commissary:* G. Peck.—*Secretary:* Michel Ameschot.

Our Society was established in 1887. The meetings are held in "het Poolsche Kaffiehuis," at Amsterdam, on the first and third Wednesday of the month, respectively devoted to the lecture of photographic periodicals and to discourses and scientific essays.—I am, yours, &c.,

Weteringplantsoen 7. MICHEL AMESCHOT, *Secretary.*

CANADIAN FEDERATION SCHEME.

To the EDITOR.

SIR,—We notice in your "Answers to Correspondents" column this week that Mr. Geo. Oakley, of Accrington, writes cautioning photographers against Canadian emigration schemes. So far as we are aware, the only such scheme which appeals to photographers is "The Practical Photographers' Federation," of which we are the secretaries. We think that if Mr. Oakley has any arguments against this scheme he should specify them and not simply sound a general warning. We have written him to this effect. At the same time we should like to point out that the preliminary prospectus is distinctly stated to contain merely suggestions, and that the management of the Federation is to be entirely in the hands of the members.—We are, yours, &c., PERCY LUND & Co.

Bedford, April 25, 1891.

A PLEA FOR SIMPLICITY IN SHUTTERS.

To the EDITOR.

SIR,—In your issue of April 24 you published the specification of Patent No. 17066, in which Mr. W. G. Tweedy claims and applies (though in a somewhat different form) the exact action described by me in the above article, his claim No. 2 being:—"A photographic drop shutter with a variable graduated aperture in its screen actuated by . . . . . falling a fixed distance.

Without in any way detracting from Mr. Tweedy's invention, will you allow me to state that my shutter was in use by myself on March 19, was shown by me to one or two friends on the 26th, and I was then asked to show it to the local Society; and, as a matter of fact, the above paper was written to be read before the Torquay Photographic Society at its last meeting, held April 1, but I was unable through indisposition to read it. The shutter was alluded to in the letter, dated March 30, you published from me in the JOURNAL, and the paper and shutter itself, together with tests of its capabilities, were sent to you April 6.

This is only another instance of how two minds may be, entirely unknown to each other, working at the same time upon the same lines.—I am, yours, &c., EDWARD J. SMITH.

Park Royd, Halifax, April 25, 1891.

[On April 7, we received an article from Mr. Smith under the above heading, together with his ingenious shutter. This, with several others outstanding, we hope to insert next week. But the dates here given show that Mr. Smith could not possibly have borrowed any of his ideas from the specification in question.—ED.]

Exchange Column.

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

Wanted, backgrounds and studio accessories in exchange for magic lantern.—Address, BRADSHAW, Photographer, Altrincham.

Wanted, good cabinet burnisher. Will exchange 19 vols. *English Mechanic*, from 1881 to present date.—Address, HORTON, Photographer, Caroline-street, Cardiff.

Wanted to exchange, whole-plate R. R. lens, by Dallmeyer, tripod stand and burnisher, for half-plate set for outdoor portraiture.—Address, W. C. BAX, John-street, Rochester, Kent.

Will exchange portable studio, wood and glass, in sections, about 24 feet by 12 feet, for group, or rapid rectilinear lenses, 12×10, or larger.—Address, The Royal Studio, Warminster.

Quarter-plate camera, swing back, double dark slide, ash, sliding and ball socket head tripod, and lens; will exchange for good half-plate outfit.—Address, S. ROUT, 4, Park Hall-place, East Finchley.

Two-foot model cutter yacht, two sets of sails, also three volumes of *Boys' Own Paper*, in parts; exchange for Lancaster's quarter-plate instantograph.—Address, C. HALL, 30, Charlotte-street, Plumstead, S.E.

Will exchange *English Mechanic*, 1869 to date, bound, for first-class modern camera, 10×8, three double backs, rapid rectilinear lens, case, and stand.—Address, C. J. LEAPER, 4, Chester-road, Ranelagh, Dublin.

I will exchange a half-plate bellows-body camera, Burr's portrait lens, and tripod stand, for a hand camera by a good maker. Will adjust difference in cash.—Address, F. SIMCO, Chemist, Wellingborough.

Will give in exchange last year's volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, also several numbers of 1889, for a toning dish, 15×12 or larger, and one dozen half-plate printing frames.—Address, J. BENNETT, Blangden's Cottages, Southgate, N.

I will exchange boat, bar, and water-piece, interior background (8×7 feet), Tylar's current producer and discharger, and half-plate view lens, for conservatory, exterior backgrounds, or studio accessories.—Address, FREDERICK C. D. HURD, Shepton Mallet.

Ford Smith hot roller, eight inch; Seavey's boat, Seavey's plaque, and reversible background, all in very good condition; Marion's background, exterior, never used. Wanted, tourist camera, wide-angle lens.—Address, ALFRED COX & Co., Tavistock-chambers, Nottingham.

Will exchange first-class whole-plate Lancaster's instantaneous lens and shutter, with iris diaphragm, very little used, and two whole-plate metal and vulcanite double dark slides, for good half-plate camera, lens, &c. State particulars.—Address, WILLIAM FLEMING, 176, Stirling-road, Glasgow.

CITY AND GUILDS OF LONDON INSTITUTE.—A course of six lectures on *Photography, treated from a Practical and Scientific Point of View*, will be given on Wednesday evenings at half-past seven (commencing on May 6, 1891), by Mr. H. Chapman Jones, F.I.C., F.C.S., &c. The syllabus embraces—Conveniences in the construction of cameras. Methods of comparing lenses, and the determination of their useful properties, including focal length, rapidity, width of angle, covering power, &c. The production of a truthful image. Distortion due to the lens and distortion independent of the lens; their comparative importance, elimination before exposure, and cure after development. The action of light, analytical, synthetical, and initiative. Photographic sensitive surfaces. Emulsions. The results of the compound nature of light. The absorption of light. The utilisation of the absorbed and of the unabsorbed light. Negative-making in general. Methods of determining the exposure needed. The approximation to orthochromatic results. The action of developers. The control of density. Printing processes compared. Desiderata in prints, especially truth and permanence. The principles of various printing methods. Colour in prints. The conditions necessary for photographing in natural colours. Fee for the course, 5*s*. Applications to be addressed to the Dean of the Central Institution Exhibition-road, S.W.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

H. G. PIKE.—Messrs. Carl Norman & Co.'s address is simply Tunbridge Wells.

H. H. COBB.—Discard your developer, and try No. 1 on p. 742 of the ALMANAC for the current year, when all your troubles will cease.

CHARLES KNIGHT.—The steeplechase pictures are good. If developed to bring out the dark shadows, they would have been still better.

J. M.—If the lens will not define sharply unless it is stopped down to *f*·48, we certainly should not advise its purchase. It cannot be by the maker named if what you say is correct.

S. WELLS.—The fact of a photograph of the building being made copyright will not prevent you also taking a photograph of it, and from exactly the same standpoint if you choose, but you must not copy the photograph.

C. J.—The material enclosed is not bitumen such as is used in photography. It seems to be a compound of gas-tar and pitch. The right material may be obtained from Hopkins & Williams, Cross-street, Hatton-garden.

FAIR PLAY.—It is preposterous that a writ should be served upon any photographer for exhibiting a portrait in his window, more especially one which was taken out when requested. What damage has the man sustained?

INQUIRENDO.—Collodion transfers are, we believe, very little used now, if at all. Bromide paper has quite superseded them. It is much simpler to work, and, unless in very skilled hands, the paper yields the best results.

C. OVERY complains of the weight of lenses, and asks why opticians cannot use thinner brass for the mounts, or, better still, employ aluminium. Our correspondent is evidently not aware that some opticians are already supplying their lenses in aluminium settings.

W. GIRLING.—Your method, we fear, would take up too much time when large quantities of paper have to be dealt with. In the other case, our correspondent requires a *dry*-plate process for direct positives; he knows all the details of the wet process.

M. W. G.—1. There is no successful way of spotting prints after they are enamelled. The spotting must be done beforehand.—2. Methylated ether and alcohol will do quite well for the collodion.—3. The gelatine certainly should not be acid if the permanency of the pictures be a consideration.

R. W.—If you decide upon opening a studio in Regent-street or Bond-street, or indeed in any of the leading West-end thoroughfares, you need not go to the expense of engine and dynamo for the electric light, as the current may be obtained from the mains, which are now laid in most of the principal streets.

A. M.—By removing the portions of the side wall and the roof, as shown in the sketch, and replacing with glass, the building will be converted into an excellent studio. We question if, in making this alteration (as it is an outbuilding), you need consult the district surveyor. We should not do so ourselves.

J. R. J. (Crewe).—Our idea is that you should initiate such a business and employ canvassers yourself. There are plenty who would execute the work for you until you were able to employ specialists to work on the premises. In the meantime, we see no objections to your doing all the negatives you can get to do.

T. BRAMWELL says: "I am called upon to photograph a room with a large mirror at the end facing camera, and not having the same difficulty with reflection before, I am at a loss how to best treat the subject. Will you kindly answer me in your next JOURNAL?"—There need be no difficulty if the camera be placed in such a position that it is not reflected by the mirror.

D. SIMPSON.—We should advise you not to make lantern slides from the illustrations in any of the weekly papers without first getting permission. Some publishers are very jealous with regard to their illustrations. Others, on the contrary, have no objection—indeed like it, particularly when the origin is quoted. Some papers do not mind pirating photographs, but they object to their prints being photographed.

F. DUNSTERVILLE (Madras).—The address of the firm who supply the apparatus is, the Americo-European Trading Company, 72, London-wall, E.C. Better communicate with the firm, who will supply the necessary material. We may mention that the collotype process is by no means an easy one to work when the temperature is high, and the modified form of it referred to will certainly not be less difficult under those conditions than the ordinary one, even if it is not more so.

M. D. Y. writes as follows: "I should esteem it a favour if you could inform me of any means of preventing or removing the oxalate of lime formed on bromide paper with the iron developer when ordinary well water is used. Our water is very hard, and we have to give up enlarging on account of the slimy appearance of paper when rain-water supply runs out."—A *very* dilute solution of hydrochloric acid will dissolve off the oxalate of lime, and leave the picture clear.

OMEGA puts the following query: "Last week I took a carbon print from a negative, developed it, and found the exposure about right. I then printed a dozen more from the same negative, on the same batch of tissue, and developed them two days afterwards, and they were every one of them very much over-printed, although they were all exposed by the actinometer to the same depth. Is it correct that carbon pictures must be developed at once, as they get darker by keeping? An amateur friend says it is."—Carbon prints get darker by keeping, that is, the action of light once started goes on even in darkness. This is what is called the "continuating action of light." If the prints have to be kept any length of time before they are developed, they must be printed much lighter in the first instance.

H. A. HUTCHENSON says:—"Will you oblige by advice in the following? I have a half-plate single lens of eight inches focus for use in a 5×4 hand camera. I use a shutter, usually working about one-tenth or one-fifteenth of a second, stopping down to *f*·22, but find the distance does not come out quite sharp enough. Would you advise me to use a lens of a wider angle—say, a W. A. landscape of six and a half inches focus? I am not particular as to price of lens, for the focus of which I can alter camera. I am going for a tramp abroad this year, and doubt whether I should be able in Switzerland to get enough of the mountains on the plate with the proper foreground."—If the single lens were properly focussed we should have thought that the distance would be well rendered with a stop of *f*·22. The latter lens will, of course, include a wider angle, but will require to be worked with a smaller stop to cover the same size plate with equal definition at the corners.

YOUNG PRINTER writes: "1. Would you kindly help me, through 'Answers to Correspondents,' with regard to developing bromide opals? I have had trouble lately in developing these when the acid solution is put on, after apparently developing to the right density; the action of the developer keeps on till image is perfectly black. What is my remedy? I use iron developer according to instructions enclosed with opals, and acid solution right strength. 2. Is it necessary to keep the oxalate solution in a bottle stopped up? 3. What is the best thing to do with a silver bath which is very scummy? No amount of filtering will clear it. I have tried putting in sun; what is best thing to keep bath clear?"—1. The development should be arrested when the acid solution is applied. We are not aware of the strength recommended for the plate named. We should advise that the developing solution be well drained off, and then the acid solution liberally used, so as to wash away the developer. 2. It is better to do so. 3. Shake up the solution with a little kaolin, and keep some always at the bottom of the bottle.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—May 7, *Toning Bromide Paper*, J. Weir Brown. May 14, Last lantern night of the season.

WE have in type, but unavoidably crowded out this week, several articles, among which are *A Plea for Simplicity in Shutters, Combining Photographs, Carbon Printing, The Flashlight and its Future*, &c.

GLASGOW INTERNATIONAL EXHIBITION.—We have received a supply of prospectuses and forms for entering pictures for this exhibition, which we shall be happy to give to such intending exhibitors as choose to apply.

POLYTECHNIC TECHNICAL SCHOOLS, REGENT-STREET, W.—A course of four lectures on *Art, in Relation to Photography*, with illustrations, will be given by Mr. Valentine Blanchard, commencing Wednesday, May 6, 1891.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 6, *Outfits for Landscape Work*. May 13, *New Hand Cameras*. Saturday outing, May 2, Twickenham to Richmond. Leave Waterloo station at seventeen minutes past two. Meet at Twickenham at three o'clock.

THE WATKINS EXPOSURE METER.—Mr. Alfred Watkins writes: "I have granted to Messrs. R. Field & Co., 142, Suffolk-street, Birmingham, a sole licence under my patent for the manufacture and supply of the above instrument. All orders and communications respecting the instrument or its belongings should therefore in future be sent direct to Messrs. Field, who have manufactured it since its first issue."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1618. Vol. XXXVIII.—MAY 8, 1891.

HAND-CAMERA EXPOSURES.

The rage that set in for detective, or hand, cameras two or three years ago certainly, at present, shows no signs of abatement, nor is it probable that it will for some little time to come. It is not necessary here to touch upon the question as to whether these cameras tend to elevate photography or otherwise—a subject that was discussed in our columns a few weeks back. One thing, however, is quite certain, namely, that pictures can be secured with hand cameras that could not be obtained without them; also that their introduction has greatly increased the number of amateur photographers—or, perhaps, as some would say, the number of those who expose the plates or films and get professionals to do the remainder of the photographic work.

There is no denying the fact that a large proportion of the negatives made with hand cameras are absolute failures in every sense of the term, while what may be classed as really successful pictures form but a small percentage of the number of plates used. These remarks, of course, do not apply to experienced and careful workers, for they usually do obtain a large proportion of good pictures. Our purpose now is to recur to a subject we have dealt with before, merely for the benefit of those who have as yet been unsuccessful with detective cameras.

Apparently the first aim of beginners is to obtain the quickest acting shutter possible, and not only that, but to make a point of always using it at its maximum speed, and that quite regardless of the actinic quality of the light or whether the sensitiveness of the plates will respond to it. Added to this, the lens is frequently used with a reduced aperture to obtain the greatest depth of focus, or to secure definition at the corners of the plate. The consequence of all this is that by far the larger number of hand-camera negatives, by modern amateurs, are grievously under-exposed—often mere silhouettes, whereas they need not have been had a little more judgment been exercised at the time of taking. It frequently happens when, say, the fiftieth part of a second's exposure has been given, that as much as a tenth might have been given without the fear of any movement showing, with the result that with the five times longer exposure a fully timed negative would have been obtained instead of an under-exposed one of no value whatever as a picture.

What is the object of a hand camera? Is it to accomplish photographic feats by showing how rapidly an image of a certain kind can be impressed on the plate, or is it to obtain pictures? If the former, then the exposure may be as brief as possible. But if the latter, then the exposure must be timed so as to secure the end in view. In connexion with this portion of the subject it must not be taken for granted that the quickest exposures always secure the, apparently, sharpest results. For example, an under-exposed picture of the silhouette type just referred to seldom appears really sharp, owing to the general lack of detail; whereas a picture taken with a longer exposure, even though it may when critically examined show a trifling movement, will generally seem sharp by reason of the extra amount of detail in the shadows. This brings us to another point.

Does the representation of absolute immobility in moving objects convey the best idea of instantaneity in a photograph? In most instances it does not. Take for example a piece of machinery or, say, a railway train taken broadside on. If it be taken with an exposure sufficiently brief to show the spokes of the wheels sharply defined, the train appears to be standing perfectly still, inasmuch as there is nothing to indicate motion beyond, perhaps, an intimation on the mount that the train was "travelling at full speed" at the time it was taken. Most of our older readers will remember two pictures by the late Mr. Rejlander, illustrating this point. He produced two pictures of a girl at a spinning-wheel, the one taken instantaneously, showing the foot and spokes of the wheel sharply defined; hence the wheel and the worker appeared at rest, and the picture as if it had received a long exposure. The other was taken with an exposure of several seconds; consequently the foot and knee of the spinner were much blurred, while the spokes of the wheel were, of course, invisible. As the head and hands of the girl were still, this picture not only conveyed the impression of motion, but also the idea that it had received the briefest exposure. Of course this was pictorially the best as well as the most correct representation of the subject. As a further example let us take a street view. If it were taken with "absolute instantaneity," the pedestrians and vehicles would seem as if they had become suddenly petrified, whereas an infinitesimal movement, particularly of those in the foreground, would destroy this effect and convey the idea of life.

At the last meeting of the Photographic Society of Great Britain a similar topic to this came under discussion in connexion with some of Mr. Muybridge's photographs of horses. Some of the positions, although strictly correct, seem unnatural, simply because the particular motion was too rapid for the vision. The eyes, under these circumstances, only realise the mean of a succession of movements. Which, then, conveys the best impression of the motion of the animals, a photograph that secures a microscopically sharp image of one movement only, or that which secures the mean of several as recognised by the eyes?

It must not be supposed that we condemn "instantaneous"

exposures, except in cases where they are given to the detriment of the picture. What is the utility of giving the hundredth part of a second's exposure to obtain little better than a silhouette when, so far as movement is concerned, an equally or better result might be obtained by giving a tenth, or longer, and thus obtaining a fully exposed negative?

ORTHOCHROMATIC COLLODION EMULSION.

Our recent announcement of Mr. J. B. B. Wellington's *Revolution in Collodion*, following closely upon a series of artices on *Purity of Materials and Sensitiveness in Emulsion Work*—in which, by the way, Mr. Wellington's name was mentioned in connexion with his earlier work in that direction—has elicited numerous inquiries on the subject of orthochromatic collodion emulsion from amateurs and others who, pending the publication of the details of Mr. Wellington's discovery, are anxious to experiment for themselves. We propose, therefore, to reply generally in the present article by briefly showing in which direction to work.

The earliest experiments in orthochromatic photography, made many years ago, before the introduction of gelatino-bromide, were necessarily with collodion plates, and the results recorded were, almost without exception, obtained by the bath process. It is well to note this fact in connexion with the much greater degree of colour sensitiveness claimed for collodion as compared with gelatine, Vogel having estimated that with the former, under favourable conditions, the sensitiveness to yellow rays was increased sixty or seventy times. One element that seems to conduce to this high result is the formation of the sensitive haloid salt in the presence not only of the orthochromatising material, but also of a very large excess of silver nitrate, which is never removed from the plate until the image has been developed. The essential point in one of the existing patents for coloured sensitive plates is that the orthochromatising material be present at the moment of formation of the haloid—that is to say, while the silver salt is in a soluble condition—but the resulting emulsion never contains an excess of soluble silver salt, the effect being apparently due to a combination between the colouring matter and the haloid at the moment of formation.

It is claimed that the increased colour sensitiveness obtained in this manner is permanent, *i.e.*, is not lost by washing the emulsion or films; whereas by the "bathing" process, in which the prepared sensitive film is passed through a solution of the colouring matter in combination with a soluble silver salt or a solvent of silver bromide and then dried, the orthochromatic effect is removed by washing. In the first case, too, the films possess good keeping qualities, while, in the latter, rapid deterioration takes place, owing to the presence of soluble matter. It seems, therefore, that the effect may depend upon two separate causes—the formation of an insoluble compound of silver, and the presence of a soluble silver salt in conjunction with the colouring matter.

In the old wet process both these conditions are present in the highest possible degree, for, whether the colour material be added to the collodion or to the silver bath, it is present at the moment of formation of the silver haloids, and these, moreover, are subject to the influence of a very large excess of silver nitrate. In the case of gelatine emulsion it is impossible to work under the same conditions, owing to the deleterious action of an excess of silver upon the gelatine itself; nor is it feasible to prepare an emulsion that can be spread upon glass and used at once, as in the case of a collodion plate. With a collodion emulsion, however, a compromise can be effected, and by the employment of an excess of silver a proportionately higher degree of colour sensitiveness can be obtained if the films are to be employed at once; but the problem remaining to be solved is how to secure keeping qualities without loss of orthochromatic effect.

With collodion, as with gelatine, there are two obvious methods of applying the colouring matter, namely, by adding it to the emulsion, and by soaking the film after coating. If the first be adopted, the dye will be added to the collodion before sensitising, and consequently fulfil the conditions requisite for the formation of the silver compound already spoken of; while, if a considerable excess of silver nitrate be employed in sensitising, the effect will be proportionately enhanced. But such an emulsion, owing to the presence of free silver, possesses very limited keeping qualities, two or three days at the outside being the full time of its useful life, and, if "washed" to remove the soluble matter, the greater portion of the orthochromatic effect is lost, leaving only what may result from the insoluble compound formed at the outset.

The mere addition of eosine or other dye to an emulsion after it has been made, especially to a washed emulsion, is absolutely without beneficial action, unless at the same time an addition of ammonia be made. This in some manner helps the combination of the dye with the silver, but unfortunately it rapidly destroys the collodion, which loses its suspending powers, while it quickly reduces the silver bromide to a granular and foggy state, so that no ultimate benefit is obtained.

In following this method of colour sensitising practice proves the difficulty, if not impossibility, of securing a permanent effect of any value, since, as has been shown, the very process of making the plates keep removes their orthochromatic character. The same may, indeed, be said of the bathing process, although by the latter it is possible to secure a more powerful permanent effect, owing to the capability it affords of applying stronger measures in the first instance. Thus, in orthochromatising the emulsion, the excess of silver it is possible to use is limited, and the employment of alkali is scarcely possible; whereas by the soaking method a very powerful as well as a strongly alkaline solution may be used if the emulsion be of such a character as will bear it.

A plate coated with ordinary washed collodio-bromide emulsion slightly tinged with eosine, if treated with a very weak solution of ammonio-nitrate of silver, may be dried and kept for use for a day or two, and will possess fairly marked orthochromatic properties; but, if used wet, a much stronger solution may be employed, and a correspondingly greater effect secured.

The best plan in practice, however, whether for films to be used at once or to be dried, consists in preparing an emulsion with a considerable excess, say three or four grains to the ounce, of soluble bromide, and colouring this to the desired extent with cosine. Such an emulsion will keep almost indefinitely in the unwashed condition, and is ready for use at any time by simply coating a plate and immersing it in a thirty-grain solution of plain nitrate of silver or of ammonio-nitrate. It may be exposed at once, in which case it will require very careful washing before development with alkaline pyro, or it may be thoroughly washed and dried. The keeping qualities will be proportionate to the washing, but the more thoroughly this operation is performed the less will be the orthochromatic power left in the film.

In fact, as already stated, the difficulty is not to obtain the colour sensitiveness, but to render it, as well as the plates, permanent when present in a high degree.

DECORATIVE APPLICATIONS OF PHOTOGRAPHY

For such purposes as we have indicated in our head-line photography, there is little doubt, is not made so much of as it might be. Few of those who practise it—and especially is this true of amateur workers—recognise the extent to which it is available, for example, in the beautification of the ordinary dwelling-house. There is at the present moment, to cite the handiest case in point, a great run on "glacier" window decorations, which consist of imitation stained glass, for blocking out unsightly prospects and filling up the "blanks" created by the partial glazing of room and entrance doors. The artistic claims of these productions are not so easy to grant as their effectiveness in fulfilling the first object for which they are employed and of imparting certain agreeable sensations of warmth and colour to the very humblest scheme of domestic decoration. We, however, should like to see photographic transparencies more largely utilised in this manner. Bearing in mind the spread of amateur photography in our midst, we feel justified in expressing surprise that it is not oftener put to such an extremely serviceable use. The rich variety of tones now obtainable in gelatine transparencies gives one command of a fine range of agreeable effects which do not by any means suffer by comparison with those produced by "imitation stained glass." During the last few months we have been over the establishments of several of the best-known photographers in the West-end of London, and have noticed with pleasure the extensive, nay, almost lavish extent, to which use has been made of transparencies for window direction. The effects, as a rule, struck us as being singularly refined. The choice of subjects, embracing portraits, landscapes, seascapes, copies of well-known pictures, and ancient and modern architecture, supply a pleasant as well as a considerable diversity, and, combined with the beauty and variety of the tones of the pictures, exhibit the photographic art in an aspect of utility which should not be without its lessons for those who stick in the old grooves of "negative and print" work from year to year, to the neglect of other and, perhaps on the whole, more profitable branches.

Our articles on ceramic photography published last month should give a good idea of the large field which is open for this kind of work, and the decorative possibilities created by the comparative ease and inexpensiveness with which porcelain may be adorned with absolutely faithful reproductions of beautiful objects. We believe that the craze inaugurated some years ago for decorating rooms with old or spurious china plates has dwindled down, so that there is probably a "good opening" for porcelain tiles bearing artistic and pleasing pictures. Some of the subjects and designs which satisfied the æsthetes of ten or a dozen years ago would not pass muster, we surmise, with refined people now, who are looking with daily increasing favour upon all kinds of pictures produced by the assistance of photography.

We once saw, in the hands of a wholesale agent, a collection of ladies' sunshades, covered with some silk-like fabric of a creamy colour. Each division of the inner side of the covering created by the ribs of the frame was adorned with a photograph of a landscape printed direct upon the fabric. The effect was certainly as novel as it was charming, the tone of the pictures which were said to be in silver, being a rich purple and quite in harmony with the tint of the support. It was anticipated at the time that these sunshades would have a great sale among the fair sex, and that the idea of supplying fabrics bearing photographs upon them would be welcomed in other directions. We believe that the enterprise here exhibited did not meet with its anticipated reward, and it is doubtful whether these sunshades ever found their way into the market. At the beginning of the season we are writing of, capricious fashion decreed that red or some other coloured sunshades should be *de rigueur*, and hence the matter was never put to the proof

The production of photographs upon silk or other fabrics of that nature is, we are afraid, more talked and written about than actually done. The very practicability of such a process is not so well known as it should be. Platinum printing lends itself to this form of photography in a better manner, perhaps, than any other, the hot-bath process being the one employed, and several kinds of sensitised textile fabrics being obtainable. We have seen most excellent pictures upon silk, nainsook, &c., pressed into a variety of decorative services. In particular, we not long since noticed several of the highly ornate lamp shades, which are now so fashionable, covered with a fabric resembling sateen, and having printed upon it some small views in platinum. As the pictures were very soft and delicate, the effect was distinctly pleasing.

It will be seen from the foregoing that the decorative capabilities of photography still remain to be made use of in a number of ways, or at least to a greater extent than they have hitherto been; but there is also room for the remark that even of the ordinary positive paper prints photographers do not, as a rule, take such advantage as they might. Let us give one example in point. One of the commonest objects of the modern dwelling-house is a folding-screen. More often than not, this is artistically ornamented with hand or mechanically painted designs, or even engravings, or cuts on paper. We, however, came across the other day an instance in which photography was made to supply the pictorial decoration. Each leaf was glazed in several sections, and a collection of unmounted photographs of a great variety of subjects, produced by several printing processes, and having a large assortment of tones, was placed *in situ*. The photographer, an amateur of as much ability as enthusiasm, assured us that he occasionally changed the pictures, which, owing to the effectiveness of his glazing, never suffered from smoke and atmospheric fumes, and thus kept up a constant and pleasing round of subjects which delighted not only himself, but also his friends and visitors. We do not know whether photograph-screens of this kind are in any vogue to speak of, but if they are not they ought to be, and they would help to sound the knell of the photograph album, whose services as a "preserver" of albumen-silver prints are, fortunately, not now so much required as hitherto.

Photographic fresco work will appear among us, no doubt, in the future; but at present there are no signs that we are aware of that it is likely to be experimentally tried yet a while. For wall-decoration such a process as the autotype carbon method seems to us to have very great merits, and we should like to see such an idea put into practice. The immediate support of the gelatine would, doubtless, have to be paper, and the access of damp and foreign substances made impossible, while the absence of glazing would demand the provision of a coat of varnish which would both protect the picture and stand

cleaning. But this is merely an idea that occurs in passing, and we record it to illustrate one of the little worlds which photography has yet to conquer. The frieze, or rather the cornice, of a room generally has some decorative effort expended upon it; what better scope could photography desire than this? Imagine a series of views in pigment so selected as to harmonise with the remaining contents of a drawing-room, and we have a decorative end to which photography may very successfully be applied, we are sure.

It is a pity that M. Lippmann's achievements turn out upon examination to be less successful than the public were originally led to suppose, otherwise we might now have been in the position of being able to forecast the probable date when decorative photography would, in common with other branches of the art, receive a huge impetus; but, despite the fact that it has entirely to depend upon a monochromatic translation of art and nature for its effects, we say that for such purposes as we have briefly touched upon its capabilities are of the highest possible order. Decorative photography, we are convinced, has a fine future before it.

THE powerful contractile effect capable of being exercised by gelatine when solutions of that substance are evaporated to dryness has been referred to by us on several occasions; and, indeed, it is remarkable that we do not hear of disasters in the use of gelatine emulsion plates. The reason, no doubt, is that the gelatine has undergone a physical change either by heating or being in contact with foreign matter in the shape of silver salt. The use of carbon tissue has sometimes been followed by injury to the surface it was developed upon. We learn from an article in the *Scientific American* that this property of gelatine is made use of in producing the species of decorative glass known as "crystalline." Until very lately this was a close-kept trade secret. To put the matter in brief, so far as its effects would be interesting to photographers, we might say that the effect is produced by brushing strong solution of glue over glass, previously roughened by sand-blast or otherwise, and then setting up the coated glass to dry. After a while the glue, as it contracts, literally pulls away pieces of the surface of the glass, and so produces a variety of fantastic patterns. So strong is the effect that uneven glass coated on the hollow side was frequently broken; and the workmen have to wear masks to keep the chips, as they fly off, from injuring the face.

A VERY interesting application of photography is about to be made, and the close connexion between our science and that of meteorology gives an added interest. Probably the oldest weather records in existence are those of Walter Merle, kept from A.D. 1337 to 1344; they are on vellum, and in possession of the Bodleian Library authorities. Mr. G. J. Symms is about to reproduce them by photographic methods.

A RECENT number of the *Comptes Rendus* contains an important paper upon the salts of the sub-oxide of silver, by M. Guntz. Some time ago this *savant* prepared the sub-fluoride, and he now claims to have prepared the sub-chloride Ag_2Cl, sub-iodide Ag_2I, and sub-sulphite Ag_4S. It is needful here to detail the mode of preparation, but the chief interest of the communication to photographers centres is the announcement that he now proposes to compare his sub-salts, prepared as described, with the product of the action of light upon the normal salts, which comparison cannot but be of great interest, from the fact that hitherto our knowledge of the so-called sub-salts produced by the action of light upon silver rests upon a by no means solid foundation.

WE have on previous occasion drawn attention to the fact that when thermometers are used in delicate operations they should be periodically examined, as the zero point is liable to become altered after prolonged keeping, or after exposure to high temperatures. This change is governed to some extent by the kind of glass of which the instrument is constructed. According to Herr F. Allhin the normal Jena glass is superior to any for the purpose. Exposed to ordinary temperature, over four years, the change in the freezing point was only ·04° centigrade, while, after prolonged heating to 300°, its indications were twice as favourable as with thermometers made of the best glass ordinarily used.

THE strange compound hydrazoic acid, interesting to photographers from the way some of its compounds are acted upon by light, continues to be studied by MM. Curtius and Radenhausen, the former of whom has suffered severely from an explosion. The azoates seem to be most amenable to rays of the green region of the spectrum, the silver compound exploding violently when exposed to strong green light. Singularly enough it possesses a property most unusual in any acid of organic origin, or indeed any single acid. Its aqueous solution dissolves gold, forming a red salt.

IT is stated that the yellow or brown colour imparted to ether when caustic potash is added to it is caused by the presence of alcohol. This impurity is *per se* of no consequence in the chief employment of ether for photographic purposes—*i.e.*, the manufacture of collodion—unless its proportion be very great, as, of course, the mechanical properties of the photographic collodion depend considerably upon the proportions in which the alcohol and ether are mixed.

THE interest in the employment of aluminium is decidedly increasing among photographers, and the makers of lenses have for some time been catering for them. The cost of the metal has always been a drawback, not to speak of the increased difficulty experienced in working it. But, according to various American journals, the price is now so low as practically, considering its low specific gravity, to put the two metals, brass and aluminium, on a level. Pure aluminium is offered at a dollar a pound, and alloys, containing ninety to ninety-six per cent., at a lower price still.

ON THINGS IN GENERAL.

IT may be "taken as read," to use a favourite form of expression, that the editorial announcement of a revolution in collodion has excited widespread interest among the readers of this JOURNAL, and that they will eagerly await more explicit details of the invention. It is linked with a good name, that of a thoroughly practical man, one who can make a plate, and, as every one knows, which is still more difficult, make a picture. All old hands at photographic processes have a lingering love for the beauties of collodion pictures, and any process which shall possess the power to produce its excellences without its drawbacks will appeal in the strongest manner to their sympathies and their prejudices. How often is the absence of the crisp beauties of a collodion negative deplored by those of the old school! Perhaps a little unnecessarily, for all the while gelatine has been creeping on, till at last we buy plates, batch after batch, that are as uniform as collodion in their results, and which, whatever their disadvantages, certainly possess many points of superiority over collodion. One thing there was in the old negatives that is not seen in gelatine is the so-called "bloom," which used to be looked upon as a necessary accompaniment of a good collodion picture. A friend maliciously says that there was at any time more approach to photography in natural colours in the colour of the bloom on the back of these negatives than in any modern representation of the spectrum, whether by M. Lippmann or any one else. By the way, the ingenious way in which Captain Abney refrains from saying anything calculated to wound the susceptibilities of a brother scientific man is delightful. True, he says the problem of photography in natural colours is left "very much as it was before M. Lippmann took it up;" but then we know that photographs in colour of the spectrum have long been in existence. Observe, however, the sentence, "M. Lippmann has succeeded in fixing interference colours.

Captain Abney, I am sure, knows very well that the interference theory, as announced in explanation of the Lippmann effects, is sheer nonsense. All the same, his remark is quite true; for it is pretty generally felt that the effects are those of iridescence. We know they are fixed, and we also know that iridescence is the effect of interference.

I should like to refer further to the important remarks in his presidential address about the size of plates. I quite agree with their general purport, but I must take exception to any recommendation by any one of using the size $6\frac{1}{2} \times 4\frac{1}{2}$ instead of $6\frac{1}{2} \times 4\frac{3}{4}$. Quite apart from the fact that an immense number of cameras are made for the old size, it must be remembered that "cabinet" pictures are primarily for portraits, and, secondarily, for views, the most popular picture of the day. For average work the smaller width does not allow sufficient margin to cut out a cabinet picture when the negative is flawed at its edges or the subject (or that part of it chosen), not exactly centrally placed, this being a most important matter. Few people are clever enough to fix the portrait or view exactly in the middle of the plate without requiring any more from one side or end than the other to be cut away. The smaller size restricts these requirements too closely for cabinet pictures, and I do not think any one proposes to change the size of the latter.

The subject of yellowing plantinotype pictures is well brought forward at the present time. There are to be seen in many places a great many platinotypes in which the whites are considerably degraded. In all probability after a certain point this lowering of the scale of tones will not continue; but, in the face of the competition of bromides, it behoves all who have the interests of the really permanent platinotype at heart to take every known pains in the making of the prints, and also to discover, if possible, any hitherto unknown cause of trouble. The experience, for example, of Mr. Wiggins, of Blackpool (see p. 271), is well worthy of note.

The subject of the Muybridge photographs of animals in motion, and the value to the painters and draughtsmen of such subjects, has been exciting an unusual amount of attention lately. Considerable misconception exists upon the matter. If every photograph that Muybridge took is to be looked upon as a suitable example of motion for an artist to copy, the error is enormous, for many phases of motion —those of shortest duration—are represented, though no human eye was ever conscious of their existence, or of anything approaching to them. Obviously it would be as incorrect to depict representations of these brief phases as exhibiting animal motion as it would be to copy the wheel of a vehicle drawn by the horse, say, for such wheel would exhibit every spoke almost as though it was stationary, which clearly would be absurd. Where these photographs are useful is to supplement eye impressions, by giving the exact form and position of the limbs when in an attitude such as artists wish to portray. As to the actual value to artists, this may be guessed when I tell my readers that Mr. Muybridge himself informed me that when Meissonier—now, alas! no more—saw his photographs, he was so impressed with their value, that he actually entirely drew and painted afresh the limbs of a charger on which Napoleon was riding in a picture he was then at work upon. How particular that great artist was to portray all objects with the exactest correctness is well known. As to equestrian pictures, he actually (here again, Mr. Muybridge, who was a visitor at his house for some time, is my informant) had a long track or line laid down in his grounds, upon which he could be propelled at the same rate as a horse galloping or trotting on a parallel track, for the express purpose of ascertaining the exact mode in which the hoofs were put down.

FREE LANCE.

CLOUD PHOTOGRAPHY.

AT the meeting of the Royal Society held at Burlington House, London, on Thursday, last week, a paper, entitled "Cloud Photography conducted under the Meteorological Council at the Kew Observatory," by Lieut.-General R. Strachey, R.E., F.R.S., and G. M. Whipple, B.Sc., F.R.A.S., superintendent of the Observatory, was read.

The authors described the work which had been in progress under their charge since 1878, illustrating it copiously with lantern slides and photographs, many of which were admitted by those who saw them to be unique and of great beauty, while the methods they employed for determining the heights of the clouds above the earth's surface and the system adopted for finding the rate of motion of the currents of air in which they floated, were commented upon by the president, Sir William Thompson, Lord Rayleigh, the secretary, and other speakers, as extremely ingenious, and being capable of rendering far more accurate results than any others hitherto employed, either at home or abroad. The range of observations in the list of results given by the authors extended from clouds floating less than one and a half mile high in air moving at seven miles per hour to nine miles above the ground in gales blowing sixty-five miles an hour, whilst the surface wind was only a gentle breeze of five miles per hour.

The advantages of a knowledge of such aerial investigations in the preparation of weather forecasts was ably pointed out by Mr. Symons, the secretary of the Royal Meteorological Society.

COMBINING PHOTOGRAPHS.—II.

IN my previous article I referred to a few of the more particular points to be observed in the preparation and copying of the pictures which it is intended to combine into one, and now proceed to treat of the necessary manipulations of the prints. And first in importance comes the need of a suitable foundation upon which to mount the prints, for on the selection of a proper support or background upon which the finished pictures are to be grouped together rests almost entirely the success of the whole operation. At first sight any one who for the first time undertakes this kind of work is very likely to turn his attention in the direction of procuring some suitable mounting-board or card upon which to affix the pictures, but such is by no means the suitable form of support. Having made up his mind as to the colour or tint of his mounting-board, or whether or not it would be advisable that the resulting group, as specified by me in my previous article, would not be better finished in the form of a vignetted picture, let the worker proceed to place a piece of albumenised paper in an ordinary printing-frame carrying a sheet of glass. This is then printed to the desired tint, toned and fixed as customary, and finally mounted on a stout card of suitable dimensions.

Or, if preferred, the pictures may be mounted on a perfect sheet of glass and a suitable tinted background backed up against them, but in practice it will be found that the printed sheet of albumenised paper will be very suitable in every respect.

Having provided the support, the same should be allowed to dry, and when of a proper degree of dryness the same should be well rolled on a hot-press. This will flatten down and almost entirely prevent any grain in the paper from being apparent when the finished negative is pulled off.

Attention should then be given to the prints which it is intended to mount together. First in importance is to see that such are only selected which agree tolerably well in tone, so as to yield a negative as nearly as possible perfect in one equal exposure. The colour of the different backgrounds is of no moment, for these will have to be removed. Having got a supply of suitably matched prints, let the worker adjust them in the rough, and make up his mind as to the exact position they are finally to occupy when mounted. This done, let him take a very sharp, finely set pair of scissors, and cut carefully round the head and busts of the different figures. Of course hardly two will be the same, for some will most likely happen to be full-faced portraits, some in profile, and very likely some of them three-quarter faces. The full and three-quarter face portraits, as a rule, will offer but little trouble to trim nicely round, but a beginner may, when face to face with a portrait in profile, hesitate somewhat in applying the scissors; but in this, like most other things of a similar kind, all that is wanted is a little courage and neat-handedness, and once this is to the fore the thing is perfectly done. Should, however, a worker not feel confident enough to cut round a profile face with scissors, let him proceed to mount the picture on a sheet of glass, and when dry let him cut round with a deep hard cut the exact outline with a sharp penknife. This done, let him float the picture off, and mount on the rolled support. The scissors, however, is the quickest and best way in good hands.

There is, however, a knack in this cutting, and all the prints should be cut on the level; by this I mean that the scissors should be so applied as to cut the prints like the edges of a bevelled card. This will assist materially in enabling their lying almost entirely flat when finally mounted on the card. When properly cut, the edges will appear to be sunk into the albumenised support.

Having trimmed all the prints, their edges should be examined for any white specks that would show up when mounted on, say, a dark background. Should any such be found, a little colour should be

applied round the edges and back of the print; this is better done at this stage, and before mounting, und when applying the colour let it be carefully selected to match the tint of the background, and use the colour moistened with the white of an egg. I know of nothing better to mix colour with for spotting prints than a little albumen; if properly applied, it will not come off when the prints are rolled on a hot plate.

The prints are now ready for being combined on the background, and this can be done with ordinary cold starch. It is at this stage that the worker will appreciate the great advantage of using a support of fixed albumenised paper, for when mounting the prints they can be moved about here or there for nearly a quarter of an hour without being hard and fast. The surface of the albumenised paper does not absorb the mounting medium like an ordinary mounting board but permits of their being so nicely slid about on its surface till the desired effect is realised. I am afraid I can offer but little advice generally on the manner in which prints should be grouped; this is essentially a matter of taste, and hardly two persons will be found who would place six portraits in the same way; so don't be offended, kind reader, if, after worrying yourself no end about how to fix this or that particular face in a group, should Mater or your youngest hope rob your well-earned efforts of its value in your eyes, by saying, "Oh, I could do it much better than that!" I always keep calm and flatter myself they could not have done the job at all. Little kids are very much given to this sort of thing; but, of course, they are adepts at patchwork.

Instead of adopting a sheet of printed sensitised paper toned to a suitable colour for the background, an alternative method may be employed which, in some respects, has special advantages. This especially is the case when the prints are not cut out with much neatness.

The alternative method consists in pasting the cut-out figures on to a sheet of glass, and when they are quite dry any slight errors in cutting which show white edges are very easily trimmed off with the aid of a fine penknife.

When this method is adopted, a piece of ordinary sensitised paper can be placed against the side of the glass which does not carry the prints, and which, on being placed in an ordinary printing-frame, will lie nice and flat, and, if the operator is smart, he will by this means be enabled to tint down the paper with ordinary daylight to the desired colour, and making his exposure will get his final negative all right, without the trouble of toning and fixing. Should any failures be made, however, the paper must not be removed from the frame, for the images will have become impressed upon the background. The great advantage of mounting the cut-out prints on glass lies in the fact that they can be finally trimmed all round the edges, and this certainly is a very acceptable resource when slight errors in trimming have been made, and which have not been discovered until after the prints are mounted.

If desired, fancy backgrounds may be employed in certain cases where such would be in keeping with the nature of the group, but a beginner should first try his hand on plain backgrounds of not too decided a tone, and, if the figures are simply busts, a judicious style of vignetting is generally appreciated.

I need hardly say that the final negative should be modelled up by the retoucher and improved as far as possible. With proper attention to the copying of the prints by means of a suitable light, and copying them through a sheet of glass, much will be done to overcome any appearance of grain in the resulting prints.

T. N. Armstrong.

INTERESTING EXPERIMENTS IN DEVELOPING.

At the North London Society on Tuesday evening Mr. John Howson developed several transparencies under circumstances which deserve being noted.

Four plates having been taken from the same packet were each exposed under the same negative to a gas flame, the duration of exposure varying with each. The first one, as timed by one of the members of the Society, got ten seconds, the second, fifteen, the third, twenty seconds, while the fourth was illuminated by the light from an ordinary vesta match. They were then all placed side by side in a dish and the developer poured over them. As each arrived at maturity of development, it was removed and transferred to a vessel, first of water, and then of fixing solution.

Upon subsequent examination by the members, it was found absolutely impossible to distinguish one from the other, all being identical in colour, vigour, and detail. It was one of those things which required being seen in order to its belief. The plates employed were the Ilford Special, for black tones, and the developer was the "Universal" Ilford, composed as follows:—

No. 1.

Hydroquinone	160 grains.
Bromide of potassium	30 ,,
Sulphite of soda	2 oz. avoir.
Water to	20 ounces.

No. 2.

Soda hydrate	100 grains.
Water	20 ounces.

For use, equal parts of Nos. 1 and 2.

Still another matter of interest was brought forward at the close of the demonstration referred to. It will be remembered that our Almanac for 1887 was illustrated by a charming picture, *The Sisters*, from a negative by Mr. Thomas Fall, which had been printed by Urie's automatic machine, on "Alpha" paper, at the rate of one thousand per day. Mr. Alexander J. Agnew, who had personally supervised the printing on the occasion referred to, had brought a roll of paper that had been exposed, but not developed (the order having been completed), and he developed a print cut from this roll before the meeting. This was a pronounced success, the print showing that the paper had not sustained the slightest deterioration during the four and a half years it had been kept since its exposure in Glasgow. It was developed by iron in the usual way.

CAMERA CLUB CONFERENCE.

PHOTOGRAPHY AS A HINDRANCE AND A HELP TO ART.

By J. Pennell.

Judging from documents with which I have been furnished, it is evident that it is the custom of the Camera Club at its conferences to lure some unsuspecting artist to these meetings, to get him to talk upon his art in relation to photography, and, when he has delivered himself defenceless and unsuspecting into your hands, to fall upon him and slay him. Why this is considered one of the essential features of your annual gatherings I have no more idea than why *I* was asked to read a paper. But, having been warned in time that such is the case, I am prepared to make a very good fight for myself, and I can only hope that by contributing my paper I may do my little share to add to the gaiety of nations.

Photography is not a fine art, and never can be. Nevertheless, many of its professional practitioners open studios and describe themselves as art photographers and artists. The photographer is not an artist. He uses an unintelligent machine to obtain results which depend for their artistic value altogether upon the most sensitive human intelligence and the most highly developed technical ability. The photographer, merely by calling himself one, cannot become an artist when he has not the artistic temperament and lacks the patience to acquire the technical knowledge. The absence of either of these two qualities is absolutely fatal. Art has always been unpopular, artists have always been sneered at. Only the public in its insides (it has no heart) covets the money made by the financially successful artist, and thinks it will somehow cut him out by photography.

The so-called art-photographer endeavours to produce by machinery what the true art-worker produces by skilled handicraft. The nearer a machine-made photograph seeks to approach artistically produced art, the more glaring are its defects and the more evident its shortcomings. Photography has become the resort of people who imagine that by pointing a machine at nature they can produce a picture, just as they fancy that by going through South Kensington or the Royal Academy they could be turned into artists. Were photographs truly artistic, they would have an intrinsic value. The production of an etching is much simpler and much less expensive than the production of a photograph, provided at the outset one has to purchase the materials in both cases. Both may represent the same scene or the same figure. The etching will, probably, only appeal to a few hundred people in the world. But, if the etching is a great work of art, it will be treasured by its possessors, and its artistic and commercial value will continue to increase. If the photograph is produced by the best appliances, on the contrary, it may amuse millions for a moment, and then become food for the paper mill.

Or, if six artists of the same eminence should be asked to render the same object from the same position under the same conditions, each of their renderings would be completely and entirely different, each would seize upon some different feature in the object and emphasise it. And yet, if six cameras of the same size were used under the same conditions,

the results would be so similar that there should not be any choice between them.

It may be argued that the cheapness of photographs and their popularity prove their value; but they merely prove the artlessness of the masses. Art, even in its most popular form, only appeals to the saving remnant, but the saving remnant alone is worth bothering about.

Again, photography never does and never can make selection. All great and good art is nothing more than selection and arrangement. And here, perhaps, more than anywhere else, photography comes to grief. It is a common thing for that dreadful person the artless critic to state that a work of art is no better than a photograph. Such an assertion would never be made if the photograph was placed alongside of the picture.

I believe it is a canon of faith with photographers that they have made artists more accurate, that in many ways they have brought them down to dots. I do not admit this for a moment. All the photograph has done is to enable artists to prove to the world certain facts which they knew well enough long ago, but of which, without science, they could not convince a multitude of doubting Thomases. I am not aware that artists owe any more to Mr. Muybridge—I mean always the greatest artists—than the conclusive substantiation which he has given to facts which were known to artists themselves from the earliest times. The only qualification which distinguishes a great artist from an ordinary mortal is his ability to see a little more into nature and to record accurately what he can see. The average man, however, will not put any faith in human intelligence, but prefers a machine which is so imperfect that it seldom records one fact altogether correctly. No object other than a perfectly flat one, which can be placed directly in front of the middle of a lens, can be rendered by the camera with entire truth. Even then the chances are a million to one that some of the most important features will be left out. In small architectural detail, one of the few subjects for which photography is used with much advantage, the camera saves an enormous amount of time on the spot. But whoever has attempted to make a drawing, or to work as an architect from one of these photographs, knows that the slightest bit of reflected light, the slightest particle of glitter, the least depth of undercutting in the stonework will be falsely rendered by the machine; while one is continually thrown back on one's previously acquired knowledge or sketches of the subject, these almost invariably proving the photograph wrong. The result in the best of cases will never compare with a drawing made of the same detail.

Mere outline, which is all the photograph can at times give correctly, is but one feature of any object in nature. Truth of light and shade, colour, and tone, no photograph ever has yet recorded, or, I believe, ever will record. The minute one proceeds to photograph an object which is rounded or foreshortened, or of any great size, even the mere outline is incorrect and worthless. If you photograph an object in motion, all feeling of motion is lost, and the object at once stands still. A most curious example of this occurred to a painter just after the first appearance in America of Mr. Muybridge's photographs of horses in action. This painter wished to show a drag coming along the road at a rapid trot. He drew and redrew, and photographed and re-photographed the horses until he had gotten their action apparently approximately right. Their legs had been studied and painted in the most marvellous manner. He then put on the drag. He drew every spoke in the wheels, and the whole affair looked as if it had been instantaneously petrified or arrested. There was no action in it. He then blurred the spokes, giving the drag the appearance of motion. The result was that it seemed to be on the point of running right over the horses, which were standing still. And in that condition he was forced to leave the picture, as the intelligent art patron, who had ordered it, wanted to have his horses' legs shown.

It is stated again and again that photography renders detail in the most wonderful way, but I do not find that it is anything like as faithful in this respect as the drawings of Albert Dürer or the paintings of Gerard Dow and Van Eyck. It has also been repeatedly stated that photography has made painters more realistic; whereas, the truth of the matter is that, just about the time of Niepce's discovery, art broke loose from the traditions of classicism and turned toward romanticism, now become realism—a realism which no photograph will ever approach. And a reaction has already begun against this realism, and, if you like, also against photography, which is having its outcome in the work of men like Monet in landscape, of Degas, and Whistler, and Sargent in figures and portraiture—a phase of art which is quite outside any photographic possibilities. But probably it is useless to have even contended that photography is not a fine art, though it would be easy to go on accumulating proofs like those I have given. In a word, photography is a mechanical science, producing its results by machinery. The minute hand-work is put upon these results—these cease to be photographs. A work of art is the expression of one man's individual impression of an object; the moment that individuality is lost it ceases to be a work of art. You do not go through the world with a camera over your eyes: you would not try to paint with your head in a bag. And yet you look and see something in nature which is fine, and then you expect a machine to show you the same thing—a machine with no sense or feeling, a machine which does not even receive the impression of objects in the same proportions as you do.

But I must now point out, as briefly as possible, how photography hinders artists, and how it helps them; and here I can give my own experience, which is at least practical.

Some years ago I was asked to produce a series of drawings of the cathedrals of England. I anticipated that, owing to the magnificent series of photographs which have been made of these buildings—photographs to which the greatest care and attention have been devoted—I should be able, simply by getting their publisher's permission, to have enlargements made from them; to put these enlargements upon sheets of Whatman paper; to make my drawing with ink; then to have the prints washed out, and to give the results to a waiting world. I proceeded with one of the cathedrals in this fashion—I had not then seen it—I carried the enlargements down to the cathedral, placed myself successively for a few minutes at the points of view from which they had been taken—in many cases extremely good. And then I tore them all up. It was a lesson which I have never forgotten, and for which I have never forgiven photography. The drawings upon which I had intended to start were general views, and I at once found that the persons who had taken them were, to begin with, from six inches to two feet shorter than I was, or else their eyes were placed either in their chests or in their stomachs; that, when I measured the front of the cathedral as given in the photographic enlargement, and compared this with more distant portions on the enlargement, the photograph was worthless, the distance being absurdly reduced by photographic perspective.

Now, I do not mean to say decidedly that this photographic view is incorrect. It is quite possible that it is literally correct. But artistically it is absurd. At any rate, if it is correct, it destroys all feeling of size, impressiveness, and dignity. I also found instantly that many of the features, such as distant turrets, and even towers, were completely hidden in the photograph, while they were quite visible to the eye. That this perspective may be correct, as I say, is possible since architecturally trained draughtsmen who have not drawn from nature to any extent render objects with photographic perspective. So, too, did some of the old Dutchmen. There was a notable example of this in the last exhibition of Old Masters at the Academy, in Ver Meer's *Soldier and Laughing Girl*. But I think it extremely likely that Ver Meer used the camera lucida, if it was invented in his time, for it gives exactly the same photographic scale to objects.

This brings me back to my original proposition, that photography is not accurate; at least, if it is accurate—and I do not assert positively that it is not—no artistically constructed person could wish for an accurate, that is, a photographic, rendering of great facts in nature, since the camera hopelessly does away with their feeling of size and importance. If this is true of a building, it is infinitely more true of nature. I am familiar with Mr. Donkin's marvellous photographs of the Alps, and until the appearance of Mr. William Stott of Oldham's pictures, they were the finest things which had been done since that wasted artist, John Ruskin, drew them. But of photographs of the Alps, and of all nature, I have only to say—though I know it is a very poor argument—that, if they are true, then no man with any artistic sense wishes for truth, for it shows that we must be living in a miserably small, petty, and mechanical world. If the machine gives you more than you saw or felt with your eye, you are not an artist.

It is also frequently asserted that instantaneous photographs are of the greatest possible value to artists. This is both true and untrue. To the man who uses instantaneous photographs for suggestions, for hints of swift action, they save a lot of trouble in investigation for one's self. But I am not aware that we have as yet surpassed the Japanese, who, for centuries, without any photographic aids whatever, have known far more about action and movement than we have. The man who depends solely upon photographs, either will become a photographer, or he will be of no value as an artist.

Results remarkably near being artistic have been obtained by a few photographers either because they used artistic methods, thus proving that they were artists and not photographers, or by successful flukes. But in the best of these cases no one would ever say that the photograph had the same intrinsic value as the painting. I don't suppose any one would pretend that Mrs. Cameron's negative of Carlyle, or rather a solitary print from it, provided the negative was broken and all the other prints destroyed, possessed the same artistic value as Whistler's portrait.

But, it may be asked, then of what use is photography to artists? And why do nearly all of us use it? Because it is to many, as to you, a most interesting and fascinating study apart from our work. Again, illustrators are frequently compelled to produce drawings of subjects with which they are more or less unacquainted, and to render details which they do not know, and which they have not the time to draw. For example, last autumn I attended a great cattle-branding or round-up—a *Ferrade*—in Provence. I did not know the costume of the cowboy of the Carmargue: I had never in my life seen 5000 people dancing the *Farandole* at once; before I could draw the detail of one group they had disappeared; I say nothing of the absolute impossibility for any one, but a man who has devoted his whole life to drawing animals, of rendering the wild rush of a bull, followed by a hundred men on horseback across a great plain. Of course, had I been trained to use my memory, as I should have been, and as a Jap is trained, I could have put down a valuable artistic impression of the whole scene. As it was, I sketched with all my might what I could sketch, and made snap shots with my detective camera at the rest. I sent the exposures to London to be developed—I am unphotographic enough to merely pull the string; and the result was six good pictures and thirty-two failures, after nearly two months of waiting. As it was, I had not made half the number of sketches which I should have made; I depended on the camera and the beautiful day; I had forgotten many details, and I should have come off much better had I kept my eyes wide open and my pencil at work. I had no intention of making pictures; indeed, no photographer yet ever did make a picture. I only wanted facts, and the machine failed me miserably; and the beauty of it is, that it even goes back in this uncalled-for fashion, I believe, on the most experienced operators; while I had had very little practice with either my hand or my eye. Had I, on the contrary, been successful with these snap shots, they would have been invaluable to work from, and would have delighted artists who had not seen the *fête*, and who would have been in their regard in exactly the same condition as I was with the cathedral photographs before I saw the cathedrals. Again, had these photographs been successful, and had I drawn straight away from them without changing and composing them the results would simply have been photographs, and not anything like nature at all. This is a curious fact which I do not understand: a photograph may look quite right as a photographic print, but if you turn it literally into a drawing it looks altogether wrong.

Photography is especially beneficial to the illustrator, and more or less to the painter, in another way. With the introduction of the practice of photographing drawings on to wood or other material for reproduction, illustration assumed a rank and importance which it never held before. I do not wish to say that quite as good work was not done before drawings were photographed on to the block or the zinco as now, but the lot of the illustrator, and even of the engraver, then was certainly not a happy one; and the mass of really great works of art which have completely disappeared under the hands of the engraver will always be deplored. The artist was compelled to make his drawing in a certain definite fashion, and of the size in which it was to be engraved, on the block, or else it had to be copied there by some hack who was careful to take all the original feeling out of it. No attempt was made to follow wash drawings at all. The engraver had the artist in his power, and treated him as he wanted. I have heard this sort of wood-chopping extolled in these rooms as a proof of the engraver's artistic individuality! If the drawing was spoiled (or improved by him, as the engraver often called it), there was no proof of the fact, that the drawing made on the block had been entirely cut to pieces. This was the fate which befell Adolf Menzel, Meissonier, with all his most artistic work, Fred Walker, Pinwell, Rossetti, Fred Sandys, not to mention the men previous to this century. Now, the draughtsman makes his drawing by whatever method he wishes, only bearing in mind, of course, that it is to be reproduced, and the methods of reproduction, which require a considerable amount of study. It is photographed on to the block; if in line, now so accurately that not a bit of handwork need be put upon it for a process reproduction; if for a woodcut or tone block, being in wash, it does not come nearly so well, and the wood engraver has to correct it, while the tone block maker not infrequently ruins it. But the drawing remains, and can be referred to, and this mode of working has developed what is known as the American school of wood engraving, which is no more American than it is French or German; but is the delight of artists and the terror of incompetent engravers—that is, those who wish to give their own individuality, and not the artists' in their work. It has also enabled men of the artistic eminence of Timothy Cole or Charles Baude to reproduce pictures in a manner absolutely undreamt of until within the last twenty years. I do not say that the best process block is any better than a line woodcut by a great wood engraver. But only a great wood engraver can rival a good process, and the intelligent remarks in literary and artistic organs about the degeneracy of illustration and woodcutting and the growth of "beastly process," are but evidence of the ignorance of the people who write them. Not long ago I saw it stated in the *Saturday Review* that the difference between a photogravure and a process block was the paper on which they were printed. We neither ever had such good wood engraving nor such process reproductions as we have to-day, and for this photography is entirely responsible. But even here there is a danger; for pen drawings can now be made into photogravures so cleverly that it is all but impossible to detect them from etchings, and one critic has even gone so far as to say that they are etchings. The same argument, drawn to its logical conclusion, would make one of Goupil's photogravures coloured by hand the equal of the original painting from which it was taken. This has been so cleverly done as to deceive the author of the work; but to deceive the public, as I regret to say it is being deceived, is nothing less than forgery and obtaining money under false pretences.

Finally, if photographers would only turn their attention, as I believe they are doing, to the making of tone blocks, that is, the reproduction of wash drawings—which is not by any means so near perfection as the reproduction of line drawing—artists would be deeply grateful to them. Whether they can ever hope to reach the level of the best wood engraving, however, is doubtful, and this is a question for the paper-maker and printer as well.

The appearance of the photograph of the drawing on the wood block, or prepared for the half-tone block, is usually very weak and poor. The wood engraver only uses, or should use, this photograph as a tracing, that is, as a guide to the forms. The process block maker, on the contrary, tries to carry it as far as possible, and even finish it, without handwork, and the best results of this work are, as far as I can find, to be seen in the Guillaume reproductions, in the edition of the same name which includes the well-known Tartarin. But even here they do not at all compare to the best wood engraving. The trouble is—I do not know the cause of it—either that the delicate tones in the large original drawings do not photograph in their true value, or else that they are lost in the different processes. At any rate, up to the present, wood engraving is vastly superior to any process work for the reproduction of wash drawings, provided always that it is the best wood engraving, and that the wood engraver is in perfect sympathy with the artist's work. But any one whose drawings have been engraved on wood always finds that certain passages in his work have not been understood by the engraver, and, when the engraver is in America and the artist in England, an understanding is not very easily come at. What we illustrators want is some method of perfectly reproducing our wash drawings, as our line drawings are now approximately reproduced, by means of photography.

You may be surprised that I say photography is accurate in this connexion, after all I have just been telling you. It does change the look of a drawing enormously to reproduce it, but we understand perfectly what these changes will be, and can make allowances for them, while, as the drawing is simply done on white paper in black ink, we know pretty well what is going to happen; but if the minute colour or wash has to be reproduced the result is always uncertain. The mechanical effect which formerly existed on all tone work has been almost overcome, but we are never certain what pranks the process will play with our washes. The tricks of photogravure, which has far more chance of success, are, up to the present time, past finding out. Many artists fear that the improvement of these processes, especially that of reproducing wash drawings, will injure wood engraving. It never will injure the best, and in art certainly it is altogether a case of the survival of the fittest.

But, although I have no doubt that photography will aid artists in an infinitude of ways now undreamt of, so long as there is any love for art, it will never supersede it or become in any way its serious rival. Not that I question the ultimate popular triumph of photography. With the general public the greatness of the photographer is as assured as that of Mr. Henry Arthur Jones or Mr. Rider Haggard, and eventually the artist may be told by the people he has educated that he must go. From the saving remnant, however, he has nothing to fear.

BY POST!

THE importance of the Parcels Post to photographers can hardly be exaggerated. It is reasonably quick in delivery, and there is practically collection and delivery everywhere. The charges, too, are generally far lower than by rail, and are always certain and fixed in amount, and that in itself is an advantage of considerable importance. But safely in transit! There's the rub. Not that other carriers are free from danger in this respect; but, as has already been stated in

these columns, the Post Office officials acknowledge a sort of responsibility for broken negatives. By the following method, however, which has had a somewhat extended trial in practice, the risk of breakage or damage is reduced to a minimum, whilst the weight of the parcel is not greatly, if at all, increased by the amount of packing required.

First the box. This must be of wood, to *secure* safety. It may be of stout card; but, to be certain of freedom from a smash, it should be of light wood, and roomy. The inside of the box should be lined with a piece of "corrugated packing." This is the well-known packing paper much used by chemists and patent medicine vendors for wrapping round their bottles, &c., or other fragile things. A very marvellous protection it is, too, very light and clean in use. Having placed the strip of "corrugated" round the sides of the box, the body space must be filled up with sheets of corrugated packing, the ribs of which should be alternated, so that the strain or stress of an accidental blow will be divided over the whole surface of the packing. A sufficient number of sheets must be cut to fill up the box, so that, when the lid has been fastened down, everything inside is tight and free from shake. All that is required is to place the negative between two pieces of the packing in the middle of the box. The strip of "corrugated" around the sides of the box prevents damage in that direction, and the elasticity of sheets of packing in the centre of the box are a first-class, in fact almost a perfect, protection to the negative or glass placed between them. To secure safety in transit, a box to contain one negative only should be at least one and a half inch clear inside depth. If more negatives are to be packed in a deeper box, it is suggested to have at least four pieces of corrugated before the first negative, then a piece between each plate; and, lastly, four pieces on the top; and there should not be any shake when the lid is fastened down.

It is true that this method of packing costs a little more in the first instance than saw-dust, bran, or cotton-wool, but it is so infinitely preferable in every way, so safe, so handy, and in the end so economical, as to ensure a continued use if once tried. There is another precaution in sending photographs or negatives per Parcel Post which must never be omitted, and the neglect of which is probably responsible for most of the cases of breakage which do occur. Always write the address to where the parcel is to be sent upon a loose label or tag, attached safely by a string to the parcel itself, and place the stamps upon the back of the tag. These (the stamps) will then be cancelled by the office stamp without danger to the parcel. The tender mercies of the Post Office officials in the stamping line are too well known to need description. It is as well, as a precautionary measure, to write the name of addressee upon the body of the parcel in case the addressed tag is torn from its fastenings *en route*. With these precautions observed there is so little risk of breakage per Parcel Post that the refusal of the authorities to make good any loss or damage may be passed over as a negligeable factor.

S. Herbert Fry.

CARBON PRINTING.

[A Communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

Of all the processes, that of carbon or pigment printing seems to be the least known to members of our Association. This is to be regretted, as it is a method simple and beautiful in its working and beautiful in its artistic results—in fact, it is the only process which embodies in itself the necessary elasticity to suit the artistic requirements of photographers, as the colour and surface of the finished print can be varied according as the class of work requires, whilst the absolute permanence of the results is undoubted. It is now more than a quarter of a century since the first photographs in carbon were produced by Mr. Joseph Wilson Swan, or by his process, and these are still to the fore, untouched by the action of light, or chemical, or other actions which have been the cause of the fading away of so many once beautiful silver prints. The basis of the process is the action of light on bichromatised gelatine, which it renders insoluble, and not only it, but any colouring matter it may contain.

Carbon, or autotype, tissue, as it is called, is prepared by coating paper with an emulsion of gelatine and permanent pigment of the colour required. After drying it is made sensitive by immersing it in a five per cent. solution of bichromate of potash, and when again dry is ready for placing under the negatives. But a much simpler plan is to purchase it sensitive, ready for the printing-frames. In process of manufacture the Autotype Company render it sensitive to light by the incorporation of the bichromate, with the result that the least interesting and only troublesome part of the proceedings is avoided, and users have the assurance that the tissue is in its best working condition, which it will retain for a fortnight from the date of manufacture stamped on each packet.

Before printing, the negatives must have an edging of black varnish, an eighth of an inch wide, all round on the glass side to form a safe edge, the function of which is to keep the margin of the tissue quite soluble, to prevent the edges of the picture from washing up in development.

As the progress of printing cannot be seen, we must regulate that time by an actinometer, which is a box with a glass lid, on which are several tints of graduated densities; a slip of sensitive silver paper is pulled under these, and the box and the printing-frames are exposed to light. An average negative will take about two tints of Burton's actinometer, which is the one we have got here, and which you will see has six small negatives. When the second lightest of these is printed to the ordinary depth the tissue will be sufficiently impressed.

I have here pieces which have been so printed, and we will now proceed to develop them. Here I must mention that there is no gold bath or hypo bath used in the process, only clean water. First, pieces of the temporary support, which is waxed prepared paper, are soaked till limp in cold water, then the tissue is also put into cold water, and when it has nearly flattened out again, after first curling inwards, it is put on to the support, both being under water, and then both are lifted out together by the finger and thumb of the left hand. Now we place them upon this mounting-block and scrape out the water from between the surfaces. You see they now adhere together, and thus we will leave them for a few minutes. The action commenced by the light is continued in the dark, so that the development ought to be effected as soon as possible after printing, say, from one to three hours, or an allowance has to be made. Advantage can be taken of this continuation of action when the prints are known to have had too short an exposure; these, if left over night, will be found to develop the same as if they had had the correct exposure.

Now let us develop our prints which we left upon the temporary support; we place them in warm water at 105 degrees, and in a few seconds, when the coloured gelatine begins to ooze out at the edges, as you see, we skin off the paper on which was spread the compound in the first instance, and leave the greater portion on the temporary support. In this is imbedded our picture, and by dashing the warm water over it, allowing it to soak a little, and again dashing it, the picture reveals itself. It is properly developed when dark-coloured streaks cease to run from the print. If it has been over-exposed, as this one was done purposely, we have only to increase the temperature of the water, say, up to 115 degrees or more, and we can perfectly reduce it, as you perceive. If under-exposed we finish the development in cooler water and save the picture. Thus you see there is a very great latitude in this carbon process. When finished to our satisfaction, we give it a rinse in cold water and transfer it to a five per cent. solution of alum, which after ten minutes' action will free it from all traces of the chromic salt, and will render the gelatine quite insoluble.

Some of you might ask why the picture could not be developed on the paper of the tissue itself. This was a great stumbling-block to the early experimenters who tried it and failed. Because, as was argued, the light acts from the surface backwards towards the paper, leaving a delicate insoluble skin on the surface of the tissue (which, although not interfering at all with the brilliancy of the finished print, seems to hold the gelatine together during development, preventing it breaking up) and varying degrees of solubility in its thickness according to the different densities of the negative, whilst that portion of the tissue next the paper is left almost wholly soluble, and that therefore, if the picture is to be developed, that can only be done by dissolving away those portions of the tissue not acted on, or only partially acted on, by the light, and this can only be done from the back. Now, I particularly wish you to notice the evolution of the simplicity of the process as now worked. After the above theory was propounded, the first step was to coat a sheet of glass with bichromatised gelatine compound; this, after exposure, was coated with collodion, and then put into warm water, which attacked the soluble gelatine next the glass, and the picture floated off in a film held together by the skin of collodion. This was caught on a piece of paper, and the development of the picture finished. This was a somewhat difficult process, and I do not think ever got beyond the experimental stage. The next link in the chain was when, about 1862, Mr. Swan took out patents for improvements. Eventually he spread the gelatine compound simply on paper (like what we see here) and, after exposure, coated the surface with indiarubber solution, and mounted it on to a piece of paper coated in a similar manner by passing it through the rollers of a copperplate press. This enabled the paper of the tissue to be skinned off (as we have done to-night), and, after development, left the picture on the indiarubber paper. It

was, of course, a reversed one, and to overcome this he made a transfer paper with plain gelatine treated with alum; this, after softening in warm water, was laid upon the picture, and when dry the indiarubber temporary support was peeled off after moistening with benzine, thus giving the picture in its proper position. This was a perfect process, and by it some of the finest photographs have been produced. But with its heavy copperplate press, its messy indiarubber solution, and the use of the pungent benzine, it was hardly suited for general photographers. So, when, about 1868, Mr. Johnson, one of the founders of the subsequent Autotype Company, simplified it yet more, a great boon was conferred upon the photographic world. He found that no cement at all was required to fix the exposed print on to any support, but that it was enough to lay down the wetted tissue on an airproof and waterproof surface, remove the air and water from between the two surfaces by the use of the squeegee, as we did, and it would adhere by atmospheric pressure, caused by the vacuum created, in the same way as a boy's sucker or "clagger" sticks to the stone he wishes to lift.

Now we will take our prints from the alum solution. We notice they are reversed. But as the support has been waxed with a solution of resin and beeswax in turpentine, which allows the picture to be eventually stripped, we will take a piece of this final transfer paper, which has been soaking in a two per cent. solution of alum for about an hour, place it and the print in water, bring them out together, place them on the mounting-board, squeegee them, and hang them up to dry. When thoroughly dry they can be easily stripped off, leaving the support ready again for use after waxing. The support may be opal glass, when the print will take its matt surface.

This is the double transfer process necessary for ordinary negatives. A simpler one is the single transfer, but this requires reversed negatives or film ones printed from the reverse side. In this case the support is prepared paper without the waxing, and the print is finished as soon as developed, alumed, and rinsed.

It will be seen that the finished prints are composed of insoluble gelatine, of the nature of vellum, in which is imbedded a permanent pigment, and is of all the processes, platinotype perhaps excepted, the only one that can be absolutely relied upon for permanence.

In conclusion, I may say all patents for this process are run out, so that any who wish may use it without let or hindrance. All materials can be obtained from the Autotype Company, New Oxford-street, London.

J. Hedley Robinson.

ROYAL ACADEMY EXHIBITION, 1891.

We purpose giving some criticisms of the pictures in the Royal Academy, strictly from this point of view, that similar subjects could be very well produced by the agency of photography in black and white. There are many paintings which might have elicited attention to their composition, but which are without question quite outside the possibilities of photography. Therefore, only those have been looked at for this object which seemed to have been admirably adapted for the purpose of our remarks. Our object is, that photographers may as a body of picture-makers be somewhat guided in the class of work which demands their attention and sympathy.

It will be observed that in many of the paintings the full record of detail has been given to the salient points of each picture, leaving the other portions less positive in outline. This is much like the work of the photographic lens, which when carefully directed will also record as its sharpest matter the points to which has been carefully directed, whilst the other parts of the picture are allowed to be slightly (if very little) outside the sharp line of focus which prevails at the centre of the work, or that portion which the importance of the matter demands.

One of the very prominent points which arrests the attention in the portraits is the very marked absence of direct shadows from projecting features of the face, which it is now the fashion for photographic portraiture to be subjected to.

Now, as photography is credited with rendering nature with extreme fidelity, the pertinent question arises, Is it quite the right thing to subjugate portraiture when subjected to the realism of photography to such an extreme course of shading which modern productions have gradually developed into? A study of the portraits in the Royal Academy will afford the photographer a good lesson in light and shade treatment, and this would involve a higher study of half-tones and those general gradations of delicate markings which give positive character and assist so much in individual beauty.

Amongst some very careful arrangements of two or more figures in some of the paintings we particularly notice No. 594, Edwin Long, R.A., of a lady sitting with her young daughter, where the positions are exceedingly easy. They are resting on a white marble seat with flowers immediately at the back; these help to carry the lights from one figure to the other, the brightest lights are on the faces, probably a most trying matter to produce by photography, as also the lady has a dark dress, whilst her daughter (about fourteen) has a light one; thus these are extreme contrasts which produce good results, but it is the extreme delicacy of treatment of the flesh gradations which might be attempted in photographic work.

No. 372, portrait by Hubert Herkomer, R.A. This is a face against a light sky where the outline has been rendered very soft, but as the figure gets lower down so the outline becomes stronger; this is a fine study for half-tones.

No. 467, young lady playing the violin, by Edwin Long, R.A. There is nothing particularly instructive about this portrait, but it may be alluded to as a matter to which photographers should give attention, viz., whilst the fingers are on the third and fourth strings the bow is pressed upon the second string.

No. 514, *Sir Sydney Waterlow, Bart.*, by Hubert Herkomer, R.A. This is a specimen of a portrait lighted from the top, so that there are but small shadows. The good result is produced by fine tones and gradations of light and shade evidently produced by a top light.

No. 212, lady's portrait, by W. F. Yeames, R.A. This portrait is singular from the way in which the fingers of the right hand have been arranged; two and two apart, leaving a large space in the interval, which is not a pleasant thing to look at, because, if natural, it should hardly have been reproduced.

We have been much perplexed altogether by the general treatment of the hands in many of the paintings, a matter which demands close attention. It would seem as if the expression of the hands was not always in accord with that of the faces; this is a subject which, in photography, can hardly look so glaring, as both the face and hands are taken at the same moment of time, and, if to some extent not graceful, must at least be harmonious.

No. 218, by Henry T. Wells, R.A.—*Portrait of a Clergyman.* Here the hands are good, being very carefully arranged, and consequently are full of expression; but in No. 396, by the same painter, the only hand visible is positively weak, it is not in harmony with the expression.

No. 237, Sir J. E. Millais Bart, R.A.—A full-length portrait of *Mrs. Chamberlain*, exceedingly well arranged, simple in pose; one hand holding up the lower part of the dress, the lines of which have been well arranged so as to assume a very pleasant series of curved lines.

No. 631, by Hubert Herkomer, R.A.—Another portrait, lighted almost from the front. Attention is called to the delicacy of the retiring detail of the face; also the exceedingly good position of the hands, both being in harmony of expression, one resting on the knee, the other on a projecting corner of the chair.

A careful study of the best portraits will show this fact, that wonderful power has been given to the heads. Subjugating all the rest of the picture to that purpose, this can and has been done by photography, but it requires the most careful arrangement of the lighting to secure the best results. Another noticeable feature in the Academy portraits is the retirement of the backgrounds, which, although of great variety of tone, required by the different colours of the faces, yet they all retire; this arises from their not being solid masses of pigment, in other words, not perfectly flat backgrounds. There will be found portions where some lighter tone appears, as it were, to be floating about; this gives distance and consequent retirement, which is much desired in photographic portraiture.

We now consider genre subjects, but more especially making reference to those pictures which might have been attempted by photography, and we have in No. 3, *A Happy Pair*, by C. T. Garland, quite an arrangement which might have been attempted by the camera. The picture is a young girl posing—in the act of dancing with her favourite dog, who is standing upright on his hind legs: here is a very pretty subject, well arranged, which, apart from colour, might have been produced by photography.

No. 5, *The Spinster*, Edwin Long, R.A. Another subject, all possible by the camera; a very pleasant picture, where a girl sitting at a spinning-wheel is treated in a very delicate manner, the arrangement of the subject being all in one line, and so just the very thing for the lens to work upon.

No. 42, Seymour Lucas A. Another subject which has all been arranged for the flat. Two cavaliers—one standing, the other sitting—are gallantly talking to a waiting-maid. The scene is in the interior of an inn, where all the lines are at right angles to each other.

No. 48, J. B. Burgess, R.A. A priest leaving the luncheon-table, with book in hand, upon which have perched two birds; a waiting-

maid (on the same line of distance) is close by at the table, all of which compose a picture within the province of the camera.

No. 49, R. W. Macbeth, A. This picture consists of one female reposing by half sitting on a table, after playing at some game, and holding her tennis bat in her hand; a simple, prettily arranged picture, all within the focus of a lens.

No. 58, *Uninvited Guests*. W. Dendy Sadler. A picture of six figures, arranged on one line, very prettily composed for the leading lines of the composition. Four people at a table in a garden, when two intruders appear on the scene; all arranged, however, to compose a good outline, and for this purpose one of the figures at the table is standing up, which just breaks the otherwise straight line of the heads; another subject which would be possible by photography.

No. 257, W. P. Frith, R.A. A young Italian girl is standing in front view of the looker-on, holding a tambourine; very prettily arranged, a simple picture, quite possible by the camera.

No. 282, *An Enigma*. W. Q. Orchardson, R.A. Two figures seated on a sofa, something having been said by the lady which causes the gentleman to retreat somewhat; here the composing lines of the figures are antagonistic to each other, immediately suggesting some disagreement between them. All the accessories, furniture, and tall flowing flowers in a stand, have been arranged in one line; very simple, but very effective.

No. 298, L. Alma Tadema, R.A. A young mother leaning on and caressing her baby laying on a sofa. This composition, quite suitable for the camera, is very simple, being arranged at the same distance from the looker-on in one continuous line.

No. 356, G. A. Storey, A. Another picture of two figures, showing a good lesson in composition. A lady sitting in a chair full front to the spectator, with her spouse, also sitting in a similar way, who is reproving her for spending so much upon dress, as revealed in an account held in his hand. Of course, the simplicity of the subject-matter has been relieved by the costume, which is that of more than a century ago, but which can always be procurable, and would much assist similar studies if produced by photography.

No. 452, Miss H. Sutcliffe. A picture of three figures all arranged at one distance. A mother, with her infant child (undressed), and sitting in her lap, with a girl of eight years of age standing at her side, and holding cherries in her hand. A very simple arrangement, where all the draperies are light and are treated very tenderly. Another quite possible subject for photography.

No. 621, *A Village Idyll*. Edwin Harris. A simple composition of country folk. A youth, sitting by a fair young girl, discourses upon the everlasting subject-matter. The light comes in from a window behind the youth, whose face and figure is in half-tone, whilst the rays of light just impinge upon the face of the maiden. The whole picture is delicately treated, and is quite adapted to the work of the camera.

No. 665, *Waiting on Daddy*. Haynes King. A simple subject very carefully treated, a child waiting upon its father. The subjugation of the accessories to the figures has been well arranged, the strongest light being upon the child in white, which emphasises the effect in a very pleasant way.

No. 689, James Sant, R.A. A very prettily arranged young girl, with a dog, who seems resting upon the ground, whilst her pose is that of walking. The composition of the leading lines are worth a study, where all point to the face of the portrait as the principal subject-matter.

No. 972, Phil R. Morris, A. Portraits of five children. This looks almost as if it had been done from a photograph. They are posed round a table, on which is a glass globe with golden fish; the arrangement of the group is very simple, and very suitable for young people. The introduction of the glass globe is good, as giving a reason why they are all together.

THE AMERICAN PHOTOGRAPHIC TRADE.

An inquiry has recently been made by a Government department of the State of Massachusetts to discover what is the cost of wages and materials in the photographic trade of the Commonwealth. The primary object of the investigation was to obtain really sound and trustworthy information which would answer the question, "What relation does the cost of labour bear to the cost of the product as it stands when completed?" Such an inquiry breaks new ground, an investigation of this kind never having been made before.

The returns from the trade show that the cost of materials in producing a dozen photographs is 32 per cent. of the total outlay; 35 per cent. is allotted to wages, and 33 per cent. to such expenses as rent, taxes, insurance, classed as miscellaneous expenditure. In another example the division between wages and material is equal, 50 per cent. being reckoned for each. In the case of a dozen cabinet photographs 28·57 per cent. goes to labour, 28·57 per cent. for materials, and 42·86 per cent. as general expenses. Quite different are the figures for a crayon portrait. There labour takes 50 per cent. of the total outlay, the materials only cost 15 per cent., and general expenses 35 per cent.

Particulars have been obtained respecting the wages paid to 301 operatives engaged in the trade in Massachusetts, 196 being males and 105 females. Eighteen of these (all males) earn 4*l*. a-week and over, twenty-eight males and three females receive 3*l*., but under 4*l*., thirty-seven males and four females earn from 2*l*. 8*s*. to 3*l*., twenty-eight males and seventeen females are paid 2*l*. to 2*l*. 8*s*. a-week; the remainder receive wages varying from 2*l*. to 1*l*. and under, most of them receiving 1*l*. to 1*l*. 8*s*. The average working time is nine hours per day.

The actual number of photographic firms in Massachusetts was less in 1885 than in 1865, having decreased from 254 to 241, although the value of capital has risen from $215,376 to $587,058, and the value of stock used from $211,403 to $248,224 during this period. The value of goods made in 1865 was $513,559 against $936,165 in 1885, while the number of persons employed has decreased to 573 against 766.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

Bath Meeting, 1891.

Programme.

July 6.—Reception and Presidential Address.

July 7.—Excursion to Chepstow and Tintern.

July 8.—General Meeting. Meeting of General Committee. Convention Group. Papers from three p.m. to six p.m., and eight p.m. to ten p.m., *The Photographic Work of Herschel and Fox Talbot*, with illustrations (W. Lang, jun., F.C.S.); *Recent Developments in Printing Processes*, with illustrations (C. H. Bothamley, F.I.C.); *Recent Astronomical Photography* (A. A. Common, F.R.S.).

July 9.—*Day:* Excursion to Salisbury. Excursion to Bristol and Clifton. *Evening:* Report of the Lens Standards Committee. Discussion on Proposed International Standards, opened by L. Warnerke.

July 10.—*Day:* Excursion to Glastonbury and Wells. Excursion to Corsham and Laycock Abbey. *Evening:* Dinner and Smoking Concert (tickets, 5*s*.).

July 11.—Council Meeting.

Permission to photograph in the places over which they have control has been granted by the Right Rev. and Noble the Lord Bishop of Bath and Wells, the Very Rev. the Dean of Wells, the Very Rev. the Dean of Salisbury, the Very Rev. the Dean of Bristol, the Rev. C. E. Cornish (St. Mary Redcliffe), and C. H. Talbot, Esq. (Laycock Abbey).

The Bath Photographic Society have placed their meeting room and dark room at the service of the Convention.

The White Lion Hotel and the Royal Hotel will be the Convention headquarters during the meeting.

J. J. Briginshaw,
129, *Southwark-street, S.E.* *Hon. Secretary and Treasurer.*

Foreign Notes and News.

The *Société d'Encouragement pour l'Industrie Nationale* offers a prize of 1000 fr. for a shutter for instantaneous and time exposures. It must fulfil the following conditions: The exposure must be equal in time to half the time required for setting in action, *i.e.*, opening and shutting. The total aperture must be at least one-tenth of the total focal length of the objective with which it is to be employed. It is to be applicable to landscape cameras, and, if possible, to be adaptable to objectives of different sizes.

In the German Photographic Society the membership goes on steadily increasing from year to year, but just as steadily as the membership *increases* so does participation in the yearly exhibition of the Society *decrease*. It is suggested in the pages of the *Deutsche Photographen-Zeitung* that this result may be due to the criticism to which the exhibitors are subjected, and a proposal has been made to have the future exhibitions *anonymous*. Surely an arrangement like that adopted in the Æneid, Bk. V., for the athletic competitions, in which *all* run and *all* get prizes, would suit the exhibitors best.

Herr Veress is still continuing his experiments on colour photography. He has recently sent some more of his results to Dr. Liesegang.

It does not, however, appear that they show much improvement on his earlier ones. Red, green, and blue are said to to be well reproduced, but yellow is absent. The material employed was collodion emulsion paper. On immersion in a weak alcoholic solution of potassium cyanide the colours increase in brilliancy, and become partially fixed. One of the photographs, according to Liesegang, retained its colours in hyposulphite of soda.

According to statements published some time ago in German periodicals, it was a Berlin photographer of the name of Günther who was in 1864 the first to photograph lightning. This is now denied from America, and it is stated that a Mr. Hestler, of Chicago, so long ago as 1856 had obtained a daguerreotype of a flash of lightning, which was of a quality quite equal to those obtained at the present day.

A gentleman in Paris named Schlumberger has recently brought out a book copiously illustrated on the subject of bank-note imitation with the assistance of photography. One of the illustrations is so perfectly and admirably imitated that the authorities have commenced a prosecution against Herr Schlumberger for forgery. We await the result with interest.

Herr A. Pricam contributes a paper to the *Revue Suisse*, on the development of instantaneous photographs. He commences the process with a weak soda developer, and finishes with a more energetic potash developer. In this way he brings out the details first and then obtains the desired density with the second solution. The following are the recipes he recommends:—

I.—Weak Developer.

Solution A.

Warm water	1000	parts.
Sulphite of soda	75	,,
Eikonogen	15	,,

Solution B.

Water	1000	,,
Carbonate of soda	150	,,

Three proportions of *A* to be mixed with one proportion of *B*.

II.—Strong Developer.

Solution A.

Warm water	1000	parts.
Sulphite of soda	75	,,
Eikonogen	35	,,

Solution B.

Water	1000	,,
Carbonate of potash	150	,,

The mixture of the two solutions is the same as in the case of the weak developer.

Our Editorial Table.

"Name it."

A. Gray, 44, Snow-hill, E.C.

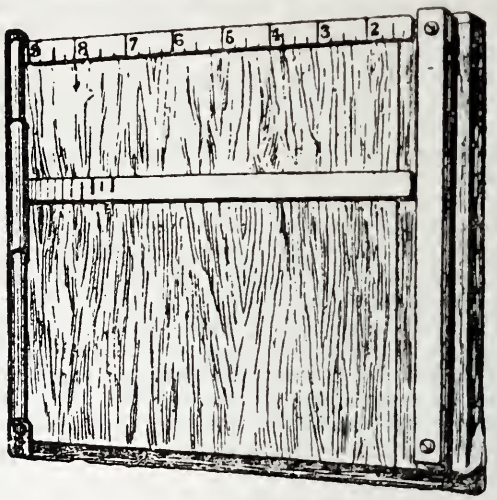
We have from time to time been subjected to an epidemic of questions as to how names or titles of subjects can be printed upon negatives so as to make each proof carry with it its own insignia. All difficulty on this score may be considered as terminated by the introduction of "Name it." It consists of a small fount of rubber-faced type of neat dimensions, together with every appliance for using the same. The title of the picture is "set" in a convenient holder; it is then inked by a pad which forms part of the outfit, an impression is made upon a thin transparent pellicle, which, when strengthened by bronze powder, is affixed to the foreground of the negative. We have tried the "Name it" outfit (which is sold at a cheap rate), and find it to answer its intended purpose admirably.

The Parallel Trimmer.

W. R. Baker, Wallington, Surrey.

The parallel trimmer, of which we give a cut below, is designed to trim prints with the sides parallel to the vertical lines, and this we find it does in an effective manner, having made our trials both with prints which resulted from negatives taken when the camera was not in a horizontal position when the exposure was made, and also from some in which the paper was placed askew in the printing-frame.

It consists of a flat board having at one side a round rod running from top to bottom, upon which slides a short tube, firmly attached to which is a brass straight-edge extending across the board. This, when lifted up, permits of the picture being laid down, and any particular vertical line in the picture being adjusted to it. On the side opposite to that carrying the rod is a flat brass rule, underneath



which is a plate of glass which forms a marginal continuation of the board. The rule stands sufficiently clear of the glass base, by spiral springs at each end, as to admit of the print passing underneath. The pressure of the fingers brings the rule down upon the print, and prevents its moving, while, with a knife passed along the edge of the rule, the print is trimmed with absolute squareness. One side having been trimmed, it suffices to place that side in contact with a wooden guide (which is graduated) at the upper ends and repeat the trimming operation with the remaining edges of the print. Dexterity in the employment of the trimmer is readily acquired. It is to be supplied by all dealers.

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in or Relating to Photographic Shutters.

(A communication from abroad by the Bausch and Lomb Optical Company, Body Corporate under the Laws of the State of New York, having its principal Office and Works at Rochester, New York, United States of America.)

No. 12,442. William Phillips Thompson, F.C.S., M.I.M.E., 6, Lord-street Liverpool, and 6, Bank-street, Manchester, both in the county of Lancaster and 323, High Holborn, Middlesex.—*March* 28, 1891.

The improved shutter consists of a series of leaves grouped around a central opening in a case or body, pivoted at their outer ends, and connected to a reciprocating ring, by which they may be opened and closed in unison. A spring-actuated drum, combined with detents, adjusting devices, and tripping devices, admits of the leaves being adjusted to produce an aperture of variable size for admitting light to the lens, and of the aperture being opened and closed at will for time exposures, or of its being opened and closed at one operation for "instantaneous" exposures.

An angular case or shell forms a portion of the lens tube, or is arranged at either end of the tube. It contains a series of thin blades or leaves sustained at the outer end by a pivot and provided with a crank pin. One of the blades is formed double or with two leaves.

A ring is perforated to receive the crank pins of all the leaves, so that when moved in one direction it will swing the leaves inward and cause them to overlap and close the opening, while on being moved in the opposite direction it will swing the blades outward and produce a gradually increasing aperture.

At its top the ring carries a stud projecting into a slot in a link, which is pivoted and provided with a stud entering a slot in a pivoted plate. The free end of this plate is connected by a pivoted link to the free end of a vibrating arm. The arm and link constitute jointly a toggle or knee-lever. The arm swings on the hub of a rotating drum pivoted to the frame, and containing a coiled spring which tends constantly to turn the drum to the right. The arm has on its back a stud which enters a restricted opening in the base of the drum, so that when the drum is turned to the right or left the arm is carried with it.

The link before mentioned has its pivot mounted on a lever pivoted to the frame, that it may swing to the right and left, carrying with it the link, so as to change the distance of the stud from the fulcrum of the swinging arm. Although the arm moves always through the same distance, this change in the position of the stud will cause it to impart a greater or less movement to the link, and through the latter to the shutter blades, so as to vary the size of the central aperture between them. The lever carries a stud, which enters an eccentric groove in a rotary disc. This disc is roughened on the edge, so that it may be turned by the fingers, and provided with numbers or graduations, so that by simply turning this disc to the required point the size of the aperture through the shutter, whether for focussing purposes or for exposure, may be regulated at will.

The shutter is closed by turning the drum to the left by means of its handle, and, when thus set, it is locked by means of a lever, the notched end of which

engages a stud on the drum. The stop lever is slotted to receive the pivot pin, so that the lever may turn on its pivot and also slide endwise. The end of the stop lever is connected to a tube or cylinder sliding over a tube connected by a tube with an elbow lever or other air-forcing device, so that when the bulb is squeezed the lever unlocks from the stud and allows the drum to turn forward under the influence of the spring carrying it with the arm,

When "instantaneous" views are required, the drum is permitted to turn forward to its extreme limit of movement during which the arm and link swing, thereby opening the shutter, and finally closing it again. The vibration of the lever causes the link to swing the arm upward and downward. The arm vibrates the link, and the latter raises and lowers the ring by which the blades are moved.

In order to stop the shutter when opened to make "time" exposures, a forked lever is pivoted so that its end may be set in the path of the stud. A spring acts at one end on the forked lever to throw its end out of the path of the stud, while at the other end the same spring acts to urge the locking lever upward and to the left. The locking lever carries a stud to act on the forked lever. Another lever pivoted to the frame has, at its lower end, a pin acting on the forked lever, so that, as the said lever is turned to the right it will hold the forked lever down and render it wholly inactive. If the lever is thrown over, it allows the end of the forked lever to rise into the path of stud.

When the forked lever is thus free, the action of the parts is as follows:—

It the shutter is set for action, the first impulse of the bulb will cause the locking lever to turn on its pivot and disengage from the stud. The drum will turn forward into position, when the stud will meet the forked lever and be stopped, holding the shutter open. The locking lever is now permitted to fall so that its stud will pass below the end of the forked lever. If the locking lever is now operated a second time the stud, lifting the end of the forked lever, causes the latter to disengage from the stud, whereupon the parts complete their revolution, closing the shutter.

In order to retard the motion of the parts, and to prevent concussion, the drum is provided with a transversely adjustable slide connected at one end by a link to a pivoted lever. The rotation of the drum causes the link to vibrate the said lever. Its vibration is resisted by a closed cap or cylinder pivoted to its end, and sliding over a plunger so fitted that the air can escape but slowly between them from the interior. This confinement of the air retards the motion of the cap, which in turn retards the movement of the drum and the shutter blades. By moving the slide, and thus changing the distance between the end of the link and the pivot of the drum, the leverage between the parts and the distance through which the cap is moved may both be varied, so that the retarding effect is modified by changing the length of movement of the parts and the leverage through which the spring acts upon them.

The movement of the slide is effected by a rotary disc, having in its back a spiral groove engaging a stud on the face of the slide. The operator has only therefore to turn the disc in order to vary the speed at which the parts move in opening and closing.

IMPROVEMENTS IN APPARATUS FOR USE IN DEVELOPING PHOTOGRAPHIC PLATES OR FILMS.

No. 5742. EDGAR FAIRWEATHER, 218, Devonshire-road, Forest Hill, Kent.—*March* 28, 1891.

IT consists of a dish with a transparent non-actinic bottom and top, the top removable so as to allow of the plate being taken in and out of the dish, and when in position to be proof against white light.

At the side, or otherwise if preferred, I place a funnel, or more than one if convenient, of suitable shape and size, communicating with the inside of the dish by means of a pipe and tap; I also place a cover on the funnel to prevent white light penetrating to the inside of the dish.

A waste-pipe is also fitted to the bottom of the dish to allow of its being emptied.

To develop, a plate is placed in the dish in a dark bag or box, and the lid placed in position; the dish may then be taken into daylight.

Solutions or water can be introduced into the dish by means of the funnel or funnels and extracted by means of the waste-pipe.

Development is watched through the coloured glass in the lid.

If a piece of looking-glass is placed under the bottom of the dish at an angle, development can also be regulated from that point.

What is claimed are:—1. In an apparatus for developing photographic plates or other substances carrying a sensitive film, the use of a dish having a transparent non-actinic top and bottom, and provided with a means of admitting to and drawing off therefrom solutions or water without exposing the plate under development to any injurious light, substantially as described. 2. The improved apparatus for developing photographic plates or other substances carrying a sensitive film, substantially as described and shown.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—May 14, Last lantern night of the season. May 21, Ordinary meeting. May 28, *Theory of Ordinary and Polarised Light*, Mr. A. Haddon.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—May 12, at eight p.m., M. Leon Vidal will read a paper on *Photographic Methods of Obtaining Polychromatic Impressions*. It is hoped that a collection of coloured prints will be on view. May 26, Subject for discussion, *The Influence of Development on Gradation*. June 9, Mr. Leon Warnerke will read a paper on *A New Sensitometer*.

DECIMAL PROSPECTS.—A joint deputation from the Associated Chambers of Commerce and the Decimal Association will be received by Mr. Goschen and Sir Michael Hicks-Beach on Friday, the 8th inst. (to-day), at one o'clock, to urge the Government to take the necessary steps for rendering compulsory the adoption of the metric system of weights and measures now generally adopted in other countries, as the first stage in the introduction of a complete decimal system.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 11	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 12	Great Britain	50, Great Russell-st., Bloomsbury.
,, 12	Derby	Society's Rooms, Derwent-bldings.
,, 12	Bradford	50, Godwin-street.
,, 12	Manchester Amateur	Manchester Athenæum.
,, 12	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 13	Photographic Club	Anderton's Hotel, Fleet-street,E.C.
,, 14	Birkenhead	Association Rooms, Price-street.
,, 14	Cheltenham	
,, 14	Manchester Photo. Society	36, George-street, Manchester.
,, 14	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 30,—Mr. W. E. Debenham in the chair.

A member produced a plate coated with collodio-bromide emulsion, and inquired whether the film was sufficiently thick, as it seemed to him to be thin.

Mr. H. MACKIE said it was quite thick enough, but it should be remembered that with collodio-bromide a different developer might be required for each make of emulsion. In reply to an inquiry as to whether bromide of zinc gave a denser image, he said that he had not found it to do so.

Mr. T. E. FRESHWATER suggested that it was now time to settle the Saturday outings of the Association, but the consideration of the matter was deferred to the next meeting.

Mr. J. J. BRIGINSHAW then gave a lecture on the *Polarisation of Light*, illustrated with the lantern polariscope. He said that the subject of polarisation could be dealt with either theoretically or experimentally. He proposed to confine himself to the latter. He would mention, however, that there were four ways of polarising—by reflection, refraction, double refraction, and by scattering, due to fine particles. The first experiment was one to illustrate total internal reflection from the surface of water. The lantern polariscope was then brought into use, and it was explained that selenite gave different colours according to its thickness, and it was also shown that by revolving the instrument the colour given by any slice would change into its complementary. A set of overlapping slices were shown, and it was pointed out that two slices each giving a certain colour did not yield a similar result to that obtained by the Chairman at the preceding meeting when using coloured films. A collection of natural objects was then put through the lantern, commencing with a section of perthite and including various minerals, and amongst organic substances an ordinary quill pen. The effect of pressure on glass was shown by the colours produced on tightening up screws holding a thick plate, and a piece of suddenly chilled glass was exhibited in which the strain had been fixed and made permanent. Slides of crystals of various chemicals in use in photography were displayed, including pyro, hydroquinone, tartaric and citric acid, and hyposulphite of soda, the last named yielding a fine display of colour. Salicine and succinic, suppuric and benzoic acid slides were also shown, the last named in the act of crystallisation. The lecture concluded with some remarks on the colours given by interference, illustrated by reflection from a soap film, and an illustration of scattering by precipitation from alcoholic solution of particles of mastic in water. The thanks of the meeting were warmly accorded.

Mr. WEIR-BROWN said that the depolarisation of light had recently been utilised by Mr. Claydon to photograph clouds in the highest altitudes; light cirrus clouds that would otherwise come out about the same intensity on the plate as that of the blue sky which formed the background. This was done by means of a mirror of obsidian or black glass, placed so as to reflect the image at an angle of about 30° 20′.

Mr. A. HADDON said that this was due to the well-known fact that the light from the blue sky was polarised, whilst that from the clouds was not so. Sir Charles Wheatstone pointed this out, and some two years ago Mr. Whipple proposed to utilise the fact by photographing light clouds in the way described. As a mirror he thought plain glass, coated at the back with the mixture advocated by the Chairman as a plate backing, consisting of burnt sugar and gum or gelatine, should answer very well.

Mr. WEIR-BROWN said that Mr. Claydon had thought his experiments in photographing clouds were original, but afterwards found that the method had been used before.

The CHAIRMAN, in expressing his thanks to the lecturer, said that the meeting had been treated to a gorgeous display of colour, and no doubt it had whetted the appetite of the observers for Mr. Haddon's promised lecture on the subject, in which the causes were to be explained. The display of complementary colours, caused by revolution when selenite was used, helped to illustrate his observations on the preceding occasion, when the question of real complementary colours was discussed.

Mr. Rawlings was elected a member.

It was announced that the 14th inst. would be the last lantern night of the season, and on the 28th Mr. Haddou will lecture on the theory of light, ordinary and polarised.

CAMERA CLUB.

ON Thursday, April 30, Mr. J. TRAILL TAYLOR read a paper on *Lantern Optics*. Mr. Lyonel Clark took the chair.

Previous to the lecture the Secretary handed round specimens of clear gelatine for lantern slide purposes, brought to the meeting by S. T. Chang.

Mr. TAYLOR first discussed the essential qualities of the several parts of the optical lantern, and then proceeded to describe a special form of condenser, calculated to supply the most perfect conditions for working.

Commander GLADSTONE, amongst others, discussed the quality of glass used in lantern condensers. The greenish glass not only cut off the light, but affected the colour of the print. He thought that no doubt the system advocated by Mr. Taylor was the right one.

Mr. ELDER mentioned Professor Boys' method of protecting his condensers from heat.

The discussion was carried on by Messrs. W. H. Harrison, Kupteyn, Little, and the Chairman. A vote of thanks to Mr. Taylor was carried by acclamation.

Thursday, May 14, will be a lantern evening.

HOLBORN CAMERA CLUB.

MAY 1,—Mr. T. O. Dear (Vice-President) in the chair.

Mr. James Sharpe and Miss C. H. Morgan were elected members.

Mr. E. H. BAYSTON then read an article from *Adams's Annual*, by Arthur S. Newman, on *Photographic Shutters*. In it the writer, in dealing with the various forms of shutters, described the direction of the movement of the shutter, the position in which the shutter was used, and the manner in which the resulting image was affected by alternatives in the direction of the movement, or of the position in which it was operated; and, in conclusion, he thought the following would be found a fair and reasonable answer to the oft-repeated question: "Which is the best shutter?" "*For speed*—one working in or near the diaphragm slot, and having a direct and continuous motion, either rectilinear or rotary; or, if absolute correctness of image is not important, one working just in front of the plate and having a narrow aperture across the blind. *For fine definition*—one working at or near the diaphragm slot, and opening from and closing to the centre. *For studio work or photographing animals*—one contained in the camera and easily operated from the outside. *For increasing foreground exposure and adaptability to several lenses*—one opening up and closing down, and fitted on the hood, or front of the lens. *For evenness of illumination*—one having a direct motion."

Mr. Bayston illustrated the article by showing several forms of shutters now on the market.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

APRIL 25.—A number of the members took part in the field day as arranged, and proceeded to Edgware.

APRIL 27,—Mr. F. L. Pither in the chair.

Mr. DICKENSON exhibited and explained the action of the Radial hand camera, and showed samples of eikonogen cartridges, which were distributed among the members.

Messrs. GOODHEW and COX reported that they had tested the plates sent by Messrs. Marion & Co., which they had found of good quality, as shown by the prints exhibited.

Mr. TAYLOR showed prints on the chloride of silver emulsion paper sent by Mr. O. Scholzig, and said he had found it easy to work, great variety in the tone being obtained.

A special meeting was then held to elect a President in the place of Mr. Humphries, resigned. Mr. J. W. Marchant was elected by a large majority. In returning thanks he said the welfare of the Club would ever be his first consideration.

THE LANTERN SOCIETY.

APRIL 27.—Mr. E. W. BULKELEY gave a lecture on *The West Indies*, illustrated by Mr. F. York's fine set of lantern slides.

This was the last meeting of the session, and the meetings of the Society will be resumed in October next.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

MAY 1,—Mr. J. A. Carter, M.A., in the chair.

Mr. D. E. GODDARD, F.R.M.S., read a paper on *Elementary Silver Printing*. Apologising for the elemental character of the paper, Mr. Goddard, in an interesting way, set forth the whole routine of silver work from sensitising one's own paper to the finished and mounted picture. A series of pictures, showing results to be obtained by printing under different coloured glasses, were exhibited. At the conclusion a very lengthy discussion ensued, in which Messrs. J. Weir-Brown, Marriott, and the Chairman took part.

Mr. WEIR-BROWN then called attention to the necessity of having a fixed subject for the Friday meeting nights, whereby, instead of simply meeting for ordinary conversation, it would be more beneficial to have a short paper and so form a groundwork for a discussion which would follow.

Saturday, May 9, whole-day excursion to Arundel; conductor, Mr. J. Purser

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

MEETINGS were held on the 24th ult. and 1st inst. At the former, Mr. Ramsay in the chair, the *Photography* prize slides were shown. The meeting on the 1st was important and interesting, the subject being *Hand Cameras*, and, many makers having kindly responded to the Secretary's invitation to send an exhibit, members had the opportunity of inspecting many of the best-know types, and in several instances having them explained by representatives of the manufacturing firms. The attendance was unfortunately below the average. Mr. Ardaseer presided. Mr. Parker showed his "Companion" hand camera, fully making good his claim on its behalf to extreme simplicity of movement. Mr. Smith, of the Eastman Company, had specimens of the whole series of Kodaks, eight in number, and very ably explained their working and distinctive characteristics, touching also upon the manipulation of the rollable film. This led to a short discussion upon films, the merits of which were warmly espoused by Major Nott. Mr. Smith also showed two 15×12 enlargements from Kodak negatives, which not only might be, but had been mistaken by experienced photographers for direct prints. A representative of Messrs. Marion & Co. showed the "Radial" with its novel plate-changing arrangement, and Messrs. Mawson & Swan followed with the original and improved pattern "Reflex," which has a focussing mirror and roller-blind shutter working next the plate. Messrs. Watson & Sons had sent the "Vanneck," which was explained by the Secretary, and Mr. Cembrano had been entrusted with and described specimens of the "Zodiac," by the London Stereoscopic Company, the improved "Facile," by Fallowfield, and the "Key" of the Platinotype Company. Members present also showed hand cameras of which they were the owners, impartially stating their merits and drawbacks. Commander Tudor produced Shew's "Eclipse:" Mr. Ramsay, Watson's old pattern and the Stereoscopic Company's "Artist" (twin-lens); Mr. Garrett, the "Ideal" (Adams); Major Nott, a camera of his own design of extreme lightness and simplicity, which had done good work all the world over; and Mr. Cembrano wound up a most instructive evening by showing a camera designed for use with several different lenses and just specially made for him by Mr. Newman.

BATH PHOTOGRAPHIC SOCIETY.

APRIL 29,—Mr. Pumphrey presided.

The principal feature on the programme was provided by Mr. E. Lambert, who gave a brief discourse on the use of single meniscus lenses for portraiture, illustrating his remarks with examples of work produced as indicated. Among the subjects chosen were some well-known local celebrities.

An interesting discussion followed, in which the Chairman, Messrs. Braham, Harbutt, and Middleton Ashman took part.

Announcements were made from the chair concerning the visit of the Convention in July. It was also decided to discontinue the indoor meetings during the summer, and start the excursions on Wednesday, May 27.

A dark-room candle lamp "the Champion," was sent for exhibition by Mr. Yabsley.

Some defective bromides and ordinary prints of large size were shown by two members, to illustrate faulty material occasionally met with.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 30,—Mr. Paul Lange (President) occupied the chair.

The following were elected members of the Association, viz., Messrs. W. R. Melly, W. N. Samuelson, J. Pickering Jones, Thomas Wynne, M. Sanders, C. F. Burne, and W. L. Elsworth.

The President exhibited Mr. Friese Greene's hand camera, enabling as many as sixty consecutive photographs to be taken in one minute.

Mr. JOHN PRICE explained Voigtlander's (5×4) hand camera lens, also Ross & Co.'s Universal Symmetrical lens.

Mr. J. T. Norman Thomas showed a framed picture of a view on a lake, representing four swans in the foreground, whereas when the photograph was taken only two were on the water. A number of reasons were assigned for the phenomenon—some of them amusing—the most likely one being that a double exposure had been given, and the swans in the meanwhile had sailed nearer to the camera.

Mr. THOMAS S. MAYNE (Exhibition Secretary) then made a statement regarding the probable financial results of that undertaking. The accounts, it was expected, would be ready for the meeting on the 28th inst. Although the success had far exceeded all expectations the expenses had been very heavy, but it was anticipated the net profit would be about equal to that of the former exhibition of 1888, which resulted in 250*l.* being handed to the Society's Treasurer.

Mr. JOHN WOOLFALL explained the progress that was being made to get the long-delayed return Boston set of slides completed.

The PRESIDENT drew attention to the excursions for the present session, the first of which had been arranged for Saturday, the 9th inst. (whole day), to Chirk and neighbourhood. Permission had been obtained from Colonel Myddleton Biddulph to photograph the Castle, and an excursion would be made to Quinta—another beautiful mansion, a Chatsworth in miniature.

Mr. J. A. FURNIVEL, of Manchester, then gave a description of the optical lantern, explaining its various parts, jets, gas cylinders, &c., and after the lantern had been lighted up, some curious sound experiments, which represented the waves of sound of the human voice on the screen. Some beautiful microscopic slides were also shown, and the adaptability of the lantern to microscopic work explained. As Mr. Furnivel exhibits for Dr. Dallinger, Sir Robert Ball, and Professor Muybridge, his lecture was most valuable to those who manipulate the optical lantern and are engaged in its use.

Correspondence.

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

THICKNESS OF GLASS IN SMALL PLATES.

To the EDITOR.

SIR,—May I call your attention to a subject which I venture to think requires consideration, and which I trust you may recognise as one worthy of public ventilation, viz., "The thickness of glass used for the small sizes of photographic dry plates?" In a packet of a dozen I have frequently found some a bare one-sixteenth of an inch thick, whilst others have measured a full eighth of an inch. In consequence, camera makers now

allow a full eighth of an inch of space in the dark slides for the accommodation of the dry plate.

This means that the Alpine climber and the photographic traveller are compelled to carry unnecessary bulk and weight of wood as well as glass.

If plates of an uniform gauge of one-sixteenth of an inch could be obtained, many hand cameras of the magazine type might carry double the number of plates they now do without increasing the dimensions of the instruments.

I feel sure the enterprising makers of dry plates will best study their own interests and those of the public by giving the matter most careful consideration. Such a decided reduction in bulk and weight, both of plates and apparatus, as would be effected if one-sixteenth of an inch were adopted as the gauge of plates for small field cameras, would tend to reduce the popularity of substances now to some extent employed as rivals to glass for supporting sensitive photographic emulsions.—I am, yours, &c., ARTHUR RAYMENT.

99, *Hatton Garden, London, E.C., May* 1, 1891.

CANADA AS A FIELD FOR PHOTOGRAPHERS.

To the EDITOR.

SIR,—I am in receipt of a letter from Messrs. Percy Lund & Co., in which they ask me if my note of warning referred to their Canadian Federation scheme. They say that my letter to THE BRITISH JOURNAL OF PHOTOGRAPHY is calculated to damage their business interests. They also send me a prospectus of the scheme, from which I learn that the gentleman who discovered Canada as the "happy hunting grounds" for photographers is to receive 250*l.* for himself, and that as soon as the company arrive at their destination they assume the whole responsibility for the success of the party! "Great Scott!" Let me tell intending emigrants something about Canada. I know the state of trade in Canada at the present day, as I returned to England only last January, after a stay of over four years.

In all parts of the Dominion there are already too many photographers. In all large towns and cities there are good all-round men walking around looking for a job, and would be willing to work for anything they could get, and the men who have work are working ten hours a-day, in most cases for from 20*s.* to 25*s.* per week. In the city of Toronto there are thirty-five photographic galleries which I could name, and there are only two houses in the lot where they can get a respectable price for portrait work. The highest price obtainable for cabinet work is from 16*s.* to 20*s.* per dozen. There are over thirty of the number who are making cabinets from 4*s.* to 10*s.* per dozen. There are several firms who advertise to make cabinet portraits for one dollar per dozen. In every town it is the same—very keen competition all over the Dominion. I know one man in Peterborough, Ont., who was making cabinet portraits for 75 cents (3*s.*) per dozen all one season. Ferrotypes can be obtained everywhere at a quarter of a dollar for two, and gems at half a dollar for twenty-five. If there were such golden opportunities there would not be so much keen competition and cutting prices.

If you go away West where there are no photographers, you will find no people except farmers, and very frequently you may travel twenty miles without seeing a human habitation. Just imagine going to a farmhouse and making a ferrotype of the family, and getting a quarter of a dollar for it, and then tramp twenty miles before you can get another job! The farmers do not handle much money, and if any one does a job for them they want you to take payment in potatoes or cabbages.

Three years ago there were a party of six Yankees went all through Canada working at a very cheap rate. They gobbled up everything in the way of outdoor work; and last season there was another company started, and they busted in less than a month.

Now, to finish up with, I might just say that the price of photographic stock in Canada is fully thirty per cent. more than in England. I might also state that my statements are not directed against the business interests of any firm whatever, but in the interests of all photographers, both British and Canadian.—I am, yours, &c., GEORGE OAKLEY.

184, *Avenue-parade, Accrington, Lancashire.*

To the EDITOR.

SIR,—Under the heading, "Emigration Scheme," I notice an attractive advertisement in an English photographic paper calling on photographers with 50*l.* to hand the same over to a gentleman who will conduct them to Canada. The same enterprising gentleman gives them to understand that they are going to fill a "long-felt want" in Canada. I think he is mistaken, for the feeling now here is that a number of photographers will have to seek some other employment, the business being run to death.

Cabinet photographs can now be had in almost every town for six shillings per dozen, and considering that materials cost nearly twice as much as they do in England, there is "sport in abundance" for the man who tries to make a living at it. Such competition in the portrait line has naturally driven men into other branches of the business, such as following lumber camps, taking houses and groups on spec., &c. It has all been well done.

By all means let photographers come to Canada if they want to, but I should advise them to hang on to their 50*l.*, so that they will have the means of returning or investing as they see fit.

You yourself, Mr. Editor, are well acquainted with the conditions here, as I had the pleasure of meeting you in this city, and I think a few words from you might be of value to intending emigrants. We are still in want of farm labourers and domestic servants.—I am, yours, &c.,

89, *Bay-street, Toronto, April* 17, 1891. J. G. RAMSEY.

THE WOLF AND THE LAMB.

To the EDITOR.

SIR,—I have a grievance against the General Post Office which, in the interests of the entire trade, should, I think, be made public.

The facts are these:—Having been favoured with an order by a customer in the west of England for an enlarged negative 12 × 10, I on the 3rd April despatched the same, carefully packed, to its destination by Parcels Post. On the 7th of April I received notice from my correspondent that the negative had arrived broken (in two pieces only), he—a commercial man—admitting that it was well and carefully packed. I immediately posted my correspondent's letter to the Secretary of the G.P.O., and received on 9th April the usual formal acknowledgment, which I noted contained the following clause:—"It should at once be stated, however, that photographic negatives are considered by the Department to be of such an exceptionally fragile nature that compensation for damage can only be given where there is clear evidence of negligence or wilful injury in the post."

Though in my printed list I expressly state that "all possible care is taken of negatives, but no responsibility is undertaken for injury while painting or during transit," I nevertheless made and despatched immediately, packed in an exactly similar manner, a second negative, wishing to spare my correspondent inconvenience from delay pending the remittance from the G.P.O., but in view of the above clause in my list, and feeling my lamb-like helplessness in any argument with the official wolf, I charged my customer half the usual cost. On the 18th April the following to hand—I quote from the letter:—"I received the 12 × 10 negative this time all safely. I cannot, however, understand the invoice. You charge me with half the risk of the first negative which was broken, but you have of course (or will have) got your 8*s.* 6*d.* from the postal authorities. An official from the Post Office called to see the broken negative and box a few days since, and appeared satisfied it was well packed and that the damage must have been due to rough usage in the post."

Similar personal attention was evinced in the matter at this end by two calls from an official at these works, and on the second occasion he left me so convinced that I should receive what can only be regarded as just compensation, that I cancelled the claim on my customer for half risk. Judge, therefore, of my surprise at receiving this morning the following:—"Sir,—With reference to your application of the 8th ult., I have to inform you that careful inquiry has been made at each of the offiees through which the parcel sent by you passed, but nothing has been elicited to afford ground for supposing that it received rough usage or wilful injury during transit, and when delivered it was to outward appearance in good condition. In the circumstances and for the reasons stated in my communication of the 9th ult., your claim for compensation cannot be allowed. The postage cannot be refunded.—I am, sir, your obedient servant, S. A. BLACKWOOD, *Secretary*."

Now, sir, as a interested party, I am fully aware that "my opinion" must go for what it is worth, but I should be pleased to hear your opinion, and that of some of your readers, for whom the matter may possess commercial interest on the abstract case of two boxes admittedly adequate in strength, each containing a piece of glass 12 × 10 admittedly well packed, each travelling 250 miles by Parcel Post, each—to all outward appearance—in good condition when delivered, yet the glass in one is whole, while the other is broken into two pieces only.

Why, sir, the "careful inquiry" consisted, I presume, in a few questions to the parcel carrier, who could hardly be expected to criminate himself by saying he let the parcel fall, or while sorting threw it from one side of a room to the other (which I am informed is done), and I maintain that the slight damage of being broken into only two pieces is the best possible evidence "to afford ground for supposing that it received rough usage during transit," for only a sudden jarring concussion could have done it "in the circumstances and for the reasons" which must be apparent to any but an official wolf having a lamb at his mercy.—I am, yours, &c., J. MARTIN.

Printing and Enlarging Works, 4 and 5, Park-villas, New Southgate, N., May 2nd, 1891.

TRADE CATALOGUE.—Mr. James Stuart, Frederick-street, Edinburgh, has sent us his new catalogue. It is so arranged that the left-hand page is devoted to hints and instructions, the page on the right being a price list of all that is required in photography.

ON Monday the Vienna Amateur Photographic Exhibition was opened by the Archduchess Maria Theresa. Among the exhibitors are the Princess of Wales, the Archduchess Maria Theresa, the Grand Duke of Tuscany, Count Bardi, and both Barons de Rothschild. The exhibits of English photography are much admired.

Exchange Column.

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

Will exchange a whole-plate portrait lens for a half-plate rapid rectilinear or symmetrical.—Address, E. PINFOLD, Upper Tooting.

Dallmeyer C.-D.-V. lens, good as new, with stops complete. Offers. Wanted, wide-angle lens, short focus, to cover 12×10.—Address, T. J. LLOYD, Photographer, Coventry.

Wanted, 20×16 or larger camera, long focus; will give in exchange Seavey's backgrounds, twenty to choose from.—Address, FRANZ BAUM, Manchester, or 12, Old Bond-street, W.

Would exchange a quarter-plate camera, mahogany bellows body, with double slide, lens, plates, and chemicals, for watch or jewellery, and pay difference.—Address, F. BURNS, 105, Cornwallis-road, Upper Holloway, London, N.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

COLOURIST.—The work is now out of print.

H. L. MOREL.—Let the angle of the roof be from forty-five to fifty degrees; sides, eight feet.

F. R. FICKEN.—Thanks; we shall treasure the specimen. It is by one who flourished over thirty years ago.

T. RAMSELL.—Mr. Warnerke has not published any book on the process. Everything known has appeared in our pages.

A. SEDGWICK.—If the picture was taken by the operator, and registered in the name of the employer, it is not legally copyright.

IVY.—Messrs. Marion & Co., Soho-square, will probably supply the backs without the glasses. Communicate with them.

R. E. CHESHUNT.—1. Both Rouch and Fallowfield make such magazine cameras.—2 and 3. Fix without toning, and dry without attaching to glass.

F. H.—We believe that some information concerning Sir W. Thompson's water tap is now, or recently was, to be found in the advertising columns of the *Engineer*.

ESPERANZA.—Either of the "rapid" lenses mentioned will answer for enlarging. The films are well adapted for skies. Use a small stop, and give a rapid exposure.

CAMERA.—1. More than one form of the camera alluded to is patented. 2. Sutton's camera is not patented, but it differs materially in its details from Lomas's camera.

G. PAGET.—There is no existing copyright in Hogarth's original engravings. If there were, it would be equally as illegal to reproduce them for lantern slides as paper pictures.

C. J. W.—The euryscope and the rapid rectilinear lenses will be of equal rapidity when stopped down to the same ratios. With full aperture the former will be the quickest.

DENSITY.—If you use plates that are richly coated, there will be very little if any blurring, more especially if you back them. Better try another developer than that which you have been using.

B. O. MALLEY.—We do not imagine that any dry plate makers would undertake to clean off old collodion negatives and recoat the plates with gelatine emulsion. They prefer to use new glass.

AMATEUR (Sutton).—Xylonite dishes are quite trustworthy for general photographic purposes; but they must not be used for acetic acid or alcohol, both of which are solvents of the material.

F. A. B.—If you do not obtain good results from dry-plate transparencies, try carbon ones. Most of those who make enlarged negatives, as for carbon enlargements, work from carbon transparencies.

B. W.—A licence of 10*s.* a-year has to be paid to use a still, if only for distilling water. But the licence will not permit of the redistillatiou of methylated spirit with the view of strengthening it or of removing the methyl. To do this is illegal.

C. BIDFORD.—A few of the automatic machines are at work, and we have seen some of the portraits taken by them, though we cannot say much in praise of them. The various machines we ourselves have seen happened to be closed, or out of order, at the time, or we should have invested a penny.

STUDIO says he has met with "the greatest consideration" from a large number of amateurs, and he considers that professionals are somewhat jealous of amateurs, and considers himself an injured man because the amateur takes a few portraits of his friends, in return for which he gets laughed at.

W. COLLINS complains that his mackintosh focussing cloth stick together when folded up and allowed to lie out of use for a time. He asks if there is any remedy. Evidently the rubber is decomposing, as some rubbers are apt to do. The best way of preventing the sticking is to rub the surface well with French chalk from time to time.

NORMAN.—The design for studio, sketch B, will be far better for portraiture than that marked C. This, however, would be the best for copying purposes. A we do not like at all. The light would be difficult to manage, particularly when the sun was bright. Nothing is better for portraiture than the old ridge roof or the "lean-to."

C. PHIPPS says he has a batch of ready sensitised paper which absolutely refuses to tone to anything beyond a red, and to that only after a very long time, no matter what bath he used.—Try the effect of immersing the print in a very weak solution of common washing soda for a few minutes before toning. This will often overcome the difficulty.

S. S. S. says he makes up a new bath each time he tones, and precipitates the gold with a solution of sulphate of iron when the toning is finished. But he finds, sometimes, that no precipitate is formed on the addition of the iron, and asks the reason.—In such cases we presume all the gold was exhausted by the prints, hence none remained to be precipitated.

R. G. inquires: "How many quarter-plate papers should a tube of gold, containing fifteen grains, tone, or how many quarter-plate papers will one grain of chloride of gold tone?"—This will depend on the depth to which the toning is carried. Purple and black tones require more gold than red or brown. One grain of chloride of gold is generally reckoned to tone a full-size sheet of paper, 23×18.

COLLOTYPE.—You are quite correct; parchment paper expands considerably when wetted, and contracts again when dried. This property is taken advantage of in capping bottles. The paper is wetted and allowed to expand, and in this condition is tied over the cork. When dry, the paper contracts, and becomes tight. This property must be taken into consideration when working the paper method of collotype.

W. DUDDELL writes: "Will you kindly tell me if the following statements in Captain Abney's presidential address at the Conference of the Camera Club, as reported in your issue of April 24, are correct? 1. The nearest size to English half-plate, 6½ × 4¾ inches, is 26×18 centimetres. Taking 1 centimetre as equal to ·4 inches, 6½ × 4¾ inches is 16·25 × 11·875 centimetres. 2. 26×18 centimetres is a size largely employed abroad."—Evidently this is a mistake. Probably the ordinary whole-plate was intended.

U.S.A.—1. Vitrifiable pigment has certainly been applied to and printed on paper coated with gelatine, but we do not know of collodion having taken any part in it.—2. *Hardwich's Manual*, ninth edition.—3. We do not know.—4. You will find the demonstration recorded among the transactions of the Society in both the journals of the period, but of the precise date we are at present unaware.—5. Dr. Vogel's emulsion with acetic acid was introduced about 1881, or soon after. You will find some mention of it in the American journals of that time.

MARMION says: "I am a retoucher, and have been at work at various places for the last five or six years, and up to date have had no bother or trouble in connexion with my work; but for the last week have been troubled with a peculiar twitching of the second finger. I may state that I work with my left hand. The twitching is a 'horizontal movement,' if you can understand me. I should be pleased to hear whether you can give me any information as to the probable cause."—Perhaps some of our readers can suggest a remedy. Some persons who do much writing, at times suffer from inconvenience in the fingers. But then we think it takes the form of cramp, rather than a twitching, as in the case of our correspondent.

PRINTER asks:—"Will you give me your opinion of the following toning formula, which has been given me by one of the leading albumenising firms:—Chloride of gold, 48 grains; acetate of soda, 2½ ounces; carbonate of soda, 2½ drachms; water, 144 ounces. To strengthen bath add 4 grains of gold for every four or five sheets of paper. My desire is to obtain rich warm-toned silver prints. Each batch of prints is well moved about in three changes of water previons to toning, but I fail to get the results wished for. An answer will be greatly esteemed."—The formula quote is an excellent one, and one capable of yielding a great variety of tones. But it is in a too concentrated form for use without dilution. With twice or thrice the quantity of water it would be more manageable in inexperienced hands.

THE Woodbury Company's business at Ealing has been acquired by Messrs. Eyre & Spottiswoode, the Queen's printers.

LIVERPOOL CAMERA CLUB.—The ordinary meeting will be held in the rooms, Liverpool College, Shaw-street, on Wednesday, May 13, at half-past seven. Business, *Bromide Printing*.

WE have received from Colonel J. Waterhouse, India, a pamphlet, *Further Notes on Reversals*, &c., and with it some charming examples of the results obtained by Colonel Waterhouse.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 13, *New Hand Cameras*. May 20, *Hand Camera Possibilities*. Saturday outing, May 9, Dagenham. Train from Fenchurch-street at thirty-two minutes past two. Meet at Dagenham Station at quarter past three o'clock.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1619. Vol. XXXVIII.—MAY 15, 1891.

PHOTOGRAPHY AS A HELP TO ARTISTS.

The full text of the paper contributed by Mr. Joseph Pennell to the Camera Club Conference last month is now before our readers, who, we have no doubt, will quite understand Mr. H. P. Robinson's avowed inability (see p. 232) to regard it as other than "a sort of joke" which "ought to be received in solemn silence." This is a fitting fate for jokes of an inferior quality. In the discussion which followed the reading of this curious deliverance and at which, it should be borne in mind, the author was not present, Mr. Joseph Pennell's possession of any art knowledge was disputed, while his claim to speak on behalf of artists was not proved. There was no need to deny him an acquaintance, even of the most elementary kind, with photography, since his paper teemed with evidences of the greatest possible ignorance of every branch of the subject.

Mr. Pennell's paper was the result of an invitation which, we suppose, he regarded as such a compliment that he found it impossible to decline it. For the future guidance of those who are charged with the duty of providing papers for photographic meetings and discussions, we would humbly suggest that an endeavour be made to ascertain whether those persons to whom it is contemplated to issue invitations are acquainted in some way with their subjects, and are competent to speak in the name of those whom they aspire to represent. If this be generally done, we may congratulate ourselves that the paper before us has produced at least one good effect. Of Mr. Pennell's status in the world of art we can discover nothing beyond the fact that he is an illustrator of books, and that he is at present engaged in a controversy with Professor Herkomer anent the precise nature of some illustrations in one of that gentleman's works. Assuming these qualifications to entitle Mr. Pennell to pose as an authority on art matters, they are insufficient to constitute him a critic or even a judge of artistic photography.

To follow Mr. Pennell point by point through his paper would serve no useful end that we can think of, and for our part, therefore, we are content to allow it "to answer itself," which it does, to our thinking, in an exceedingly complete and effective manner. We should, indeed, have passed it over altogether were it not that not only does Mr. Pennell betray a woful ignorance of the present position of photography in the world of art, but he seems far behind the times in regard to its relation towards those upon whose behalf he presumes to speak. "Of what use is photography to artists?" he asks. For "artists" we here take him to mean book illustrators, since the context implies just so much and nothing more. We search the remainder of the paper for any admission or knowledge of the fact that photography is directly useful to other artists besides book illustrators. True, "it is especially beneficial to the painter," but only as an aid to the reproduction of his pictures as engravings. Fie! Mr. Pennell; are you really unaware that it is often "especially beneficial" to him *before* his picture is painted?

The extent to which photography aids artists to-day is very largely under-estimated, which, of course, chiefly arises from the circumstance that the majority of people have no means of forming any opinion about the matter. Would Mr. Pennell be surprised to learn that to our knowledge nearly one-half of the painters, whose Academy pictures we criticise in the same issue as we print his paper, find "photography of use" to them in a variety of ways which they probably would not care to have announced from the housetops? This assistance is not restricted to portraiture alone, since we are acquainted with some illustrious landscape painters who have used the camera for years to obtain studies of two of the effects which Mr. Pennell says no photograph will ever record, namely, truth of light and shade.

Then, with many artists, the camera has totally supplanted the sketch-book. This is peculiarly the case with the adherents of the Impressionistic schools. It might interest Mr. Pennell to know that at a certain gallery not a hundred miles from Piccadilly there is at this present moment a "one-man" exhibition containing a large number of studies painted and drawn from photographs, taken by the artist himself under such circumstances as probably saved him an enormous amount of time and money. We search the catalogue in vain for any admission that the pictures, or even the "mere outlines" thereof, are suggested by photographs taken expressly for the purpose; but we have seen some of both, and we can guarantee that to the original prints the fidelity of the copies—for they are nothing more nor less—in "truth of light and shade," in "detail," in "selection"—indeed, in most other respects in which Mr. Pennell denies the artistic capacity of camera pictures—is remarkable. But, then, this artist is a clever photographer, and he cannot even "pull the string" properly. According to the theory of our critic the artist has ceased to be such, and has "become a photographer," and "is of no value as an artist." As a matter of fact, since he became the one he has, in the opinion of the art-critics, considerably advanced as the other. His studio and his dark room, however, do not adjoin, to enlighten "Show Sunday" crowds, and the interviewers.

One other instance for Mr. Pennell, and we have done with him. Some time ago there was an exhibition of drawings, water-colours, and so forth, by a certain artist, and the critics unanimously pitched upon a series of figure studies, the subjects

of which were about as difficult to treat as any the artist could have selected. He came triumphantly through the ordeal. The poses were instinct with grace, beauty, truthful drawing, and anatomical accuracy, but the studies were simply copied from instantaneous photographs (which we saw) taken by the artist himself the moment he discovered that he could not get his models to sit long enough in the required positions for him to sketch them. The critics united in recognising the extreme difficulty of the subjects, and the masterly manner in which they had been "handled;" but the drawings could never have been made without the assistance of the camera, and it is high time that the critics should know this, or, if they know it, that they should say so.

These are only a few instances where photography is "of use" to artists, but if Mr. Pennell desires any more he can have a large number of them. We no more blame a painter for deriving help from photography than we do a photographer for seeking inspiration and instruction from a study of good paintings, but we respectfully plead that borrowers should own their indebtedness. Although it is notorious among an inner coterie that the artists of whom we write above, as well as numerous others, secretly attach as much importance to their lenses, cameras, dry plates, and chemicals as they do to their "art" tools, *camaraderie* or *bonhomie*, or probably both, successfully operate to hold the mutual secret from those who would be most interested to have it—we mean the general public. But no doubt the murder will out one of these days, and then poor photography will come in for a little better treatment than she has received from the omniscient Mr. Pennell and others of his kind. The public and the critics will then understand how it is that in the course of a few weeks' residence in foreign parts an artist's industry enables him to accumulate several hundreds of sketches ready to be translated into finished drawings upon his return home, notwithstanding that the mere arithmetic of the trip, allowing, say, an hour for each sketch, would argue that he had worked half his nights as well as all his days. They will know, in fact, what Mr. Pennell does not know, namely, that photography has been a perfect god-send to those who are among the first to deny its artistic capabilities, and who, if at this moment it were publicly advertised that their "exhibitions" were built on a photographic foundation, would find their occupation, if not their bread and butter, gone.

SOME OF THE DIFFICULTIES OF COLOUR PHOTOGRAPHY.

We have explained the difference between the so-called transparent and opaque colours of the artist's palette—how to obtain its significant colour the former requires a white reflecting surface behind it, either in the form of a continuous surface or of small particles commingled with the pigment, and acting in the same way, while the opaque pigments when present in sufficient quantity exhibit their characteristic tint whatever the colour of surface they are spread upon. The difference may be, in reality, and often is, merely one of degree only, the "opaque" colours not necessarily reflecting the coloured rays from the first surface of the particles that receive the light; but, beyond merely noting this to avoid misconception, the point need not be further dwelt upon. The difficulty of the colour-photographer lies here. Granted a sensitive coating which, for instance, is capable, *inter alia*, of being developed into blue after receiving a blue light, how are the various shades of blue, its lights and its shadows to be brought about? We all quite understand how the shades from white to black are produced in a negative; the stronger the light the greater the deposit, till at last it approaches black. But that will not apply with sets of colours deposited upon a plate; a blue is still a blue, even if it be in a layer of an inch in thickness.

The same remark may be made of red, yellow, green, and all the colours of the spectrum. One way of overcoming the difficulty might be available. Our hypothetical colour sensitive compound must produce opaque colours, and the sensitive film be spread upon a black ground. Then, when a dimly illuminated blue image was thrown upon it, so small an amount of blue would be produced that the black under ground would show through the attenuated coating of blue and produce the effect of shadows. Similarly with all other colours.

It may be shown that transparent colours would be quite out of question. Thus, taking first the case of such colours on a black surface, we have explained how they would be practically invisible. Next, such colours upon a white ground, say a sheet of white paper, shadows could not be produced, because no heaping up of the colour would cause it to assume a deeper shade. Finally, the case of an image produced on colourless glass and viewed as a transparency. Putting aside the fact that the very nature of such pictures as may be produced by analogues of stained glass prevents their being anything but pretty toys, all the objections to the effects obtained on white paper would equally apply. The less the amount of illumination the colour in the object to be portrayed receives, the less the amount deposited on the plate. Yet, when looked at as a transparency, that portion of the image would appear light instead of dark—an effect which obviously would be absurd. So long as the one coating of a simple chemical or mixtures of chemicals is considered, it is, therefore, proved that only opaque colours on a black underground would be available. The difficulty then to be met is to find a chemical or mixture of chemicals which are capable of being converted *in situ* into all the colours, or, say, even the chief colours of nature in opaque form, and not only that, but so converted by the action of light (followed by chemical treatment), and further that each spectral colour of the light shall only cause the chemical compound to assume one colour, and that colour the one corresponding exactly to the light. At present chemists are not acquainted with any substance or mixture of substances capable of assuming all colours of the rainbow, and if such bodies are discovered it is of distant probability that light would bring about the change, and in the specific manner required.

The interference, or iridescent, theory is not yet enunciated in any scientific form, and does not lead itself apparently to any promise of solving the problem. There is, then, left the old method of producing a photograph in colours by a series of superposed single coloured films, so that combined they would present to the eye the effect of one whole picture. Here the difficulties are great, but not necessarily insurmountable. The initial difficulty is to find coloured screens that will permit certain known rays and none other to pass. Then by taking in monochrome sets of negatives, embracing only the colours that passed through these screens, one by one, power would be given to print corresponding prints which, combined, would produce the desired effect. The mechanical difficulties would be enormous, and, most important of all, the difficulties of opaque and transparent colours would again arise.

unless the number of screens was so great as practically to be prohibitive, the effect of different colours would need to be gained by admixture, not as artists gain it by mingling of pigments, but by mingling of the light reflected from them. How is this to be obtained by opaque pigments? Eighteen centuries ago Ptolemy observed the effects of the mixing of coloured lights to produce other colours. At the present day the art of pigment manufacture has reached a very high pitch of perfection; but the mixture of pigments of a particular apparent colour and the mixture of light of apparently identical colour are as far apart as night and day. The difficulty of assimilating them once surmounted, we might have hopes of photography in colours.

Complaints have been pretty rife of late as to the way the Post Office treats photographs and photographers, and a little agitation would, no doubt, lead the officials to be more careful than they are at present. There is little doubt that when photographs, whether prints or negatives, are delivered in an injured condition, the recipient simply puts up with the loss, and does not lodge a complaint. This should not be the case. The Postmaster-General should be at once communicated with. If this were done in all instances, it would probably lead to more care being exercised with small parcels generally.

The fault, however, does not always rest with the Post Office, for we have seen parcels of negatives so packed that it was quite a wonder they were not smashed in transit. In our last issue Mr. S. H. Fry describes a method of packing negatives which, we think, is excellent. He uses the "corrugated packing paper," which is an excellent material for the purpose, though it becomes somewhat expensive when used in large quantities. But this is but of little moment as compared with the loss of a negative.

In packing negatives we take a leaf out of the book of the glass merchant's method of packing. They place the sheets altogether as a compact mass, and then surround them on all sides in the crate with stiff, springy straw. Although the crates in which glass is packed are by no means rigid, the glass seldom gets broken. We always make our negatives into a compact parcel, with a piece of thin paper between each. We then take a wooden box an inch or two larger in every direction than the package of negatives, and roughly crumple up some stiff paper and put a layer of an inch or so at the bottom. On this the parcel of negatives is laid, and the box is then filled up with the crumpled paper. We have sent numerous negatives packed in this way by post and other conveyances, and these have never met with an accident. The springy character of the packing effectually prevents concussion, however roughly the box may be treated. Nothing short of smashing the box itself will injure the negatives.

When detective cameras were first introduced, it was the aim of the inventors to make them as much unlike photographic apparatus as possible. They were disguised in all manner of ways—from a boot-black's box to a simple brown paper parcel. Now, however, there is no attempt at disguise at all, and owing to the projecting knobs, buttons, and screws, &c., the "hand camera," by the general public, is as well known a piece of photographic apparatus as if it were accompanied by the usual tripod stand. Indeed, the mysterious knobs, levers, screws, and the glass eyes, in the shape of view finders, only render them conspicuous objects of curiosity to the uninitiated. It is well, perhaps, that it is so, for it often prevents pictures being taken that might afterwards be applied to unpleasant purposes, not an unknown thing. At the same time the conspicuousness of the instrument often precludes pictures being obtained with the same degree of naturalness as if taken unsuspectedly.

There was a transit of Mercury on Sunday last. It commenced a little before midnight on Saturday, and terminated about half an hour after sunrise on Sunday. It was unfortunate that it terminated so soon after the sun rose above the horizon, as we fear that there was little opportunity for successful photographic work, particularly in some of the London districts, where it was hazy and raining at the time. It is ten years since the last transit was witnessed, and it will be three years before another occurs.

The Bill to amend the Merchandise Marks Acts, which we said a fortnight back was virtually passed, was read a third time in the House of Lords one day last week, and formally passed. This Act, if strictly enforced, as we have said before, will cause an alteration in the way that some photographic dealers conduct business with regard to foreign-made goods. It is doubtful, however, if in practice it will make very much difference.

The new Copyright Bill was read a second time in the House of Lords on Monday. It was agreed, however, that the Bill should not be proceeded with further this session.

The death of M. Edmond Becquerel, of Paris, is announced as having taken place on Monday, the result of pneumonia following on influenza. It will be in the recollection of some of our readers that the deceased savant, so long ago as 1848, published, in the *Annales de Chimie et de Physique*, an account of his researches in heliochromy. It is not too much to say that all the subsequent leading researches on photography in natural colours were based upon Becquerel's early experiments. A very full account of these experiments will be found in the early volumes of The British Journal of Photography, and in our Almanac of over twenty years ago.

PHOTOGRAPHY FROM A BALLOON.

For obvious reasons balloon photography is not one of the most popular, or, at least, generally practised branches of the art, though possibly, if the facilities or opportunities were greater, we should hear more about it. Some ten or twelve years ago, when the Balloon Society of Great Britain was formed, an impetus was given to this branch of science, and numerous ascents were made by different enthusiasts almost solely for the purposes of photography, though it is to be regretted that the results were almost entirely negative. This is scarcely to be wondered at if the numerous surrounding difficulties are taken into consideration, and I scarcely feel a great amount of shame in acknowledging to a practical failure in my first attempt in a, to me, entirely new department of photography. A brief account of my experiences and difficulties may, however, be interesting, and perhaps useful, to others who may think of venturing in the same direction.

I have said that the results hitherto obtained have been almost entirely negative, but I do not mean to imply that nothing has been done in the way of photographing from a balloon. Some very good results have been produced by Mr. Cecil V. Shadbolt—the most successful worker in this direction—but only after repeated ascents and the consequent acquisition of considerable experience: others have had to be content with failure, partial or total, as the outcome of, perhaps, a solitary ascent. Bearing this in mind, it is not surprising that, when during the fall of last year an opportunity was offered me of a trip in cloudland for a definite purpose, I hesitated to accept it, and, when eventually persuaded to undertake it, I did so with no very sanguine expectations as to success. Circumstances, however, prevented the attempt being made until the winter set in with unusual severity, and this allowed me time to make special arrangements in view of the resumption of operations in the spring.

All I need say of my first, or original, preparations is, that I had to do the best I could at two or three days' notice, and that best, in my view, was to make as many exposures as I could, and to trust to the law of averages. Accordingly I provided myself with a 5×4 "Kodak," carrying, I think, forty-eight films, and a Loman's "Reflex" camera for plates, this latter being provided with a focussing-glass and finder combined, which I thought might prove

useful in selecting special "bits." Speaking, however, from subsequent experience, I am afraid I should have been able to derive little benefit from the "finder" while up in the clouds. However, the affair was postponed, and I had time to study the matter from a practical point of view, and, as I was well acquainted with what had been done in the early days of the Balloon Society, I had the advantage of being able to profit by the experience and failures of others. How I availed myself of the opportunity remains to be seen.

In the first place I came to the conclusion—urged upon me at the outset—that for my purpose the quarter-plate, or 5×4 sizes, were too small, so I resolved to "build" a "detective" camera on a large scale. For a detailed description of the instrument I must refer my readers to an article which appeared a few weeks back on *Detective Cameras*, in which the apparatus I actually used is fully described. In a general way, or for ordinary purposes on *terra firma*, I should wish to alter nothing in that arrangement, but I now think it might be modified somewhat for balloon work.

It is difficult to take seriatim and in a methodical manner the different points I wish to emphasise, as they are so intimately entangled one with another; but I will do my best to make myself clear. First of all, with regard to the size of the picture, it was considered that the smaller plates originally fixed upon would render the objects on so small a scale that they would be indistinguishable. "Make enlargements from them," some one suggests. But then the question arises whether the definition obtained would be such as would permit this to be done with any advantage. So far as mere obtaining a sharp focus is concerned, there is, of course, not the least trouble, as, owing to the entire absence of "foreground" in a balloon view—the subject being, in fact, practically all on one plane—it is the easiest thing in the world to set the lens for distant objects, with the certainty that everything will be in as sharp focus as it is possible to secure with the particular lens and stop.

But then other elements enter into the discussion. What about movement of the object—or, what is equivalent to it, of the balloon? We have three separate motions to deal with. The straight-away motion of the wind current, the upward or downward motion, one of which is almost invariably occurring, and last, but not least, the rotary motion of the balloon on its centre. Taking these circumstances into consideration, a very rapid exposure is indicated, in conjunction with the largest possible aperture; and, while there is no guarantee that the exposure is quick enough to secure absolute immobility, the large aperture goes far to destroy all hope of fine definition, except a very small portion of the plate. It was decided, therefore, to employ a larger plate and to work direct without enlargement, this arrangement, of course, involving the use of a lens of proportionately long focus. From motives of convenience, $7\frac{1}{2} \times 5$ was the size of plate selected, and the objective a Suter's 4 B aplanatic of eleven inches focus. This combination includes an angle of about 35° on the longer dimension of the picture.

Let us briefly consider these conditions and how they actually affect the work in practice. First with regard to the travelling of the balloon and its effect on sharpness. It is seldom that an aeronaut will make an ascent in a gale of wind, and certainly such an occasion would not be the one selected for photographic purposes. But if it were? Suppose, for instance, that the balloon were travelling at the speed of an express train, say a mile a minute at an altitude no greater than 1000 feet, and that an exposure no quicker than one tenth of a second was to be the rule; the angle subtended by small objects at that height would be so small that I question if any loss of definition would be practically noticeable. One thousand feet too is a lower altitude than an experienced aeronaut would choose for that rate of travelling, and, of course, the higher or more distant the point of view, the less would be the comparative effect of motion. Of course, too, there is the option of using a quicker shutter; and if the "Flying Dutchman," going at the rate of sixty miles an hour, can be photographed on *terra firma* with sufficient sharpness, surely the conditions are more favourable up aloft for that degree of rapidity.

Next we may consider the up and down motion of the balloon as affecting the definition. I may at once point out that no injurious effect is at all likely to be produced by this motion, except when at very close quarters with your objects, that is to say, at the moment of starting or of coming down. At a height of fifty or sixty feet the result on definition from alteration of focus or of the size of objects that would occur during one-tenth of a second would be infinitesimal and beyond detection; while below that height, whether on the upward or especially the downward journey, I scarcely think any attempt would be likely to be made at exposing. At the start, however ready you may be, the first rush is so rapid that you are some hundred feet up before you can well take the bearings of the landscape, while during the last three or four hundred feet of the descent, when the ground seems to be coming up to you with abnormal suddenness, you are likely to be otherwise engaged than in selecting a picture.

The last form of motion—the rotation of the balloon itself—is theoretically the worst, though practically of no moment so far as it affects definition. It is certainly inconvenient, inasmuch as it may take you right away from the direction in which you wish to point the camera, and, in your endeavour to work round to the side of the car you wish to be, you make matters worse by increasing the movement. But, should an exposure be made when there is any "spin" on the car, a movement of an inch on the part of the camera may mean that it sweeps over a space of fifty or sixty yards of landscape a couple of thousand feet away, in other words, that the whole landscape would be obliterated. But, on a rough calculation, if such a movement of the car took place in one-tenth of a second, a complete revolution would be made in ten or twelve seconds, and at that rate of motion aeronaut and photographer would soon be reduced to a state of equality at the bottom of the car. From actual observation I never found the motion to be even one-tenth as rapid as that, and then only when I had caused it by some sudden movement of my own.

Summing up, then, the conditions attendant upon the various motions of the balloon itself, and putting together the theoretical difficulties and the actually observed facts, I see no reason for believing that a quicker exposure than one-tenth of a second is required, except under any very exceptional circumstances such as I have hinted at. That being the case, it seems probable that small plates, and subsequent enlargement when required, would prove more convenient from the point of view of actual convenience while in the car. I say this because my rather bulky camera was decidedly troublesome to handle—especially in changing the plates—in a wicker basket, measuring at its widest part only about three feet square, with a flow space slightly smaller. Within that limited area, besides the necessary stock of ballast, two full-grown, if not gigantic, specimens of the *genus homo* had to make themselves as comfortable as they could; and, speaking for one of them, I can only say, I should have preferred either more room or less bulky apparatus.

In remaking my arrangement from the commencement, I should probably therefore not exceed a half-plate in size, using a lens of about nine inches focus, or might probably go even further than that However, the half-plate arrangement would enable a very large saving to be made in the outward measurement, and a consequent addition to the comfort in using the apparatus.

Next, with regard to the necessity for using the largest working aperture available. This is, of course, suggested by the supposed need for excessively rapid exposures, which, as I have already shown, does not really exist. At the same time, in case of bad light—and that seems to have been almost invariably the balloon-photographer's luck—it seemed to me that the quickest plate obtainable was the proper thing to take, and I accordingly acted on that idea, intending, in the case of a really good light, to bring the "iris" diaphragm into action. But I was favoured with as miserably dull and yellow a light as could have been expected in October or November, though, no doubt, its actinic value was greater than would be imagined from its appearance to the eye. Besides, one does not realise, until he actually looks down upon it, that a landscape viewed from the clouds possesses practically no shadows at all; there may be differences in colour to distinguish a house from a tree to the eye, but every object is acting as a reflector of light falling upon it with little power of discrimination. Add to this that the ground haze and smoke, and the lower clouds, which are scarcely noticed at the time, are at work still further destroying the contrasts in the picture presented to the photographic plate, and perhaps some explanation will be found of the reason why so few balloon pictures have proved successful.

For my own part I admit the great mistake I made in not calculating for this, for my chief trouble was over-rapid plates. What is

really required is to *create contrast*. A plate of a certain rapidity is a *sine quâ non*, but it should be one that, with its quickness, combines the property of giving any degree of density, or even what would be, under ordinary circumstances, *hardness*. With plates of the highest degree of rapidity, such as I employed, when they came to development it was a choice between stopping them as soon as the prominent features of the landscape began to appear, and so obtaining a thin, ghostly image, or in a few seconds more having everything blocked up into an even shade of fog; the former plan had at least the advantage of leaving some sort of an outline by which the picture might be recognised. On my next attempt I shall take with me a slower and more "robust" make of plate, and shall develop with hydroquinone and plenty of bromide; the more powerfully the sun shines the better it will be for making contrast, without materially affecting the chances of over-exposure, for the diaphragms can always be resorted to.

There is one very important caution I must give to those who may "go up" with the camera, namely, to remember that in resting the instrument horizontally over the edge of the car, "waiting for a shot," the lens is pointed as "dead on" to the sky as if it were placed lens uppermost in the middle of the street. Failing to realise this until too late cost me more than one plate, for few shutters will pass safely the ordeal of protecting the otherwise unprotected plate during an exposure of perhaps five minutes or more to the clear sky. While on the subject of unexpected failures, let me warn those who have an adjustable focus camera to see to the position of the focussing arrangement immediately before each exposure. Until one has experienced the pleasure of manœuvring about with another being in a space of three feet square, filled up with sandbags, it is difficult to believe how easily the slightest projection in body or apparatus engages with something else it should let alone. When I next go up I shall screw my focussing lever in a fixed position.

One more caution. In the interests of justice, not only to yourself and your apparatus, but to the general public below, it is wise to attach the camera by a line or lanyard of some kind to the balloon, lest in the excitement of stumbling over a sandbag it might go loose. The loss of ten or twelve pounds' worth of apparatus would be in itself bad enough, but perhaps some of the mathematical gentlemen who are fond of calculating the speed of drop-shutters will be able to state what would be the velocity a fourteen-pound-weight camera would gain before reaching the ground from a height of 2000 feet, and what would be the value in pounds avoirdupois of its impact upon anybody who met it. But in trying it do not, as I did, attach it to the basket-work of the car, or you will inevitably in a short time find the rope round your legs. Sling it to the hoop from which the car is hung, and at such a height that you can comfortably rest it on the edge of the car for exposure.

In conclusion, I can only say that, though I have already confessed to a failure on my first trip, I hope, thanks to the practical experience gained on that occasion, to make a better fight for it next time, if the elements are at all propitious; and, so far as the "outing" is concerned, I can assure my readers that no greater *change* or *fresher air* can be obtained anywhere than in a short balloon voyage.

W. B. Bolton.

WARM TONES ON BROMIDE PAPER.

[A communication to the London and Provincial Photographic Association.]

After the able scientific communications which are made to this Society, I confess I have felt not a little nervous about bringing this matter before you; and I must tell you at once that my object in putting it forward is more *to obtain* information than on the supposition that I will be communicating anything with which the members of this Society are not already acquainted.

I must also say that I am not a chemist, and that, compared with those who are listening to me, my knowledge of photographic processes is very superficial.

The methods I have adopted I cannot at all claim as my own, for they are simply the adaptation of known photographic formulæ to the end I had in view.

Probably it may turn out that my procedure has been very unscientific and is chemically incorrect, but the hope I have is that my labours may not turn out to be quite useless and that the result of these experiments may lead to the supply of a want. I trust also that the consideration you may be good enough to give to the subject to-night may correct the errors I may have made, and advance the process a stage or two beyond that to which I have been able to carry it.

I was led to undertake this work by the frequent inquiries made by brother amateurs as to whether there was any simple and reliable method by which their enlargements could be produced in tones warmer than the usual black and white of the bromide paper process. The process is not intended for contact printing, for which there are already abundant methods at our command.

Enlargements, I know are produced in a variety of tones by the *carbon* process, but this, I understand, entails the making of enlarged negatives, and is rather beyond the average amateur, who probably wishes to make but one enlarged copy from a negative.

I do not propose to trouble you with a recital of all my experiments, but would simply mention that I made trials of different methods of mercurial intensification, and that these produced uncertain results, and gave, as a rule, tones which were not as good as those from which I started.

Darkening with ammonia or sulphite, after beaching with mercury, gave at one time one tone, at another time another tone, and at no time a satisfactory one.

I have been informed, but I have not tested the statement, that bromide prints can be toned by bleaching them with mercury before fixing and afterwards treating them with a combined gold toning and fixing bath. I think probably my informant must have omitted to say that they would have to be redeveloped in some way first. This method would suffer under the disadvantage of having to be conducted in the weak light of the dark room, and my efforts were rather directed to finding a mode of toning the prints in the more agreeable light of my open workroom.

Some time after making my first experiments I came across the modification of the Uranium intensifier, which I believe is due to Vogel, and contains the addition of acetic acid. As this intensifier imparts a red non-actinic colour to negatives, it occurred to me to try it with bromide paper, and I was pleased to observe that it produced very much the effect after which I had been striving. It was not, however, all that I desired, as, although the half-tones and lighter details assumed a pleasant tint, the shadows were heavy and of a blackish brown.

This led me to try some method of producing by *development* an image of a brownish colour, which, I calculated, would be more amenable to the toning process, and I adopted at first a developer of quinol, with carbonate of potash much diluted. Quinol, with caustic soda, gave a blue black image, which was as unsuitable for toning as that produced by iron, whilst slow development with the formula I was using gave me a muddy brown, from which I could get the tones I desired.

It was, however, so slow as to be a greater tax on my patience than it would bear, and I don't grudge a little trouble when I can see the end before me. I turned again to hydroquinone, with caustic soda, diluting it, this time, with twice its bulk of water, and I found I got the same colour in much less time; but I must warn you, if you don't know it, that even caustic soda with hydroquinone *doesn't* work like magic *at this* strength.

The exposure for this developer is considerably longer than for iron—a half more at least—and probably twice as much, as I think probably these toned prints turn out best when they have been developed soft. But perhaps that is only my individual taste, and a brilliantly developed print may give a tone that might please some of you better.

Here I might mention that in my experiments I have not used the most rapid papers. A slow paper I find acts more satisfactorily, and its action under the developer when I first tried it was remarkable. The first faint image which appeared was of a delicate yellowish pink, which very slowly gained density, and assumed at last the muddy brown hue. It struck me as presenting itself very much like a chloride paper.

The developing formula I use is—

No. 1.

Hydro	180 grains.
Sulphite of soda	2 ounces.
Bromide of potash	30 grains.
Water	20 ounces.

No. 2.

Caustic soda	100 grains.
Water	20 ounces.

One part of each and four parts water.

I now hand you a print developed by this formula as I have de-

scribed, and which, if you desire it, I shall afterwards tone. This is the colour which, as I said before, gives in my hands the best toned prints.

I also hand you a number of specimens of the toned prints. You will find these mostly, I think, in pairs; one print being of a warm brown, and the other of what I call a sepia tone, and one print you will find toned to a deep red, to show to what extent the process can be carried. The pairs, I may here say, were toned to the same colour to start with, and the difference between the warm brown and the sepia is the result of less or more washing, as I will explain when I come to that part of my subject.

The prints are fixed in the usual way, having previously had a very good washing. This is very essential, as without it the fixing solution very soon gets muddy, and the prints are apt to suffer in consequence.

After fixing, the washing must again be very thorough, as the slightest trace of hypo left in the prints seems to produce a red stain. Besides, it is to be remembered that it is afterwards to come into contact with pot. ferridcyanide, and a decided reduction might at once be set up.

As an extra precaution, I usually pass the prints through a weak bath of peroxide of hydrogen, and wash them again for fifteen minutes, and I consider I may now proceed with the toning.

The operation can either be gone on with now, or the prints may be dried and reserved for toning at any other time.

The toning bath consists of—

Water	8 ounces.
Glacial acetic acid	90 minims.
Pot. ferridcyanide	4 grammes.
Uranium nitrate	4 „

This is considerably weaker than the intensifier given by Vogel, which acts much too rapidly, and is beyond control unless you are dealing only with a single print.

Even at this strength, when freshly made up, it acts very rapidly. The prints change quickly in this bath, which seems to clear away the muddiness to begin with, and the tone progresses into a brown, and through various stages into the bright red of which I handed round a specimen.

A series of prints in different tones can be arrived at in two different ways, and I have prepared two section prints to show you approximately the differences that can be produced.

No. 1 has been *toned in four sections* for from five to twenty minutes, with fifteen minutes' subsequent washing. As I will explain, this washing materially affects the final colour.

No. 2 was all toned to a rather red shade of brown, and was *washed in sections* for different periods till certain shades were reached.

Section "A" of this No. 2 series has had only sufficient washing to remove the yellow stain which the toning bath produces, but not sufficient to make a reliable print. I think fifteen minutes is necessary, and is probably sufficient, but I will have to deal with that part of the subject presently. By either of these means, then, you may obtain the particular colour you wish, always remembering that an allowance must be made for the washing.

And this brings me now to what I said (when I first published the result of my experiment) was the weak point in the whole process; so weak a point, indeed, that it has been considered by some to make the whole thing useless. The tone we have produced can be entirely removed by prolonged washing. Sufficient washing is necessary first to remove the yellow stain and the acid, and second to arrive at the desired colour; but excessive washing I hold to be quite unnecessary, and I feel satisfied that when the prints are finished and dry they well withstand all the moisture that our pictures are usually subjected to. They won't bear tubbing every morning, or even once in a while, but neither will any of our other pictures without injury of some sort.

When the prints are removed from the toning bath they are at once placed, if possible, in *running* water and closely watched. The yellow stain will be removed in four or five minutes, and the colour will gradually tone down. The section, print No. 2, shows you the rate at which the reduction takes place, the sepia stage, when starting from the red brown, being reached in about thirty minutes.

When the shade is reached which is desired, or perhaps I should say when it has been *almost* reached, the print should be carefully and thoroughly blotted off and set aside to dry. By blotting off the reduction is checked, and you will easily see that if this is carelessly done, and some spots of water are left on the surface of the print, the result will be inequality of tone.

In producing a batch of prints which are desired to be all of one colour, I wash and blot off one copy and set it at the side of my washing basin, matching the others by this one, one by one, as they reach its shade, and blotting them off in the same way. By this means the batch may be, as nearly as possible, all one shade.

This brings me to the end of my explanation, but I wish to say a few words more on the washing question. It was stated last month in a certain publication that the image could be washed away in a few hours. Now, although a certain amount of reduction of the image accompanies the reduction of tone, this is a very misleading statement. The reduction in prints toned to the sepia and brown is so slight, even if all the toning is washed out, as to be negligeable. Indeed, I am inclined to think that in a certain sense, and to a certain degree, this partial reduction is a positive gain, for I have noticed throughout my trials that it has the effect of clearing and brightening up the prints, and of giving sharpness of tone, and what I think Mr. Debenham described as separation to the shadows. For instance, in a case where the print has developed heavy, and is wanting in life, I should tone it to a rather red shade, remove all the colour by prolonged washing, and *retone* to the stage desired. The result of this experiment will show that the reducing action is to some extent advantageous.

To show you how much washing the brown image will stand, I hand you a print, No. 3, which was toned to brown, and one half of it has been washed in running water for twenty-eight hours. The reduction is not great. I also show you another print in four sections, three of which have been toned to a rather *red* brown, and the remaining portion not toned at all. With this redder tone you will observe the reduction is greater, but there is very little difference, if any, between the portions which have been washed only till the tone has been removed and that which has been washed for twelve hours.

With prints toned to the brightest red the matter is quite different. The reduction is here considerable. No. 5 was continued in the toning bath for an hour after the red stage was reached, and there ceased to be any apparent change in colour, and, by washing with the other (No. 4) for twelve hours, you see the image has been almost removed.

However, if the print is taken out of the toning solution *as soon as* the red is reached, the result is not nearly such a great reduction, as you will see by print No. 6. But, as I have said when writing on this subject before, those who wish this colour for any purpose have only need to give it *sufficient* washing to remove the stain and acid, and I have reason to think that when dried it will withstand all the conditions of atmosphere to which our prints are usually subjected.

J. Weir-Brown.

REPORT OF THE COMMITTEE ON STANDARDS.

It will be remembered that a Committee was appointed on March 11 1890, to consider the question of lens standards, and to report on the advisability of introducing other standards (such as for weights, measures, intensity of light, &c.) for use in photography. It was intended to continue the work carried out by the Society in 1881, but not to alter any of the standards then laid down. The Committee consisted of the following gentlemen:—Captain W. de W. Abney, C.B., R.E., F.R.S., A. Cowan, T. R. Dallmeyer, J. Sebastian Davis, W. E. Debenham, A. Hadston, H. Chapman Jones, Sir David Salomons, J. Spiller, W. Taylor, and L. Warnerke. They have made a report so far as the extension of the lens standards of 1881 is concerned, and the Council have thought it advisable to publish the report without suggesting that it should be adopted by the Society, The question of standards will shortly be discussed at the Congress in Brussels, and it therefore seems premature to come to any definite. decision until after the Congress has taken place.

The report of the Committee is as follows:—

Object of the Council.

March 11th, 1890.—Capt. W. Abney, A. Cowan, T. S. Davis, W. E. Debenham, H. Chapman Jones, Sir David Salomons, J. Spiller, W. Taylor, L. Warnerke, T. R. Dallmeyer, and later on A. Haddon (President of the Lens Convention Committee) were appointed to consider whether any, and, if any, what explanatory additions should be appended to the Report of the Committee on Standards for 1881, and to report on the question of Standards in subjects not dealt with by that Committee.

The Committee held eight meetings, and the following questions were under discussion:—

New Sizes for Lenses and Flanges.

1. In order to secure more universal acceptance of the Photographic Society's Standards, the Committee entered into communication with the leading opticians, and invited members of the Convention Lens Committee to take an active part in the deliberation of this question.

After an exhaustive examination of the subject, the Committee decided to recommend the addition to the existing sizes of flanges for lens screws 1 in., 1¼ in., 1¾ in., and 2¼ in. in diameter, with 24 threads to the inch; that no greater number of threads than 24 to the inch be used for photographic lenses and flanges of one inch and over; and that each flange or adapter shall have a mark indicating the top of the flange, so that, when the lens is screwed home, the slot for diaphragms, or the index of an iris diaphragm, shall be uppermost. In addition to the indication of rapidity ratio of various diaphragms, the relation of focus to aperture was recommended to be marked on the diaphragms.

Standard Sizes for Plates, etc.

2. In order to introduce uniformity in the sizes of plates and apparatus, the Committee recommend the adoption of standard sizes for plates, taking the existing half-plate ($6\frac{1}{2} \times 4\frac{3}{4}$) as the unit, and that smaller or larger sizes be produced by doubling or halving one dimension, so as to produce a series—$4\frac{3}{4} \times 3\frac{1}{4}$, $6\frac{1}{2} \times 4\frac{3}{4}$, $9\frac{1}{2} \times 6\frac{1}{2}$, $13 \times 9\frac{1}{2}$, 19×13, 26×19, &c, and a second series with a unit $5\frac{1}{2} \times 4$, namely, $4 \times 2\frac{3}{4}$, $5\frac{1}{2} \times 4$, $8 \times 5\frac{1}{2}$, 11×8, 16×11, 22×16; the optical lantern size to remain $3\frac{1}{4} \times 3\frac{1}{4}$.

Weights and Measures.

3. On the question of weights and measures the Committee recommend—That photographic formulæ be expressed in parts per 1000 of the total volume, using parts by volume of liquids, and parts by weight of solids. The units of weight and measure may be grammes and cubic centimetres per litre, or grain weights and grain volumes per 1000 grain measures.

Questions for Further Consideration.

Other questions which may require future careful consideration are the following:—

1. Uniform nomenclature of the photographic processes.
2. Unit of light for photographic purposes.
3. Determination of the actinic intensity of light.
4. Determination of the sensitiveness of photographic films.
5. Custom House formalities.
6. Copyright law.

ROYAL ACADEMY EXHIBITION, 1891.

We will now review the landscape paintings, and as a matter of course, again, only those pictures will be noticed which the lens can also record.

No. 81, Ernest A. Waterlow, A.—A very charming bit of well-selected matter, where the line of sight, which is a small cottage, is placed about one-third below the top of the canvas; from this a pathway comes down to the left, about the middle of the space, whilst the foreground is made up, partly of a pond of water and some small foliage; the subject is exceedingly simple, and similar bits can be found over and over again, but it is in the arrangement of the point of view, and the lighting, which is very low in power, that the merit arises, the result being a oneness of tone which is very effective.

No. 177, J. C. Hook, R.A.—A departure from the usual work of this exhibitor, this scene has been taken on a small river in Holland, but very skilfully chosen. A far-away distance gradually ascending, and coming forward to a tree on the left corner, such a scene could be well executed by the camera. The selected and arranged matter is a boat on the right side of the picture which is being towed along by some women. The presence of this boat gives a balance to the composition, by providing some dark bits on the right side; then, again, the clouds have been well arranged, so as to assist the composition by carrying along the notion of lines going in a contrary direction to the one first noticed.

It may now be desirable to notice how very carefully all the clouds in these pictures have been studied, both for composing lines in harmony with the rest of the picture, as also for their retiring character, they never overwhelm the other portions of the scene: these are matters which can be arranged for the photographic result, as clouds can always be taken separately, and then fitted to the requirements of the scene, including the time of day, and the balance of well-studied points of effect.

No. 198, Henry T. Wells, R.A.—A very fine picture made from very ordinary materials, consisting of a flat bit of a common sloping down to the right, with some foliage in the distance. Simple arrangements, similar to this picture, may be found in many country localities. The clouds, rising up from the left to the right side, harmonise with the opposing line of the common; the whole scene is very quiet but full of poetic charm. In photography the detail would have to be very carefully attended to, but more especially the form and direction of the clouds, which really govern and emphasise the picture.

No. 210, David Murray, A.—Here again, on a large canvas, we have a well-chosen and picturesque bit of English scenery, consisting of a small group of trees, almost in the middle of the canvas, close to which are some old cottages, occupying about one-fifth of the width; there is a rustic bridge on the right, crossing a stream which nearly covers the lower half of the picture, reaching down to the left corner; at both edges of this stream are some bits of small foliage, full of good detail, which contrasts well with the comparatively out-of-focus appearance of a small amount of distance. Here also the clouds are kept in retirement, and do not come forward in any way; a visit to the gallery, if only to study the clouds, will be found invaluable.

No. 244, G. D. Leslie, R.A.—Another of those views stretching from left to right of the canvas, and is divided into four almost distinct portions: a foreground, a river, some trees, both close and at a distance, and a small amount of sky; wherein, then, lies the charm? In the retiring character of the middle distance, which is produced by a girl in the foreground with a dark dress, whose presence just regulates the whole expression and character of the scene, which is very simple in subject-matter, but has been treated most artistically.

No. 277, Joseph Milne.—Another picture very simple in subject. There is a field and some short trees just placed on one side of the centre, with some very elaborate clouds, very ordinary material from which to make a picture, which depends for its results upon the subjugation of the scene to the clouds which contain all the light portions.

No. 293, Sir J. E. Millais, Bart., R.A.—This is a large painting containing a vast amount of detail, suggesting a photographic origin. The subject is a very ordinary one, merely a small stream starting from nowhere and coming right down to the lower part of the picture, with some very small side rivulets running direct to the right. These all go meandering on amongst some rich and very pretty small growth of weeds, which flourish in singular profusion on the banks of each stream. The effect has been intensified by a reflected light in part of the water, which, being painted very light, gives a point to the whole subject. It is rather curious that no locality has been given to the scene, which seems slightly un-English in its profuse detail of beautiful weeds and very small growth of trees. The whole canvas is so wonderfully full of carefully painted detail that it arouses a feeling of astonishment that the hand of a painter can rival the products of the most carefully focussed photograph; at the same time, if such a scene does actually exist, it would be a great boon to know where to find it, as many would glory in attempting to reproduce the original detail by the aid of a lens.

No. 400, G. W. Johnstone.—A landscape very prettily chosen, and arranged for the foliage to form a very picturesque outline (which study should engage the attention of the photographer). The crudity of some water is much modified by judicious shadows, which may or may not have been present; but it is these little things which make it somewhat difficult to see how the painter's opportunity of alteration can be introduced on a negative. All we can do is to point out that which is artistic and effective, leaving it to the photographer to appreciate and work out all these various suggestions.

No. 432, Sir J. E. Millais, Bart., R.A.—Another of those truthful and wonderful bits of scenery which this painter so frequently produces. Here, again, we are struck with the photographic aspect pervading the detail, which is most wonderful in its choice of subject-matter and artistic treatment. Truly these two paintings are fine studies which the photographer who understands the capacity of his instrument can fully appreciate. There is very little poetry about these paintings, which are merely exquisite representations of natural objects; but when we look at them we associate them with the camera, and instinctively recognise the accuracy of the detail which photographers know so well.

No. 468, Frank Walton.—Another of those marvellous pictures, most charming and beautiful in the exquisite arrangement of the detail and choice of subject, which consists of a middle distance, a powerful nearer arrangement of trees and foliage, and then a foreground of profuse detail arising from the growth of unchecked vegetation; surely the camera can do as much, and will the moment the artistic perception has been at work.

No. 482, *Solitude*, B. W. Leader, A.—We notice this picture just to make a passing remark of its power; but, as the scene consists of dark trees and foliage against a vivid sunset, such a scene, although most simple in its arrangement, is depending for effect upon colour, and so is impossible to be realised by photographic resources.

No. 547, Peter Macnab.—Another of those studies where cottages and other rural subjects are in slight shade, whilst the sky beyond is still brilliant with the declining sun. This, no doubt, is a very

difficult task to undertake with the camera, yet in these days of successful cloud-printing such subjects can and should be produced by photography. A white horse and a female walking help the perspective by a bit of light which is very effective against the houses in half shade.

No. 737, Miss F. A. Saltmer.—*Haymaking*, a very pleasant and well-treated subject, which is a field of hay being turned over. This is a very pretty scene, and suggests no difficulties which cannot be overcome by photographic work. The great point in scenes of this kind is the choice selection of the time when the light is most suitable for securing a sufficiency of detail. However, we can always refer with a proud satisfaction to those studies of a similar character which have been most worthily produced by some of our advanced artistic photographers. No. 799, by the same lady painter, is a very ordinary bit of subject, being some old cottages in a country lane, with a winding wall opposite. At the end are some trees, and in the middle distance two females, upon whom are concentrated the lightest portion of the picture. The merit of this scene, which is very pretty, arises from the point of view, which has evidently been well studied for a picturesque arrangement of ordinary material.

No. 842, H. G. Crabbe.—A picture made up of very ordinary materials. A foreground of some large vegetable, some stems of trees (no leaves), a cottage, and beyond some foliage. Here is a subject to which photography can do full justice; but it must first be recognised that there is some pictorial merit in the combination, so that there must be a study of the most effective point of view and time of day, and then the camera can produce equally good results. These are homely scenes, which can be made into picturesque subjects by artistic treatment.

No. 937, Ernest Christie.—Quite photographic in its apparent truthful record of the subject, which is an old cottage with trees of ordinary form; but here again the pictorial value arises from the rustic buildings coming against a sunset, giving great contrast, while at the same time plenty of detail in the foreground. It is the artistic value of such foreground which makes the picture. They emphasise the highest lights and darks, and give power and meaning to the scene. Too often in photographic works the foreground is completely barren of any detail. The introduction of some well-studied matter confers an importance and effect which change the whole value of the subject.

No. 973, W. E. Harris.—A well-arranged subject, where the sides of some hayricks very nicely assist the composition, aided by one or two trees at the back, the whole making a good picture. Now, similar subjects have frequently been attempted by the camera, but it is in the point of view where the merit arises. In this picture the hayricks come in front of some trees; the whole approaches the pyramidal form, and, again, the clouds have been very carefully introduced; a flat sky would have been fatal to the effect.

No. 982, *Sand Dunes*. B. W. Leader, A.—Here is a picture which at once calls to mind a similar subject at last year's Pall Mall Exhibition; and, as so much of the good result in the painting arises from the local colour, we can the more readily acknowledge the very good photographic picture alluded to, which rendered a similar scene in black and white most effectively.

No. 1016, K. Mackenzie.—A bit of scenery rising from the lower half of the picture to about the middle, then some one or two trees, with others in the distance continuing the perspective—these, with a good array of clouds, form a picture made out of every-day material, only great attention must be paid to the details of the field in the immediate foreground, so as to secure some sufficiently strong light and dark bits, the total being a quantity of delicate lights, with a few dark parts to assist the effect.

No. 1042, Edward Holmes.—Some selected matter which owes its merit to treatment. It is a spot on a small stream of water, with some middling dark foliage in the distance, whilst in the foreground are some tree stems which, being the lightest portion of the picture, are a very effective study, as every other portion is lowered in tone, so that these light tree stems come forward. This is balanced by the clouds being made somewhat lighter on the opposite corner, which enhances the effect. Half-way between the front stems and the middling dark foliage are some other light stems; these, being subdued in tone, keep their proper place. This spot might have been photographed, after a careful study of the right time of day and the amount of light required to take it.

No. 1137, Ernest A. Waterlow, A.—Here is another ordinary bit of selected subject well treated, from which it derives its importance. A pathway on the side of a river with an ordinary tree close to the foreground, in the distance a bridge, over which a church steeple is visible. Now, very much of the artistic effect of this painting can be realised by photography, but it must be produced by subsequently toning down some part of the scene; and, if art is to govern the result of the camera work, some such course must be adopted. Concentration of light and shade must be the study, which will be found not impossible to realise when the artistic requirements have been well considered.

No. 1130, B. W. Leader, A.—An ordinary bit of scenery, part of an old church, with trees. Now, in considering the painter's selection of the point of view, the question arises, Has anything been altered so as to suit the artist's requirement? The scene represents the decline of day, with a brilliantly lighted sky, necessitating some trees to be in very low tone, but full of good detail. Has the painter, then, altered any of the trees so as to assist him in making a good perspective of the outline? All the other portions of the picture can be produced by photography, but the success must depend upon the best scientific treatment of the well-selected subject.

No. 1144, Philip R. Morris, A.—A view divided into three equal portions, a foreground of some corn or other serial, then some sea, and finally the clouds. Possibly this is a picture which derives some of its value from colour, at the same time it is very capable and has been well rendered by photography. Once again it must be noticed that the outlines separating each section require careful attention, so as to produce harmony and not discord.

No. 1145, Camille Vernède.—A well-arranged picture for composition, including near and distant trees. A roadway goes up the centre of the picture, with a big tree, or portion of one, on one side and some smaller ones on the other side, with a very small bit of distance. The big tree goes to the top of the canvas, the detail of which, although rich, has been tempered down. Now, this is a matter which photographers should carefully give attention to. Many a work, otherwise fairly good, has been ruined by the upper portion being rendered too large and extravagantly dark. There are a very large number of other landscapes exceedingly artistic in selection and treatment, but, as they do not possess any points which may be considered strictly from a photographic point of view, they have not been noticed, our object having been simply to point out those works which might have been equally attempted by the camera, as also to point out the lessons to be learnt from their artistic treatment, not from their colour attributes, but solely from their choice of subject-matter and the treatment of the same from a black and white point of view.

A PLEA FOR SIMPLICITY IN SHUTTERS.

As we approach the summer and the light improves for rapid exposures, no doubt many photographers will be debating in their own minds, and probably with their friends, what kind of shutter they will adopt, and it is equally probable they will consult the advertisements in the various photographic and scientific journals to determine the point, and the result must be hopeless confusion of ideas if they have not some experience, either their own or their friends', to help them, as nearly all are advertised as the "best and quickest." Now, it is just this assertion of best and quickest it is well to consider. Can the two terms, "best and quickest," be properly applied to a shutter for general work, especially for amateurs? I think we may safely say no—emphatically no. For various scientific purposes, and under some special circumstances, no doubt the highest rapidity obtainable is necessary, but for "*picture making*" the consideration should be not how *quickly* can this view be taken, but how *long* an exposure will the subject allow? If any of the users of the "one-hundredth-of-a-second" shutters doubt this, let him take two pictures of the same view without moving objects giving one, one-hundredth of a second, and the other fifty times as long, and develop them, as they must necessarily be developed—one without restrainer, or nearly so, and the other well restrained. One, no doubt, may have all the objects properly delineated, but where is the half-tone? Compare with the longer-exposed plate, and I have no doubt as to the verdict.

Let it be assumed, then, that within reasonable limits the longer the exposure the more perfect the results. We have then to consider the length of time that can be given to subjects having moving objects, and on this point a few trials—or, in other words, experience—is worth a good deal of calculation as to number of inches an object may move without spoiling the sharpness, and here let me say I cordially hate "fuzziness" in small pictures. Experience proves that ordinary street scenes, without trotting horses, or any scene with objects moving not quicker than a man will usually walk, may be taken quite sharply in one-sixteenth of a second (·06), and scenes embracing trotting horses and objects moving up to ten miles an hour may be secured in half that time. These degrees of rapidity will cover all moving objects that will usually fall in a day's work, and in

good sunlight can all be obtained with a rapid symmetrical lens working at *f*-11·3. Sea and cloud subjects require nothing quicker if a smaller stop be used.

Having, therefore, determined the speed required under ordinary circumstances not to exceed ·03 of a second, let us see what amount of mechanical complication is necessary to obtain this and longer exposures.

There are those who advocate the use of a mechanical shutter for all exposures, and are inclined to look down upon the man who goes into the field provided only with the old familiar cap. But why increase the impedimenta by one article that will not be required? and, as an exposure of half a second can perfectly easily, and with sufficient accuracy, be given by hand, no mechanical arrangement need be carried on dull days for motionless subjects. It may be assumed, therefore, that no shutter is *necessary* (one may be a convenience) for outdoor photography unless it is intended to give exposures of less than half a second. The difference between half and a tenth of a second may be perfectly controlled in development; we therefore arrive at the conclusion that our shutter need not work slower than ·1, and we have before seen it need not exceed in speed ·03 of a second.

I have used many shutters, and as a result advocate for general use one that has been more abused than any other, viz., the simple drop. I do not contend that it is the very best, either in theory or practice, for giving the actual exposure; but there are other points to be considered in selecting a shutter—weight, cost, facility for getting out of order, and the ease with which it may be carried. I certainly prefer in theory one of the shutters opening from the bottom and closing from the top, and there are two most excellent ones on this principle in the market, but they are very awkward to carry, and cost from 29*s.* upwards. The drop has the advantage of giving a perfectly equal exposure over the whole field, and any vibration only occurs after the lens is covered, and no harm can be done; add to this the cost—sixpence if you make it yourself, and half-a-crown or three shillings if you buy it—that you hardly can injure it unless you put it on the ground and stamp upon it, and that it need not weigh more than three ounces, and you have a list of advantages hard to equal.

The drop-shutter, as usually made, consists of an opening in the drop the full size of the mount of the lens, and, if an acceleration be required, one or two pieces of elastic are used. This manner of increasing the speed has several drawbacks: first, the pressure of the elastic increases the bite of the catch so much that it is difficult to release without causing a jar, just at the very worst time; secondly, elastic becomes longer by use, and consequently weaker; and, thirdly, you cannot know the speed, as no calculation will give the velocity of a falling body helped on by elastic.

These drawbacks to what is unquestionably the simplest and one of the best shutters led me to think out an improved drop-shutter, that would give known variations of exposure, and I fixed upon the limits above given, of from ·03 to ·1 of a second, as the most useful, though a much wider range might be made. The idea may be nothing new, it may have been used by others for long enough; but, as I have never either seen it or heard of it, others may be equally in the dark, so I give a description of it for what it is worth. If every one kept their ideas to themselves till they had either patented them, or were quite certain no one else had ever thought the same, the world would have either to pay for them or go without.

The principle, then, of the shutter is the utilisation of the unvarying force we have always at command, viz., the acceleration of gravity, and is nothing more than an unvarying drop by unassisted gravity, with an opening of variable length, the small opening for rapid exposures being at the upper part, or end of the drop, thus gaining the required and calculable speed by the acceleration of gravity alone, and I dare say it may surprise many, as it surprised me when I first learnt the fact by actual experiment, that a fall of 2·5 inches before uncovering the lens will give a speed equal to that obtained by loading a drop, falling half an inch before opening, with an elastic pressure equal to 7·2 ounces.

The shutter I am about to describe, and which any one possessing a penknife and measure may make for himself, has been made for reasons I need not now enter upon, to be used with no larger stop than *f*-11·3 with 9-inch lens, but the principle may be applied to any size. As a description is always more easily followed if an actual case be taken and real measurements given, I will assume that we wish to make a shutter for a Ross' R.S. lens, 8 × 5, with the hood removed, to give exposures with stop *f*-11·3, varying from ·1 to ·03 of a second, and that we already possess the outer case of an ordinary drop-shutter. It is best made of wood; but, as to do this requires considerable skill, I will say select cardboard of which three thicknesses will not exceed the thickness of the ordinary drop which has been removed, cut three pieces nine inches long and the width of the slot in the case, say 2¼ inches, draw a line down the centre of each and mark one end of each "top." In two of them cut a hole centrally in width 4 × 1, one end of the hole being two inches from the top end of the card. In the third card cut centrally in width a slot 7 × 1¼, one end being 2 inches from the top, and the other open to the bottom, now glue both sides of this third card, place it between the other two, all the "tops" being accurately together, and leave under pressure until quite dry. We shall then find that we have a shutter with an opening 4 × 1, and that the piece of card cut from the slot, if reinserted and pushed up from the bottom will close the opening entirely, or to any desired extent. Paint the side that will be towards the lens black, and on the other side set off a line temporally in pencil 1·2 inch from the top; this represents the point to which the shutter has to fall to finally close the opening, and will then correspond with the top edge of the diaphragm *f*-11·3. Now insert the sliding card, and push it up until it is within ·8 of an inch of the top of the opening, and draw a permanent line in ink across *both* shutter and sliding card, 4·6 inches below the first line; this represents the point at which the shutter will stand at rest before falling, and will correspond with the top edge of the diaphragm. Withdraw the sliding card and it will be found that the line upon it is exactly three inches from the top end. On the left of the central line, and on the ink line, write 3, and on the right side ·03, now beginning at the top measure off ·5, ·8, 1·05, 1.35, 1·7, 2·1, and 2·5 inches, draw lines at these points across the sliding card only, and write the following scale:—

Inches.	Second.
·5 =	·1
·8	·09
1·05	·08
1·35	·07
1·7	·06
2·1	·05
2·5	·04
3·0	·03

It will be seen now, upon reinserting the slide, that, placing the line ·5 | ·1 upon the slide in correspondence with the ink line already drawn upon the shutter, we obtain an opening 3·3 inches long with a fall before opening of ·5 inch, and this will give an exposure of ·1 second. If the slide is pushed up till line 3 | ·03 agrees with the fixed line we shall have a hole ·8, a fall before opening of 3 inches, and an exposure of ·03 second. The intermediate lines will, of course, give the intermediate exposures. All that now has to be done is to cut the slot for the pin to prevent the shutter falling clean through the case, taking care that it is cut long enough, and to cut the nicks for the catch. This latter is most easily done by drawing two pencil lines across the shutter, one 3·4 inches above the permanent line, and the other ·4 below it, and cutting the nicks to hold the shutter with these lines across the *centre* of the lens, the top one when focussing, and the bottom preparatory to exposing.

If the cards have been accurately cut and carefully put together, the sliding card will be sufficiently tight to retain its position; but if wood is used there must, of course, be a pin or some contrivance to keep the scale in position.

My object is not only to advocate the use of the drop-shutter, but to enable any one desirous of possessing one of variable capabilities to make it for himself, and to this end I append a table by which we may at once ascertain the exposure given by a shutter we may already possess, or obtain the measurements for making one to give a desired range of exposures. It must be borne in mind that the exposure will vary with every diaphragm used. The shutter described is for *f*-11·3, focus nine inches; if *f*-16 be used, all the exposures will be shortened.

The duration of the exposure is the time the shutter takes to fall to end the exposure, less the time the shutter takes to fall to begin the exposure. To use the table, ascertain the total effective fall in inches, find that in the left-hand column and note the time placed opposite, ascertain the fall before opening, find that on the table, and note the time opposite, subtract one time from the other, the difference is the exposure. It is not always easy to measure the effective fall of a shutter, and measuring the total actual fall will lead us wrong. The *effective* fall is the fall before opening plus the lens aperture (or, if a stop is used, the stop aperture) plus the shutter aperture. If the fall before opening with full aperture be known, to ascertain fall before opening with a smaller stop, take fall before opening with full aperture, plus *half* the full aperture minus *half* the stop aperture.

Example I.—We have a lens full aperture 1·25, shutter drop before opening ·25, aperture in shutter 1·25: how long is the exposure?

The effective fall is 1·25 + ·25 + 1·25 = 2·75, opposite 2·75 in the left-

hand column we find ·1193. Fall before opening is ·25, opposite this we find ·0359.

·1193
·0359

·0834 the exposure.

Example II.—What is the exposure, using the same shutter but substituting stop *f*-64 of a 9-inch lens?

9 ÷ 64 = ·14 diameter of aperture in stop.

Drop before opening full aperture,		·250
+ Full aperture 1·25 ÷ 2 = ·625.		
—Stop aperture ·14 ÷ 2 =	·070	·555
= Fall before opening		·805
Add stop aperture		·140
And shutter aperture		1·250
Giving as total effective fall		2·195

We shall not find this exact figure in the table, but 2·2 is quite near enough—opposite this we find ·1067. Fall before opening we have found to be ·805, and, as this is not in the table, we take ·8, opposite which we have ·0643.

·1067
·0643

·0424 the exposure.

Example III.—Having a lens of 9-inch focus, using stop *f*-22·6, and shutter falling ·75 inch before opening, what aperture must be cut in the shutter to give an exposure of ·06 of a second? 9 ÷ 22·6 = ·4-inch diameter of aperture in stop.

Drop before exposure, ·75 =	·0623 second.
Add exposure required	·0600
	·1223

This is the time occupied by the total effective fall. Look for this time in the *right*-hand column.

The nearest is ·1225, opposite which is		2·90-inch
Deduct fall before opening,	·75	
And diameter of stop,	·40	
		—1·15
Opening required in shutter in inches		1·75

Inches.	Seconds.	Inches.	Seconds.	Inches.	Seconds.	Inches.	Seconds.	Inches.	Seconds.
·25	·0359	1·25	·0804	2·25	·1079	3·25	·1297	4·25	·1483
·30	·0394	1·30	·0820	2·30	·1091	3·30	·1307	4·30	·1492
·35	·0425	1·35	·0836	2·35	·1103	3·35	·1317	4·35	·1501
·40	·0455	1·40	·0851	2·40	·1115	3·40	·1327	4·40	·1509
·45	·0480	1·45	·0866	2·45	·1126	3·45	·1336	4·45	·1518
·50	·0508	1·50	·0881	2·50	·1138	3·50	·1346	4·50	·1526
·55	·0533	1·55	·0896	2·55	·1149	3·55	·1356	4·55	·1535
·60	·0557	1·60	·0910	2·60	·1160	3·60	·1365	4·60	·1543
·65	·0580	1·65	·0924	2·65	·1171	3·65	·1375	4·65	·1552
·70	·0602	1·70	·0938	2·70	·1182	3·70	·1384	4·70	·1560
·75	·0623	1·75	·0952	2·75	·1193	3·75	·1393	4·75	·1568
·80	·0643	1·80	·0965	2·80	·1204	3·80	·1403	4·80	·1577
·85	·0664	1·85	·0979	2·85	·1214	3·85	·1412	4·85	·1585
·90	·0682	1·90	·0992	2·90	·1225	3·90	·1421	4·90	·1593
·95	·0701	1·95	·1005	2·95	·1236	3·95	·1430	4·95	·1601
1·00	·0719	2·00	·1017	3·00	·1246	4·00	·1439	5·00	·1609
1·05	·0737	2·05	·1030	3·05	·1257	4·05	·1448		
1·10	·0754	2·10	·1043	3·10	·1267	4·10	·1457		
1·15	·0771	2·15	·1055	3·15	·1277	4·15	·1466		
1·20	·0788	2·20	·1067	3·20	·1287	4·20	·1475		

EDWARD J. SMITH.

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

THE arrangements for the Glasgow's great International Photographic Exhibition, which is to be held in September next, continue to make satisfactory progress. Those upon whom the duty devolves of making all arrangements are working incessantly, and everything will be well forward long before the time of opening.

Amateurs and professionals alike of the West of Scotland are entering with great spirit into the undertaking, and it is certain to be a very big success.

The time of the year chosen is very suitable, it being the season when tourists flock through Glasgow on their way to the Highlands. Already several of the leading workers in the West of Scotland have been busy with their cameras, taking advantage of the early foliage and good spring sunshine, in the hope of securing some good things to grace the walls of the Exhibition. That enthusiastic clever amateur mechanic, Mr. Alex. Robb, contemplates a tour to Madeira. By the way, among the new things of the season, is a camera which Mr. Robb has just completed with his own hands. Every year sees something new from him in the way of cleverly contrived cameras, and, to use his own words, the one just finished takes the bun in the way of simplicity as a hand camera. Doubtless before long a full description of this box will be placed before the readers of the B. J.P.

Mr. T. N. Armstrong has, along with his friend, Mr. William Alexander, started on a lengthy tour with a caravan. Cameras of all sizes accompany them, and we understand it is intended to visit the Whangie, Finnick Glen, Aberfoyle, Loch Ard, Lake of Menteith, the Trossachs, Loch Katrine, Glen Finlas, Brig O'Turk, and Pass of Leny. Doubtless the fruits of this excursion will also be seen at the exhibition.

Caravan travelling with the camera is likely to become popular in the West of Scotland.

Mr. Morison, President of the Glasgow and West of Scotland Amateur Society, also contemplates another trip this year. By the way, we have just been favoured with a view of some platinotype prints which Mr. Morrison has thrown off from negatives secured when last year he made his celebrated voyage of ninety miles on the Thames in a small boat. These pictures are specially worthy of notice, on account of their being produced by the ordinary hot bath paper, but they are developed with the cold bath salt, heated to 120 to 130°, without any platinum being added to the bath; by this method, fine, rich, vigorous prints are obtained. Platinotype workers should note this, and see what an improvement they will get over the other methods.

Foreign Notes and News.

CAPTAIN JOSEF PIZZIGHELLI, whose name is well known in the photographic world, has recently been promoted to the rank of major.

MESSRS. ALEXANDER LAINER and Josef Eugen Hörwärter have been formally appointed by the Austrian Ministry of Public Worship and Instruction as Professors in the Vienna Photographic Institute.

LIEUTENANT-COLONEL EMEL CARL, member of the technical department of the Military Committee of Austria, and for a long time member of the Vienna Photographic Society, has died, after a very painful illness. His place on the Military Committee has been taken by Lieutenant-Colonel Ludwig David.

RECENT researches by Professor Alexander Lainer go to show that the ordinary acid fixing bath exercises a clearing and reducing action on the negatives immersed in it for a length of time. Professor Lainer speaks of as much as forty-eight hours. Even in a quarter of an hour, however, a certain amount of clarifying action is perceivable. The hardening action of the acid bath on the gelatine is particularly valuable in hot weather.

ACCORDING to a recent analysis, crystallos turns out to be composed of 9 parts hydroquinone, 30 parts sulphite of soda, 5 parts of yellow prussiate of potash, 20 parts of caustic potash, and 200 parts of water. Another secret developer, carrying on business under the name of "safranin," is said to be hydroquinone developer coloured red!

IT appears that the employment of *eau de Javelle* for removing the last traces of soda, as recently recommended, must be accompanied with caution. Fixing soda contains dissolved silver, and as it is converted by the *eau de Javelle* into sulphite of soda the dissolved soda is precipitated as chloride. If, therefore, it be present in anything but very small quantities, the result is to injure the high lights of the picture. The prints or negatives must, consequently, be very thoroughly washed before being introduced into the *eau de Javelle* bath, which should be of about 1 : 100, or even weaker. They should be left in the bath for about five minutes. The proposal has been made to add about five per cent. of common salt to the *eau de Javelle*, to dissolve any traces of silver chloride

that may be precipitated, and this, the *Photographische Nachrichten* thinks, would probably prove efficacious.

Platinum is threatening to go up still further in price. It appears that the output of ore in the Ural Mountains has decreased enormously owing to want of water. In addition, the Russian Government has raised the export duty, and, the exchange value of the rouble fluctuating greatly, exporters make a habit of calculating well on the right side. It is estimated that the cost of platinum, owing to these causes, will in a short time be trebled. This may not much matter to photographers in these days of bromide printing, but what will happen to the electricians?

Herr A. Culin, of Hamburg, recommends a solution of iodide of potassium in water for reducing negatives developed with hydroquinone. The strength of the solution depends on the density of the negatives: very dense negatives may remain in the solution all night. The details are unaffected.

Another member has been added to the noble army of developers. It rejoices in the name of Yxol, and is said by its discoverer, M. Lucoste Delpérier, to be at least as energetic as hydroquinone, if not more so. According to a correspondent of the *Amateur Photographer*, who has tried it, it brings out more details in the shadows than hydroquinone, and is particularly good for under-exposures.

Cannot the French keep their politics apart from things with which they have no earthly connexion, and must they even obtrude them into photography? At the last meeting of the French Photographic Society M. Bourdier exhibited some new "sensitive" plates, which he had christened "Muscovite," "in honour of our amicable relations with Russia." The whole episode is certainly what the French themselves would describe as "for to laugh."

The Fine Art Society of Caen is arranging a photographic competition open to all photographers, whether amateur or professional, who have been born within the limits of the five departments of Normandy. The subject is to be an original from nature, and there is to be no limit in size or shape. The prize is to be a gold medal, value (reputed) three hundred francs, and other awards of silver and "vermilion" are destined to soothe the feelings of unsuccessful competitors.

Our Editorial Table.

A Practical Hand Camera.

By W. I. Chadwick.

The leading feature of Mr. Chadwick's hand camera, or that in which it differs from so many others of the same *genus*, consists in his having discarded the Magazine and Sheath system now so commonly used and substituting therefor the single back, each plate being retained in its own dark slide. And these dark slides are really very thin and light, and are serviceable and trustworthy withal. We have tried them by exposure to sunshine, and have found them quite light-proof. They are made of indurated millboard under Barnett's patent. The camera itself is formed of mahogany and is stained black. Although constructed of thin wood it is strongly made, and it seems impossible for it to get out of order. The focal range is long, the adjusting power permitting the use of lenses from $3\frac{1}{2}$ to 6 inches, or, strictly speaking, to an inch beyond this latter figure, for the focal centre of a lens is not necessarily situated at its back or even its mechanical centre. The focussing is effected by a flat milled-head screw, which lies close to the side, and which operates a rack and pinion. A black pointer in the milled-head moving over a graduated ivorine ground permits of the focussing being made with the greatest nicety for objects situated at any distance. The camera is fitted with a Kershaw shutter, which allows of "instantaneous" pictures being taken, although, when time-exposures are wanted, the services of the lens cap can be had recourse to with facility.

The foregoing is an outline of the construction of the "Practical Hand Camera," and strongly as Mr. Chadwick speaks in favour of this, his latest child, we cannot say, after a very careful trial of it, that he says a word in its praise which is not warranted by its actual performance. He is in particular to be congratulated upon his adoption of the method employed so extensively in America for attaching the lens board to the camera front, by which it can be instantly detached, reversed, or substituted by another.

In a descriptive pamphlet which accompanied the camera, Mr. Chadwick "goes in" against magazine cameras, which he adjudges to be complicated and unreliable, however ingenious they may be. This has not been our own experience, at least not of late. Some of this *genus* there may be which warrant his strictures, but, on the other hand, there are others which work with smoothness and reliability.

We are pleased to find that Mr. Chadwick, while going in so thoroughly for all the requirements of a "hand" camera in this his latest production, is not insensible to the value of the services which it may render when erected upon a stand, and the exposures brought under the influence of time as against snaps.

Among the new productions in cameras for the season, Messrs. W. W. Rouch & Co. have successfully applied the principle of their patent "Eureka" hand camera for stereoscopic purposes. The plate is of the time-honoured standard size, and the cameras, which were barely finished when we saw them, are the smallest binocular ones possible to be made. As they are fitted with reservoirs or separate magazines, one may go on a tour armed with an indefinite number of plates, which can either be exposed one-half at a time for lantern subjects, or simultaneously for the stereoscopic purpose for which the camera was originally designed. The Eureka changing-back can now also be applied by this firm to all their cameras up to whole-plate size.

A "Facile" Case.

Some time ago, when we first noticed the now well-known "Facile" hand camera, we stated that it had a brown paper cover, which makes it look like an ordinary parcel. But there are some individuals who, when on tour, and desirous of removing the exposed plate and loading up with a fresh dozen, do not care to encounter the small trouble involved in removing and replacing the paper covering. To such, and we ourselves admit the soft impeachment, Mr. Jonathan Fallowfield proves the friend in need; for he has devised a neat and most easily "unlimbered" case, made in leather and in canvas, from which the camera can be removed in as few seconds as it took minutes under the original *régime*. We speak from personal experience, for we have tried it, and would not willingly return to the paper covering, handy (and deceptive to outsiders) though it be.

The Electro-platers' Handbook.

By G. E. Bonney. (London: Whittaker & Co., 2, White Hart-street, Paternoster-square.)

In these days, when photogravure and similar photo-engraving processes requiring the services of electro-deposition are so much practised, a work like the present one cannot fail of rendering excellent service. Mr. Bonney, in this copiously illustrated work of over two hundred pages, treats in a practical manner of the various batteries adapted for electro-deposition and their special characteristics, the composition and treatment of the depositing solutions of copper, silver, nickel, and the other metals and compounds employed for electro-deposition, and altogether gives in a compact form a great amount of useful information.

A sample of quarter-plates for the hand camera received from the Britannia Works, Ilford, shows upon trial that the productions of this firm continue to prove all that can be desired.

Lancaster & Son's New Catalogue.

First of all we would say that this new catalogue of Messrs. Lancaster, Colmore-row, Birmingham, forms one of the finest examples of the printer's art we have seen, being printed in two colours on toned and glazed paper of admirable stoutness. It is illustrated by numerous cuts and by two full-page Meissenbach prints from negatives taken by Messrs. Lancasters' apparatus. Here we find cameras, lenses, stands, shutters, and *everything*, both individually and combined into sets for ladies, boys, amateurs, and all classes who use or are likely to use the camera as an adjunct to pleasure or business. We are glad to see that the stereoscopic camera finds a place among this compendium of apparatus. It is a cheap fourpenny-worth, if only for the sake of seeing the novelties in instantaneous shutters.

Hardtmuth's "Koh-i-noor" Retouching Pencils.

Professional retouchers and all who desire to improve their negatives whether landscape or portrait, ought to feel grateful to Messrs. Hardtmuth for the introduction of the "Koh-i-noor" series of pencils. The special feature in their manufacture is the extreme fineness and smoothness of the graphite of which they are composed, coupled with

the great compression to which the material has been subjected, and which enables them to retain their sharpness of points much longer than heretofore. The series consists of twelve, commencing with six B's (extra soft and very black), and terminating with six H's (the hardest). Armed with such a battery, one is enabled to put on a negative any and every class of work which it requires.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 19	North London	Wellington Hall, Islington, N.
,, 20	Bury	Temperance Hall.
,, 20	Manchester Camera Club	Victoria Hotel.
,, 20	Edinburgh Photo. Club	5, St. Andrew-square.
,, 20	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 21	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

May 12,—The President (Mr. James Glaisher, F.R.S.) in the chair.

A paper on *Polychromatic Impressions by Photographic Methods*, by M. Léon Vidal, was read (the author not being present) by the Assistant-Secretary. The paper set out with the proposition that its object was not to consider the probability of obtaining coloured photographic effects direct from the colours themselves. That would be a question for the future. The investigations and discoveries recently made had not thrown much light upon the matter, and no practical or artistic effect of commercial value had resulted from them. The author would refer only to well-known methods, and make use only of pigments that were ready to hand. The point which struck him most at the outset was the indifference of typographic and lithographic printers in general to photographic methods. Some few indeed did make use of these methods, but they were comparatively rare, and he should be glad if he could induce others to enter upon the employment of the methods, which were really within the reach of all, or most, printers. For want of sufficient information, printers still mostly thought of photochromy as something out of their line, and presenting difficulties too serious for them to undertake. In the present paper it was only intended to call upon light to perform those functions which it could readily be made to do. Chromography might be divided into two methods. By the first method the photograph was produced in one tone with a single ink, and the colours were applied by printing from stones prepared by the draughtsman. This might be called simple chromophototypy. The second method was one that had been worked by Ducos du Hauron and others; most recently by Ives, of Philadelphia. In this method there were generally three negatives made, each being prepared on a selective principle, so as to exclude the action of certain colours, whilst permitting that of others. The negatives were then transferred to printing surfaces, each inked with the colour appropriate to the negative, and the combination of coloured effects on the print gave the colours of the original. It was stated that three primary colours—red, yellow, and blue—were sufficient, but he considered that four separate shades gave a better effect. He protested against the claims put forward by some that they had been able to reproduce the effects of nature by the selective character of the negatives only. It was always necessary for the operator to do something in the way of retouching or masking out the effect of some part of the negatives or printing surfaces. He had never seen the photographic selection of the three colours sufficient; a correction must be made by hand. The plates used for making the negatives should be orthochromatised, and, if the picture contained red, eosine or erythrosine would not suffice. A suitable plate could be prepared by the means recommended by Mr. J. B. B. Wellington in 1885, using chlorophyll, cyanine, or methyl violet. [At this point a series of slides were passed through the lantern, one of a coloured picture of a group of flowers, and others of negatives taken therefrom, with a view to use as *clichés* for the several colour printings.] The paper continued that the methods of printing most suitable were collotype and Woodburytype, and examples were shown of prints upon which photographic images in monochrome by these methods were imposed upon paper on which appropriate colours had been previously printed. The processes most commercially valuable were those of these kinds, that is to say, simple chromophotography, wherein the colours were arranged by the lithographic or other draughtsman, and a monochromatic photograph employed as a finish on the top of the colours. Another kind of correction required was to put a flat tint over parts of the image that came out with too strong lights, as, for instance, the lights on a black satin dress. When printing from three or more negatives, selectively prepared by photography, regulating crosses were marked upon the collotype plates by touching them with tannin or gallic acid, to make them take ink in the registering places. [Another set of slides was passed through the lantern, to show the plates made from a coloured subject when four selective plates were employed.] He concluded by inquiring whether the reason that chromophototypy was so little worked was that collotype was only worked by a few specialists. All lithographers, he argued, should be ready to use these methods, which were easy for any one to carry out, and he expressed regret at his inability to be present.

Mr. J. Spiller called attention to the remarkable series of coloured impressions hanging on the walls of the room, mentioning particularly some photo-heliochromes by Hanfstaengl, of Munich, and some exhibits by the firm of Goupil's successors. He was also interested to hear that it was the author's opinion that we are as far from realising photography in natural colours as ever we were.

Mr. G. L. Addenbrooke proposed the adjournment of the discussion till the next meeting, when the paper would be in the hands of the members.

Mr. Valentine Blanchard said that one of the methods shown by the firm, the successors of Goupil, was one that was practised in England a hundred years ago. The method of registering a photograph upon a coloured ground, used by Goupil, was really the discovery of the late W. Woodbury, and that gentleman had been very indignant at his method being appropriated without acknowledgment.

Dr. Eugene Albert, of Munich, was introduced to the meeting, which he addressed through an interpreter. He had tried his best to bring colour processes into use in connexion with the cheapest methods for art reproduction. He had therefore abandoned his father's method of using collotype for this purpose, and employed typographic methods instead. The photographs round the room were, he said, only indirectly photographic results, as portions from separate plates were blocked out or selected by hand. In his own work, a specimen of which was shown, the selection was entirely photographic, and the resulting negatives were used for producing three blocks, printing red, yellow, and blue respectively.

The President, in proposing a vote of thanks to M. Léon Vidal, included in that vote one to the Assistant-Secretary of the Society for his activity in getting together such a collection of photographs with colour effects as adorned the walls of the room. These included specimens by Hanfstaengl, of Munich; Loewe, of Vienna; Frisch, of Berlin; Boussod, Valadon, & Co.; Photochrome Company, Zurich; Rouillé, Paris; Rommell, Stuttgart; Angerer & Goeschl, Vienna; the Photographic Art Colour Company, and Wezel & Naumann, Leipzig. These exhibits would, for the most part, remain on view until the end of June. At the June meeting a paper on a new sensitometer would be read by Mr. Léon Warnerke, and after the paper a discussion. There might, if time, be a further discussion of the present paper.

Dr. L. S. Bruce and Messrs. H. Holiday and C. E. Pearce were elected members of the Society.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 7,—Mr. J. J. Briginshaw in the chair.

A circular with regard to the Federation scheme was received and considered. It appeared that only three societies, including altogether not more than 100 members, were represented by the issuers of the circular.

Mr. F. A. Bridge thought that these three societies had better federate and form one stronger one.

The Hon. Secretary said that the parent photographic society were getting up a much better scheme, and he thought the best thing was to take no further steps with regard to the proposals contained in the circular before them. This appeared to be the general opinion of the meeting.

A camera by Mr. Low Sargent was shown, to the front of which was attached a movable reflector of black glass, which when in position was fixed at the proper polarising angle for the purpose of photographing clouds. Bright clouds, he found, came out well with an exposure of a tenth of a second, using a stop *f*-11, or about No. 8 on the universal system. Very delicate light clouds could be photographed in this way, that would be quite impracticable without such an arrangement. The size of plate used in the camera was the quarter of a half-plate. The level was attached to the ground glass, so that it could be seen at the same time as the image was examined by the finder. The cut-off for securing against admission of light when the shutter of the slide was drawn out was in the camera back, so that the slides had not to be fitted separately with the appliance. Moreover, in this place it served as a lock or catch, and prevented the slide from being drawn out until the shutter was replaced.

Mr. G. W. Atkins showed a plate backed with a mixture of pitch, dissolved in turpentine and Canada balsam. This, he thought, would form as good a mirror for cloud photographs as black glass, which, in a polished state, was not readily obtainable.

Mr. A. Cowan said that Bates's black varnish made a good backing. He showed two plates: one that had been thus backed and exposed under a cut pattern to the light. The pattern was clearly defined, whilst on an unbacked plate that had received only a quarter of the exposure the form was quite indistinguishable—lost by halation.

Mr. J. Weir-Brown then read his paper on *Toning Bromide Prints*, and illustrated it by a series of prints toned and untoned, and by practically demonstrating the process before the members.

Mr. Cowan inquired whether a very thorough washing was not necessary before applying the intensifying solution.

Mr. Weir-Brown said that it was, and that to complete it he used a solution of peroxide of hydrogen.

Mr. W. E. Debenham would like to know to what extent Mr. Weir-Brown's experiment had supported the suggestion that he (Mr. Debenham) had made at a previous meeting, that the want of gradation in the shadows, which was one of the principal defects in gelatino-bromide prints, might be alleviated by a toning process.

Mr. Weir-Brown said that in one case prints had actually been made brilliant by toning when before the shadows were very flat and heavy. This was particularly the case when a print had been toned, then washed until the colour due to toning was gone, and then toned again.

Mr. A. Haddon said that in this case there was a reduction similar to that effected by Farmer's process. In that case hypo was mixed with ferricyanide, and the silver was dissolved at once. In the present instance a salt was formed, which was slightly soluble in water, and by long washing was removed.

Mr. Gower inquired what was the use of acetic acid in the formula.

Mr. Weir-Brown replied that the yellow stain washed out in a quarter of the time that would be necessary without it.

Mr. T. Bolas thought that nothing was actually lost by toning and sufficient washing. The details in the deep shadows showed much better after the process.

Mr. Weir-Brown asked whether a little of the acid left in the paper would affect the result.

Mr. Haddon thought not, acetic acid being volatile.

The Hon. Secretary could endorse what Mr. Weir-Brown had said. Until he used acid in the solution he could not get rid of a yellow stain.

Mr. Cowan said there was no doubt the gradation was improved by the process.

The Chairman said that it was very valuable to have a means for varying the tone, and especially for improving the gradation of bromide prints. He had tried the process, and found that an over-exposed print had been made a bright one by toning. He was sure the Association would tender a hearty vote of thanks to the lecturer, which was done.

Mr. T. E. Freshwater said that Mr. Debenham had lent him a lens by Suter, one of the extra rapid aplanatic kind, to try on photographing the larger subjects of the insect kind for the lantern. Mr. Debenham had thought the lens should be suited for this kind of work on account of its fine definition when used for portraiture or otherwise. He had found this to be the case, and now showed a slide of the May fly made with the instrument. Being of longer focus than was generally employed for microscopic work, there might be difficulty in extending the apparatus sufficiently.

Mr. J. H. Sinclair was elected a member of the Association.

CAMERA CLUB.

On Thursday, May 7, Mr. Willis gave an address entitled *Clam-Chowder*. Mr. F. Machell Smith occupied the chair.

Previous to the lecture the Hon. Sec. handed round some examples sent by Messrs. Fallowfield of their film-carriers for fitting in sheaths or slides.

Mr. Willis's paper treated chiefly of the influence of temperature in developing platinotype prints, and some examples were shown. Amongst other illustrations, also, were some excellent examples of platinotype prints upon wood for panels and decorative work. These have since been arranged upon a screen for exhibition at the Club.

A discussion followed.

On Thursday, May 21, Dr. Acworth will read a paper treating of the flash light.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

April 21.—General meeting.—Mr. Oakley in the chair.

This being a lantern night, a number of pictures were exhibited upon the screen by Mr. Grover, Mr. Hudson, and the Secretary, after which the prize slides belonging to Messrs. Mawson & Swan were exhibited, and excited general admiration.

Another meeting was held on the evening of May 5—Mr. J. Traill Taylor (President) in the chair—when Mr. Howson and Mr. Agnew attended and gave a demonstration on the making of lantern slides on the Ilford plates. Four negatives were supplied by the members, and these received ten, fifteen, and twenty seconds' exposure respectively, and the fourth was exposed to the light of an ordinary wax match, the first three at a distance of eighteen inches and the latter at eight inches. They were all developed in the same dish by means of the Ilford universal hydroquinone developer, and, although the exposures had been so varied, four perfect lantern slides, which could hardly be distinguished the one from the other, were the result, thus showing the extraordinary latitude which is allowed by these plates. Mr. Agnew then developed and toned two slides on the ordinary Alpha plates with excellent results, showing that by long exposure a red tone was the result in the first place, which could afterwards be toned to any colour desired in the combined hypo and sulpho-cyanide bath. But a more interesting demonstration still had been prepared by Mr. Howson. He brought with him a picture printed on Alpha paper by Mr. Agnew in 1886, and which formed the frontispiece of The British Journal Photographic Almanac for 1887. This picture, along with a number of others, had lain undeveloped, simply packed in some brown paper in a cupboard in Glasgow, ever since that year, and Mr. Agnew now developed and afterwards toned a most beautiful print from it, which is to be framed and presented to the President of the Society. Nothing could give a more striking demonstration of the keeping qualities of Alpha paper.

On May 19 Mr. Newman will lecture on *High-speed Shutters*.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

May 9.—Notwithstanding the cloudy weather a fair number of the members attended the field day arranged for this day to Highgate and district, satisfactory work being done.

May 11,—Mr. J. W. Marchant in the chair.

A demonstration on the working of platinotype paper was given by a member. Prints from the frames were passed round for inspection, showing the depth of printing necessary, and were then developed. The bath was kept at about 75°, and in some instances, where the shadows were a trifle heavy, the dark portions were withdrawn from the developer, while the lighter portions were allowed to gather strength.

Numerous questions were asked and answered.

On Monday, May 25, a demonstration on the working of kallitype paper will be given by Mr. F. W. Cox. Visitors will be welcome.

HOLBORN CAMERA CLUB.

May 8,—Mr. Frederick Brocas (Vice-President) presided.

Mr. Arthur Lawton was elected a member.

Two representatives of the Autotype Company attended, and gave a practical demonstration on the Autotype or carbon process. After giving an outline of the method of preparing the tissue, the demonstrator went on to speak of the printing, which he characterised as the only obstacle to overcome in the carbon process. The development of the picture was, to a great extent, under control, but it was quite as well to have a properly exposed print. For this purpose he showed three actinometers, one, the simplest, acting by colouring a piece of silver paper to a standard tint. The other two were on a different principle, one having a numbered scale, and the other a scale of tiny negatives of varying densities. He then mounted some exposed prints, and developed them by placing in hot water, and washing away the soluble gelatine in which the picture is buried. Development was then stopped by placing the print in cold water, and, after placing in five per cent. solution of alum to thoroughly discharge the bichromate salt, it was thoroughly washed and hung up to dry. For negatives made in the ordinary manner, an additional operation becomes necessary; for, if the printed tissue were laid down at once on its final resting-place, the picture would be inverted. To remedy this the exposed tissue is laid down on a temporary support, such as a thick paper with a hard, highly polished surface, from which it is finally transferred on to its intended support, such as an opal. The process is an extremely simple one, and recommends itself to all amateurs.

Twenty members attended the club outing to Pinner on Saturday. Leaving Pinner they walked to Ruislip, through Eastcot, passing an old inn with the curious sign, "The Case is Altered." The walk was a very pretty one, and in fine weather would be a paradise to amateurs, or the plate-makers. Last Saturday was rather dull, but a very enjoyable day was spent, some eighty plates being exposed, finishing up with an excellent tea at the Swan Inn, Ruislip.

BRIXTON AND CLAPHAM CAMERA CLUB.

May 7.—Mr. T. J. Bartrop gave a lecture entitled *A Tour in the Ardennes*, illustrated by some eighty or ninety lantern slides taken with a hand camera by himself and his party on a trip last August.

On Saturday, the 9th inst., the first outing of the season took place. The district chosen was Perivale, but the dulness of the day and the poorness of the scenery somewhat damped the ardour of those who took part. Some good views, however, were obtained of the church and rectory. There are also a few pictures to be had along the canal.

The next meeting will be held on the 21st inst., when a lecture will be given on *Hand Camera Work*, by Mr. W. H. Powell.

RICHMOND AMATEUR PHOTOGRAPHIC SOCIETY.

At a special general meeting of the Richmond Amateur Photographic Society on Friday, the 8th inst., Mr. Cembrano in the chair, it was resolved that the Society should be called the Richmond Camera Club, and the alterations in the rules consequent on the change were made.

At the ordinary meeting which followed the subject for discussion was *Fixing and Washing Gelatine Negatives*. The Chairman opened the subject, and recommended the use of two separate fixing baths in the case of valuable negatives.

Mr. Ardaseer explained the chemical changes in fixing, and insisted on the importance of leaving the plate in the fixing bath a sufficient time for the insoluble bromide that was left in the film to be converted into the soluble form, which could be washed out.

Several other members took part in the discussion.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS OF GREAT BRITAIN AND IRELAND.

April 30.—A successful meeting was held at the Talbot Hotel, Sheffield, the object being the formation of a Sheffield District Branch. The Chairman (Mr. J. Crosby, Rotherham) explained to those present the objects of the National Association of Professional Photographers of Great Britain and Ireland, and how and where the scheme for such a Society had first originated. During the course of his remarks he said, judging from the gentlemen present that evening, the branch which they were about to form would be very prosperous.

After the enrolling of all there in the parent National Association of Professional Photographers of Great Britain and Ireland, the old and new members decided that a District Branch should be formed, and pledged themselves to support it to their uttermost.

The following gentlemen were elected to the respective official posts: *Chairman:* Mr. J. Crosby (Rotherham). — *Vice-Chairman:* Mr. Dakin (Sheffield). — *Treasurer:* Mr. Dickinson (Sheffield). — *Committee:* Messrs. Seaman (Chesterfield), G. V. Yates (Sheffield), J. E. Eddison (Barnsley), Whaley (Doncaster), Ainley (Sheffield), Shingler (Sheffield), Wilkinson (Sheffield).—*Secretary:* Mr. A. E. Yates (Sheffield).

Letters of apology were received from many expressing their regret at their inability to attend on account of ill-health.

The next meeting will be held on Tuesday, May 26, at seven o'clock.

THE STEREOSCOPIC CLUB.

May 6.—Meeting at Brooklands Hotel, near Manchester.—Mr. W. J. Cunliffe (President) in the chair.

The Hon. Secretary (Mr. W. I. Chadwick) read several letters received, congratulating the members on the formation of the Stereoscopic Club, and expressing hopes that reports of the proceedings would be continued in The British Journal of Photography.

Mr. James Wilson and Mr. Alfred Tysoe were elected members.

The Chairman referred to the remarks of Mr. W. I. Chadwick at the last meeting, viz., that 3-inch picture taken with a 5-inch focus lens, and a 6-inch picture taken with a 10-inch lens, and a 12-inch picture produced by a 20-inch focus lens—all from the same position—would each contain exactly the same amount of subject, and in the three pictures the proportions and perspective

would be precisely alike; also if these three pictures were respectively viewed at distances corresponding with the focus of the lenses employed to produce them they would all "look" of equal size, and each would convey to the mind of the observer the impression of *natural* size. But, notwithstanding the very able manner in which the subject was treated by Mr. Chadwick, he (the Chairman) was not quite sure that all the members fully realised what had been said; he had therefore had constructed some apparatus with which to ocularly demonstrate the facts, which consisted in two wooden boxes about 12 inches square by 28 inches long; in one end of each was a small sight-hole and opal glass coverings to the posterior ends; a transparency on glass was fixed inside each box. The members, without being informed of the respective sizes or positions of these pictures, were invited to inspect them; the unanimous opinion was that they were of equal size, or, at any rate, it would only be *guessing* to say which was largest or smallest; but, when the posterior opal coverings were removed and the pictures revealed, one was found to be 4 inches diameter, fixed at 12 inches from the sight-hole, and the other 8 inches diameter, arranged 24 inches from the point of sight. Much interest was shown in the manifestation, and the Chairman presented the apparatus to the Club.

Mr. James Wilson humorously remarked that, as it had been proved large pictures had no advantage over small ones, he had great pleasure in presenting to each member present a portrait of the Hon. Secretary, postage-stamp size.

Mr. Chadwick appreciated the joke as well as the picture, but did not wish to be misunderstood; he had never said there was no advantage in large pictures except under certain conditions, and the stereoscope was one of these.

The Chairman followed with a lecture and demonstration on *Contact Printing and Camera Printing of Transparencies for the Stereoscope*. There were two styles in which stereoscopic transparencies were usually finished, one in which the dual pictures were surrounded by a white margin, and the other, which was by far the most effective, consists in a black or opaque margin and division between, produced by cut-out paper masks inserted between the two glasses, the aperture in the masks forming the finished size of pictures. The size and centres of the dual pictures were again referred to, and the difference was explained between what should be better known as centres of *picture* and centres of *subject*. A slide was passed round for inspection, the centres of the picture being $2\frac{5}{8}$ inches, whilst the centres of the subject were $2\frac{3}{4}$ inches, and in the stereoscope the effect was of a landscape *beyond the mount*—in relief—whilst in the next slide the centres of the picture—formed by the cut-out paper mask—were $2\frac{7}{8}$ inches, and the centres of the subject $2\frac{3}{4}$ inches as before. This, however, when viewed in the stereoscope, represented the mount *beyond the landscape*, and gave a confusing and unnatural effect. Although by a properly constructed printing frame it was quite easy to print correctly by contact, and with which he had made some hundreds of stereoscopic slides, he was much in favour of camera printing when daylight could be used. He had at first great hopes of the ground-glass-coated plates of commerce—those coated on the matt side—for contact printing, as they simply required a single cover glass in front; but the coarseness of the matt surface was a serious drawback. When, however, plain glass plates were used for contact printing, it was necessary to protect the film by a cover glass in front and back them with fine ground glass—thus three glasses—as the ground glass provided in ordinary stereoscopes was very much too coarse, and in some instruments it was not provided at all. Referring again to camera printing, the ordinary stereoscopic camera being used with twin lenses, the transposing is done by the lenses themselves at a single operation, and when the negative is copied through the glass the resulting picture can be looked at through its own glass with a fine ground glass at the back, which serves to protect the film. Thus only two glasses in all, this being a great advantage in point of lightness; but the great facility with which the adjustments could be made was, perhaps, the greatest claim for camera printing.

Mr. J. Wilson exhibited about twenty transparencies from negatives he had taken last year at Niagara. These were printed and mounted according to the club standards, and considered of a high order of merit.

Mr. Chadwick exhibited a Monocular stereoscopic camera—an instrument of bygone days—kindly lent to him by Mr. James Martin, of London. This contained a motion for converging the axis of the lens between the first and second exposure to a certain point in the view, first one side and then the other, not parallel axes as in modern twin lens stereoscopic cameras. This, however, was a very bad principle, and having seen it advocated in some of the recent numbers of one or other of the photographic papers, &c., he would, at another meeting, explain its incorrectness.

EDINBURGH VIEWFINDERS' CLUB.

May 4,—Mr. F. Dundas Todd in the chair.

A considerable portion of the evening was spent in discussing the merits of a number of prints submitted to the consideration of the members.

The members of this Club have agreed to criticise any prints submitted to them, and to give hints as to the most suitable printing process for a picture. All pictures should be addressed to the Editor of the *Scotsman*, and forwarded not later than the end of the month.

EDINBURGH PHOTOGRAPHIC SOCIETY.

May 6,—Mr. Bashford (President) in the chair.

The chief business of the evening was a paper by Mr. Bashford, on *Allotropic Silver*. Silver may exist in three forms. First, allotropic, which is Protean in its nature, sometimes soluble, and occasionally insoluble, in distilled water. It may be of almost any colour, some of them being particularly brilliant and lovely. Unlike normal silver, it is very soluble in some forms and very active. The second form is the intermediate, and may be yellow or green in colour. It always shows metallic lustre, is never plastic, and is chemically inert. The third form is ordinary silver.

Mr. Hume wished to know if the allotropic forms possessed any resisting power to the more powerful reagent as compared with normal silver.

Mr. Bashford said it was peculiarly sensitive to all forms of energy. Chemicals that have no action upon normal silver produce powerful reaction upon the allotropic form.

Mr. M'Alpine wanted to know if the different allotropic forms could be converted into the haloid salts, and, if so, had they the same properties of the haloid salts of ordinary silver. He thought that the silver was simply in different states of aggregation.

Mr. Bashford had no knowledge from tests by himself, but presumed the results would be the same, as Carey Lea was of opinion that the base of the halogens was really silver in its allotropic form.

Mr. Forgan had examined some of the deposits of the allotropic forms with the microscope, and, after comparing them with a deposit from a weak silver nitrate solution, had come to the conclusion that they were composed of ordinary silver in a peculiar state of aggregation. On scratching the deposit he found the normal metal underneath.

Mr. Bashford thought the microscope was of little use in investigating this subject; what was really wanted was spectroscopic examination.

Mr. Powell submitted some Ilford plates that were exposed after being kept for four years, and produced good negatives. More interesting still were some that, after being exposed, had remained in the slides for the same period, and on development a few weeks ago showed no trace of fog. The developer used was hydroquinone.

Correspondence.

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

COLOUR PHOTOGRAPHS.

To the Editor.

Sir,—Upon reading in your Journal of the 24th ult. Captain Abney's presidential address, and giving his description of M. Lippmann's method of producing colour photographs, the question suggested itself whether, by spreading the sensitised material on a silvered or platinised surface on glass, any distinct impression of a bright spectrum image when thrown upon it could be developed into a colour image? The writer is supposing that the mercury or mercury vapour in M. Lippmann's plan has played no chemical part in the formation of the image, but simply that it acts as a brilliant contact-reflecting surface. Or, again, if on such a silvered or platinised surface a thin layer of selenium were melted and spread before the application of the sensitised substance, and then contact of this with the metal-mirrored face made at the moment the spectrum image was thrown on the sensitised prepared surface, or at that moment connected with the elements of a single cell of a small battery, would the irridiscent image occur, or be in any way altered on development? Perhaps some able experimenter may be induced to answer these questions, if worth any attention.—I am, yours, &c., Quæsitor.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the Editor.

Sir,—May I be allowed to call the attention of those interested to a lecture which is to be given by Mr. A. Haddon (our Curator) to the members of the above Association on *The Theory of Ordinary and Polarised Light*, on May 28? As it is not probable that the lecture will be published, the members will be extremely pleased to see any visitors who may favour them with their company at the Champion Hotel that evening.

May I also take this opportunity of stating that we are now receiving many new members, and shall be glad to welcome many more? The subscription (five shillings per annum) is kept extremely low in order to accommodate our numerous country members, who can, perhaps, only visit us two or three times a-year.

We are forming a photographic lending library, and amongst our members we number most of the men of "light and leading in the photographic world, several of whom are our most constant weekly attendants, and always ready to assist and advise inquirers in the most genial manner.

If the advantages of membership of such a prominent and central Society were more widely known, there would be far less heard of such ideas as federation or affiliation. It may be, as Mr. Chapman Jones asserts in an article in your contemporary, that there are too many photographic societies round London, but if the leading spirits of such would bestir themselves, and get more into touch with other workers by association with one or other of the leading Societies of London in addition to their own Society, there would not be the difficulty in obtaining papers or lectures that the smaller Societies seem to experience now, by all accounts.

Thanking you, sir, in anticipation, I am, yours, &c.,

The Hon. Secretary,
London and Provincial Photographic Association.
The Champion Hotel, Aldersgate-street, E.C.

CANADA AS A FIELD FOR PHOTOGRAPHERS.

To the Editor.

Sir,—Naturally enough, the question as to whether Canada is a good field for photographers has two sides; most questions have. Two persons going over exactly the same ground, and getting different experiences, have totally different stories to tell. Each story is true, from its

own standpoint; but it depends, too, upon the temperament of the person who has had the experience, and who tells the story.

Mr. George Oakley, on page 303, comes down upon the question with a rush, and he begins with something like an imputation because a man is to be paid for an equivalent, and he uses slang to state his case. If it was so good as he seems to think, neither should be necessary. The scheme proposed by Mr. Henry, and sent out by Messrs. Percy Lund & Co., seems, so far as I have been able to gather from a perusal of the circular, fair aud square and honest. And, further, it is stated that, if the thing is carried out on the proposed lines, remuneration is to be paid to Mr. Henry. I do not know him, have never seen him, nor am I going with the party, but his words are honestly put and have the ring of truth.

Mr. Oakley writes apparently as a disappointed man. Some men cannot make a great success of life either at home or in the colonies, but Mr. Oakley may be not one of such. I once travelled on an Atlantic steamer, coming to England, with a man who inveighed against Transatlantic ways, the country, the people, and what not; and I found that he was going back by the same steamer he had travelled out by. He had been about ten days on the other side, and had never gone out of the port into which the steamer took him. He would go back and tell a fine tale. Many would believe him, for there are many persons of the sort Carlyle has made reference to.

The *bona fides* of the proposal that has worked Mr. Oakley up can be looked into; but because Mr. Henry thinks it can be made to pay it does not follow that he lies because his experience has been different from Mr. Oakley's.

I know the United States and Canada, and I believe that a well-organized scheme, worked out by earnest men, not afraid to work, and ready to go off the track to get their work, will pay. It is in their hands, any way, and those that go must understand it. Mr. Ramsey writing from Toronto can be understood; he would be competed with. But the world goes on by competition. Mr. Henry's seven years' experience can be put safely alongside of Mr. Oakley's four years, and men of pluck need not fear.—I am, yours, &c.,

AN AMATEUR.

EMIGRATION TO CANADA.

To the EDITOR.

SIR,—May we have space for a few words in reply to two correspondents whose letters appear in your current issue? With regard to Mr. J. G. Ramsey's (of Toronto) warning, we are not at all surprised that Canadian photographers should wish to discourage emigration on a thoroughly organized plan, and advise those who wish to go out to do so individually, and to "hang on to their 50*l.*" until they reach the country. Mr. Ramsey has not seen the prospectus of the Practical Photographers' Federation, and from the way in which he speaks of the 50*l.* one would imagine that it was a sum to be paid to ourselves. If we were advising individual photographers to emigrate in the hope of finding situations, we should certainly urge them to "hang on" to their 50*l.*, or as much of it as they could after paying expenses. But the Federation that we propose is on co-operative, profit-sharing lines; and the 50*l.* is calculated to cover cost of saloon steamboat accommodation from port to port, railway fares, and living expenses until work is commenced, and apparatus and materials for the work of the Federation. We don't think that even Mr. Ramsey can show how a photographer can leave England and set up in Canada as his own master, and yet "hold on" to very much cash out of a capital of 50*l.*

Mr. George Oakley seems to have gone to Canada on the very lines we deprecate, and to have returned, after making a failure of it, with a very black opinion of the whole Dominion. It is because we are well aware of many of the facts that Mr. Oakley states that we took up Mr. Henry's Federation plan. We are aware that there are hundreds of men in Canada asking for work at any price; so there are in England. But in neither country do they interfere with men of real talent, or with firms with a sound business organization. Many of them in both countries would be better employed, and happier too if they could be content to "dig potato patches." Mr. Oakley makes out a black but somewhat generalised case about the prices which prevail throughout the Dominion. There are numerous men who make *cartes* at 1*s.* 6*d.* per dozen in England, and yet there are higher-price men who flourish, and so in Canada.

Surely Mr. Oakley must think that Englishmen are absolutely without information as to the extent and capabilities of the Dominion when he calmly states that "a party of *six* Yankees went *all through Canada* working at a cheap rate. They *gobbled up everything* in the way of out-door work" (italics our own). And because these six people did this *three years ago*, and because another "gang" has since attempted the same thing and "busted," Mr. Oakley would apparently have us believe that all out-door work in Canada has been "gobbled up" for ever.—We are, yours, &c.,

PERCY LUND & CO.

CANADIAN FEDERATION SCHEME.

To the EDITOR.

SIR,—I have read with some interest the letters of Messrs. Oakley and Ramsey in this week's issue, inasmuch as the correspondence only tends to confirm the statements laid before the public in an article, entitled "The Canadian Northwest," which appeared in the *Practical Photographer* last August. In this article I pointed out in the strongest terms the utter folly of photographers emigrating to Canada alone and without capital, simply on "spec."

My acquaintance with the lower provinces is not profound, but I have spent considerable time in that district and, as I usually keep my eyes open, I could not fail to see the pitiable straits to which many photographers were reduced—hence my article.

But your correspondents are both somewhat beside the question. My Federation scheme has not been designed with a view to drafting forty photographers into the lower districts of Canada, there to wander at large without aim or object; nor is it proposed to start a lot of petty studios in order to still further cut rates in the scramble for the almighty dollar.

I have seen specimens of the "companies" mentioned by Mr. Oakley, and directed attention to them in the *Canadian Northwest*. Such companies are usually limited to two shareholders owning a cheap viewing outfit between them. When a "company" of this description starts business without capital, credit, or system, and, in many cases, without a particle of ability, it is hardly a matter for surprise if they become (as Mr. Oakley so charmingly expresses it) "busted in less than a month." To arrive at this melancholy conclusion in so short a time betokens an alarming lack of capital, since such a "company has positively no expenses of rent or rates to meet, and the cost of board and lodging is but 12*s.* *a-week*.

Mr. Oakley's assertion that "farmers do not handle much money," &c. is about as contemptible and misleading as the manner in which he phrases the preceding sentence. Truly one "*may* travel twenty miles without seeing a human habitation" (or even two hundred miles); but who, with a grain of sense, would dream of doing anything so utterly worthy of an imbecile?

Mr. Ramsey is in error about the *handing over* of 50*l.* My remuneration is distinctly stated in the prospectus, and I venture to think the sum of 250*l.* is anything but excessive payment for the labours of organization, for three months' services in Canada, and for the payment of all personal and travelling expenses during that period.

The very foundation of our scheme depends upon *systematic* co-operation, a *practical* union of capital and labour; but, as the prospectus is already advertised, I need hardly occupy your valuable space by dealing at length with the objects of the Federation. It is probable Canadian photographers would prefer to cope with *individual* opposition, rather than the competition of a powerful company of accomplished craftsmen—this is but natural—especially when in a state of uncertainty as to the location of the head centre.

In conclusion, I beg to inform your correspondents that I am well acquainted with the pitiable state of depression existing in the lower provinces, and that I do know (and that right thoroughly) of other, and richer, districts in the Dominion, where good prices may be obtained without having to accept cabbages as *quid pro quo*. Furthermore, we do not propose to start in a weakly condition; consequently we shall be totally unaffected by opposition "companies," nor will the low-price workers of Toronto and Peterborough affect us in the slightest degree.

The very strength and system of our Federation will enable us to govern reasonable prices *in the whole of our district*, and to protect our branches from any rate-cutting parasites who may happen to cross their path, and this we will do at all costs. Fair competition will not affect us; rate-cutting we will not endure.—I am, yours, &c.,

W. ETHELBERT HENRY,
Organizer, Practical Photographers' Federation.

Olvaston, near Derby.

Exchange Column.

Wanted, eight-inch condenser, in exchange for magnesium enlarging lantern and lamp (by Solomon).—Address, A. H., 31, Lynton-road, Crouch End, N.

A dark tent, fitted with shelves and small cistern and sink, in exchange for cabinet burnisher, in good condition.—Address, B., 37, Nealdon-street, Landor-road, Stockwell.

Taylor's half-plate wide-angle rectilinear lens, quite new. Offers. Wanted, one Dallmeyer No. 1 quick-acting single stereoscopic lens, four and a half inch focus, or a pair similar by good maker.—Address, M., Alex. Jeffrey & Co., 140, West Nile-street, Glasgow.

Wanted, 20×16 camera, with one or more slides, no matter what condition, in exchange for whole-plate camera, lens, shutter, and stand; also good half-plate tripod, in exchange for reversible plain background.—Address, R. W. BEAVAN, Photographer, Newport, Monmouthshire.

WE have received from the London Sensitised Paper Company, Lawford-road, N.W., a sample of their "Sans Egal" brand of paper. It prints evenly and takes a good tone.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—May 14, Last lantern night. May 18, Whole-day outing to Gomshall and Shiere. May 21, Ordinary meeting. May 28, *Theory of Ordinary and Polarised Light*, Mr. A. Haddon. Visitors cordially invited.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 27, *Cameras and Dark Slides*. Bank Holiday, outing at Gomshall (Surrey). Train from Charing Cross at twenty-eight minutes past nine: London Bridge at thirty-five minutes past nine. Does not call at Cannon-street.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

A. J. Bailey, Pimlico, London.—*Photograph of Sunderland football team.*

John Hodge, Stonehouse, Plymouth.—*Two photographic groups containing portraits of Her Majesty the Queen, Prince and Princess of Wales, Prince Albert Victor, and other members of Royal household, and the Committee of the Royal Naval Exhibition.*

ARTIST.—We are unacquainted with the practical details of dry-point work.

W. FORD.—Your question in no way relates to photography, therefore it does not come within our province.

R. E. (Cheshunt).—We must trouble you to repeat your query fully, as we do not remember in the least what your former question was.

TONER IN DIFFICULTY.—Use clean dishes, with clean fingers, so as not to contaminate the solution. It is this that causes the gold to precipitate.

H. G. M. CONYBEARE.—A lens having an open aperture of *f*-6 will work as well when stopped down to *f*-16 or less as one having an open aperture of *f*-8.

SILENDO.—The pictures referred to as being examples of "photography in colours" are printed from collotype plates by the means employed in chromo-lithography.

W. C. W.—For general all-round work a lens of the "Rapid" type will be best. It includes quite as wide an angle as is pictorial. The use of wide-angle lenses should be discouraged, except in special cases.

C. HOGG.—It is impossible for us to say if your proposed detective camera infringes any of the many patents that are now in existence. The only way to obtain the information is by making a search at the Patent Office.

LEEDS.—A good brand of dry plates for negatives for photo-lithographic work is Mawson & Swan's photo-mechanical plates. They yield negatives very much of the wet collodion type. They are slow, but quick plates are things to be avoided for this class of work.

L. F. S.—To render the bichromated gelatine insoluble without exposure to light, add a little chrome alum or a small quantity of sulphuric acid. We have mislaid our authority *re* purifying alcohol by permanganate, but you can easily try the experiment yourself.

W. A.—One of two things is certain. Either the slides of the camera are not in register, or the lens does not work to focus. The former is, no doubt, the fault. We have never met with a lens by the maker named in which the visual and chemical foci were not coincident.

C. COWELL.—Enlargements can be made direct on carbon tissue, but a solar camera must be employed for the purpose, and that cannot be used without sunshine — often a scarce commodity in this country. A powerful arc light would answer, but this, for every-day work, would become somewhat costly.

ROBERT J. HENDERSON.—Lead toning is not to be recommended, on the ground that the prints will not be permanent. Yellowness, as in your case, is a very common occurrence with lead toning on account of sulphuration. The presence of free nitrate of silver in the print facilitates the toning as well as the sulphuration.

C. WASSEL wishes to know what is the best strength of silver bath for sensitising albumen paper. He says so many strengths have been given at different times that it is very misleading.—The strength of the bath must be governed by the amount of chloride in the albumen and the time of floating. Makers of the paper generally supply formulæ for sensitising, and that will generally be found the best for that particular kind of paper.

C. TOMLINS.—You must not be discouraged because—although you have followed accurately the instructions given in the manual—you do not meet with success with your first attempts with wet collodion. This is a process that requires learning, and the knowledge gained by an amateur in working dry plates is not of much avail. The manual is right, and one of the best. It is you that are wrong. Persevere and work strictly according to the details of the manual.

A. McC. writes:—"In a report of the Philadelphia Photographic Society recently published in your JOURNAL, a gentleman was spoken of as having brought specimens of *reversed* rubber type for naming negatives, by pressing direct on the film. Could you kindly tell me where I could obtain a set, as it seems the simplest way of naming and numbering negatives?"—In reply, we some time since had a visit from one of the representatives of Messrs. Anthony & Co., New York, who had these types in his possession. A letter addressed to this firm will doubtless bring you the information.

BICHROMATE POISONING.—"Griff" writes: "Could you tell me what to do? I have three fingers very badly poisoned, and they are most painful. I have tried vaseline for preventing it, but it is a failure. Working in collotype and photo-lithography, it is important to get them (the fingers) well if possible."—There are two forms of evil arising from the use of bichromate of potash: one is that from the salt entering the flesh through abrasions of the skin, and causing ulcers of a painful nature; the other takes more the form of a disease in the skin. Our correspondent does not say which he is suffering from. If the former, treatment with very dilute ammonia and poulticing is good. If the latter, the strong nitrate of mercury sparingly applied at bed-time, and a *very* dilute solution of carbolic acid in alcohol to allay the irritation, will be found beneficial. If our correspondent will write giving fuller particulars of the symptoms, we may help him further.

STAMP writes: "I am just now doing a lot of the midget plates known as 'Postage Stamp Photographs,' but I find a difficulty in getting a suitable adhesive agent. I have been using gelatine, but find that it makes the prints very brittle and curl up very much. Have you any idea what agent is used on the commercial postage-stamp, or could you please tell me of some suitable adhesive agent, and also suggest a way of drying the prints to prevent their curling, as I have a great many in hand just now?"—The adhesive on the postage stamps is dextrine, and this would, no doubt, answer our correspondent's purpose. The addition of a *very* small proportion of glycerine would prevent the curling.

A. J. A. says: "I have inquired through our leading chemist for a solution or ink that gives a coloured mark which disappears entirely when dry, and he refers me to a photographic chemist as the only means of success. Is there such an ink sold, or any photographic or other chemical to answer this purpose? Will chloride of cobalt do?"—There are many such inks, but we are not aware that they are articles of commerce. If the writing be made with a solution of nitrate of silver with a little citric acid added, it will remain invisible till exposed to the light. Solutions of the chloride or acetate of cobalt, when written with, remain invisible till heated, and the writing disappears again on cooliag.

GOLD writes: "Will you please inform me how to proceed to precipitate a sovereign, and make it into chloride of gold, and how I should test it to know how many grains it contains?"—By "precipitate" we presume our correspondent means dissolve a sovereign. This may be done in aqua regia—one part pure nitric acid to three of hydrochloric acid, no more acid being used than is absolutely necessary for the solution. Heat should be used to facilitate the solution. The solution is then diluted, neutralised with carbonate of soda and filtered, and again made slightly acid with hydrochloric acid. Each grain of gold dissolved will be about equivalent to two grains of the commercial chloride of gold.

M. M. "when photographing buildings finds difficulty in having his lines straight, such as the lines of a tall building. He raises the front with the lens to get it in proper position on the plate, but finds he has to tilt the whole camera, with the result that the lines are not upright, but inclined inwards at the top of the picture, although using the swing back. Is it right to tilt the camera at all, or should it be perfectly level? He uses best lenses and good camera, but is in a fix which is the right thing to do—to raise the front only and use the swing-back, or tilt the camera."—The camera may be tilted if necessary, but then the swing-back must be adjusted so that the lines of the building appear upright. There is no difficulty in the matter. The lens may be raised as well as the camera tilted.

AN AMATEUR asks the following questions: "1. A cabinet lens is wanted quick enough to take a restless subject, and at the same time generally useful for *cartes* and cabinets; what do you advise? The choice lies between 3B and 2H (Dallmeyer). The studio is twenty-four feet in length, and there is more available length by taking the camera into another room.—2. Can you also advise me as to studio blinds? Should they work laterally or vertically—for the roof? Half-a-dozen ordinary spring-acting window blinds could be fitted to the slanting roof; would that do?—3. What shutter do you recommend for studio work."—1. The B lens will be the quicker of the two and, for this reason, the best.—2. Working vertically will be preferable.—3. Any of the ordinary flap-shutters in the market will answer.

R. SLINGSBY writes: "It may be interesting to you to learn that a medal was awarded to some of my work at the late show at the Crystal Palace, though I don't appear in it. Last February, I and my assistant were engaged to work the Mayor's fancy dress ball, at Birmingham, on the 4th of February, for J. Collier. I took about a quarter of a ton of apparatus, including cameras, lenses, plates, &c., everything except a background and a chair or two. We took a 12×10 interior and about a hundred cabinets, single figures and groups, in the two evenings, by the flash light. I don't care a toss about a medal, only when I sent to the Edinburgh Exhibition, last November, a lot of portrait work by the flash light, they were never looked at by the judges.—Mr. Slingsby is scarcely correct in saying that the pictures he sent to the Edinburgh Exhibition were "never looked at by the judges," for we happened to be present when the judges were on duty, and to our certain knowledge *every* exhibit was examined by them.

CANADA.—Apply two thicknesses of the transfer paper whilst the prints are still on the glass: they may then be mounted without much loss of gloss. If you wish the gloss to be at its maximum, after applying transfer paper, cement on the mount, and allow to dry under pressure. When dry, strip.—Our correspondent, *re* the emigration to Canada scheme, writes: "I see that there is a scheme on foot to get photographers to emigrate—those who can find the fifty pounds. Well, I wonder what next will startle us. I can speak in corroboration of J. G. Ramsey's letter, having had over seven years in Canada, and during that period I visited many towns, and in all there are plenty, and many good ones, so I should advise those who have fifty pounds to spare to take a trip and see for themselves. In London alone there are eleven studios; population, I think, about thirty thousand. Of course, if parties go up into the North-West, they may meet with a locality without opposition; but I doubt if there is a place in the Dominion where one could find a good location without plenty of opposition and hardships."

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CHROMO-PHOTOGRAPHY IN PRACTICE.

Notwithstanding all the misleading statements that have been made in the non-technical press with regard to the discoveries of the practicability of taking photographs in natural colours, the fact remains that we are as far off as ever from this long-wished-for end. Seeing this, one naturally seeks for a means of obtaining the best results in colours by other methods—those of a mechanical character.

Any one at all interested in chromo-photography should not miss the opportunity of viewing the collection of photo mechanical pictures in colour, got together on the occasion of the reading of a paper by M. Léon Vidal on the subject, which are still, and will continue to be for some little time, on view at the rooms of the Photographic Society of Great Britain. They are by different processes, and from various countries—Paris, Munich, Vienna, Berlin, Zürich, Leipsic, Stuttgart, and elsewhere. The details of the different processes by which the specimens are produced are in most instances withheld. However, on a critical examination, it is not difficult for an expert to arrive at a pretty safe conclusion in most instances as to the method adopted for their production. One thing, however, must freely be admitted, namely, that the majority of the examples shown are, far and away, in advance of anything produced commercially in this country up to the present time. It is true that none of them can be classed as pure photography, that is to say, photographs in which no hand work has been expended upon the different *cliches* from which the examples were printed.

It must be distinctly understood that the majority of the pictures are produced by methods analogous to ordinary chromo printing processes, inasmuch as different matrices are used for the different colours. The printing plates or stones being made more or less by the aid of photography, as an incentive to experiments in this direction, we propose now to indicate some of the methods by which prints in colour may be obtained, and probably the ways by which the majority of those on view were made.

In 1876 M. Ducos Duhauron patented a method which he termed "Photographs in colours." His method was to obtain three negatives of the subject—one by green light, another by yellow, and a third by violet light, by means of coloured screens, aurine, eosine, and chlorophyl being employed as different colour sensitisers. From the three negatives thus obtained prints were made on semi-transparent media, prepared with the complementary colours, and then superimposed on each other. The late Mr. W. B. Woodbury devised a process for producing prints in colour. It was this. He made a Woodbury print on paper which had previously had the appropriate colours printed upon it by lithography. By this process M. Léon Vidal, some years ago, produced some excellent work, and evidently does so still, as proved by the specimens now on view.

Another plan is to take three or more negatives of the same subject, and then stop out by hand in each certain portions representing the various colours, finally using these negatives to prepare printing plates or stones for successive printings, as in the case of chromo-litho or chromo-zincography. By this system chromo-collotypes have long been made, but with by no means the success in this country that they have been abroad.

Messrs. Goupil & Co. have for some years past been producing "photogravures" in colours in one printing from a single plate. The method is this: The intaglio plate is inked in with different coloured inks applied locally as required. This method is a somewhat tedious one, and necessarily requires considerable artistic skill on the part of the printer. Notwithstanding this, the firm have shown many excellent examples from time to time in the exhibitions of the Photographic Society. Instead of applying different coloured inks on the same plate, it is obvious that separate intaglio plates can be prepared for the different colours and used for separate printings. Indeed, we strongly suspect this is the method adopted in one or more of the series of pictures now on view in Great Russell-street.

In his paper M. Léon Vidal alluded to the original method of superimposing a Woodburytype in monochrome on paper printed with suitable colours by lithography, and also treating similarly printed paper by imposing upon it a collotype print as being the best in practice. He also expressed the opinion that the claims, which had been put forward by some, that the effects of nature could be obtained by the photographic selective character of the negatives only, without the necessity of retouching or masking, could not be sustained. This opinion is quite in accord with our own, for all the examples we have hitherto seen of this kind would certainly have been much improved by a little hand work or dodging on the negative.

One of the cheapest processes of chromo-photography is that of printing from half-tone relief blocks. Several examples by this method are shown in the exhibition. The blocks may be made from different negatives, representing the different colours, as in other processes, or they can all be made from a single negative, afterwards cutting away certain portions corresponding to the colours not required in that particular block.

As we said at the commencement, all who take an interest in chromo-photography should not fail to visit the present exhibition. They will then, doubtless, realise the fact that while this country has been resting, and is still resting, on the

subject—as is further evidenced by the sparse attendance to hear M. Vidal's paper—our foreign confrères have been going ahead. The pictures on show are not mere small experimental things, but most of them are of large size, and are being produced commercially. Great credit is due to the officials of the society for getting together such a representative collection, which certainly ought to act as a stimulant to English photo-mechanical printers.

A MODIFICATION IN THE SODA DEVELOPER.

Carbonate of soda, in conjunction with pyro, hydroquinone, or eikonogen, may be said at the present time to be the most popular alkali used in the development of plates, films, or paper, mainly on account of its cheapness and the ease with which it is obtainable wherever civilisation reigns. In many respects—even with pyro—it runs ammonia very hard for supremacy, while, with hydroquinone or eikonogen, it is the better alkali to employ, as ammonia—at least, liquor ammonia—for some reason does not appear to work well with the two latter. At the same time it has to be acknowledged that, unless the carbonate of soda be combined with a very large proportion of sulphite of the same base, it possesses objectionable features which have prevented its adoption by a very large number of practical workers.

The great fault of the carbonate—whether employed in the form of "washing soda," the pure crystals, or in the anhydrous state, the result is the same—is that an intense yellow stain is produced in the clear portions of the negative, unless a larger proportion than usual of sodium sulphite is also used. It does not suffice to mix the sulphite with the pyro or hydroquinone in ordinary proportions, as would suffice with ammonia or potash to prevent staining, but the carbonate solution itself must contain its own *quantum*, unless, indeed, this be supplied by an over-addition to the other portion of the developer. But even then it does not follow that immunity from stain is secured, for, the more thoroughly the negative is washed after fixing, the greater is the likelihood of the objectionable yellowness appearing, although it may be quite absent at first.

The yellowing produced by or with carbonate of soda is unique in its character. It partakes of none of the characteristics of fog or of the ordinary developing stain, and moreover, appears to be beyond cure. It may, when it appears, be discharged by the ordinary acid-clearing solutions, but reappears as soon as the last traces of acidity are removed from the film by washing. It may be also absent, or nearly so, when the negative is newly fixed, and yet gradually make its appearance in the course of subsequent washing; but the conditions under which it is present or absent require investigation. All that can be said with certainty is that a very free use of sulphite of soda is needful to ensure complete freedom from the objectionable colouration.

Washing soda is perhaps one of the, if not *the*, most readily obtainable of chemicals wherever the photographer may find himself, and therefore it is not likely that it will easily be deposed from its position of popularity. The antidote to its chief defect is ready to hand, though sulphite of sodium is not so freely obtainable in out-of-the-way places as the carbonate; besides, a great many operators, both amateurs and professionals, object to the employment of sulphite on account of its alleged retarding action on development, and other faults, imaginary or otherwise. In a great measure, therefore, the successful use of carbonate of soda may be said to hinge upon the question of whether sulphite of soda is beneficial or injurious in its action, or, if that doubt do not exist, whether the sulphite is at hand when required.

The rejection of carbonate of soda, however, is not necessary, for a way out of the difficulty is easily arrived at, without the introduction of any great complications into the formula, or the necessity for the use of anything more alarming than a salt that is as readily obtainable as washing soda and almost as cheap. Wherever a tinsmith or plumber exists in the remotest village, sal-ammoniac is obtainable, so that the travelling photographer need scarcely worry himself about his developer if he *be* wedded to carbonate of soda.

By the mixture of carbonate of soda—*i.e.*, ordinary washing soda—and "sal-ammoniac," or crude chloride of ammonium, as employed for soldering purposes, carbonate of ammonium and chloride of sodium are formed by double decomposition, and, though the developing action of the solution thus obtained is not materially altered, the behaviour as regards staining is altogether changed. The failing alluded to seems to be confined to the particular salt of sodium mentioned; sodium hydrate exerts no such tendency—at least, we have never discovered it, even in the absence of sulphite. Additions of chloride, phosphate, acetate, or other salts of soda cause no stain, though the carbonate does; it is not only the crude preparation—not so crude and impure nowadays as it was a few years back—that is blamable for stains, for the purest crystals, and even the anhydrous salt, prepared only for analytical purposes, act in precisely the same manner.

By the addition of sal-ammoniac, however, the nature of the solution is altered; the carbonate ammonium formed is an equally, if not more, powerful developing agent than the corresponding sodium salt, while the chloride of sodium that results from the interchange of elements is perfectly harmless for staining purposes. What, however, is to be said about any other effects the latter salt may have?

In general practice the alkaline bromides are known to be, and are regularly employed as, restrainers in development, while the other haloids are supposed to possess similar properties. But some few years back it was alleged that, so far from this being the case with the soluble chlorides, it was possible, by the addition of chloride of sodium to the alkaline pyro developer, to actually increase its energy, or, in other words, that the addition of common salt in no inconsiderable proportion to the ordinary developer rendered shorter exposures possible. M. Andra and other members of the French Photographic Society investigated the matter and corroborated the opinion previously expressed, and we at the time made experiments in the same direction which, at any rate, showed that the addition of chloride did not *slow* development. Theoretically, then, the addition of sal ammoniac cannot be said to be a disadvantage.

The matter is easily tested however. It must be borne in mind that carbonate of ammonia—not so much *per se*, but by virtue of the free ammonia it gives off—is a more energetic developer than carbonate of soda. Therefore, in calculating the strength of the solution, it is as well to start with a less concentrated solution of the soda salt than is ordinarily employed. We should fix on a fifteen-grain-to-the-ounce solution of washing soda as fully the strongest to be safely used, though we prefer it not stronger than twelve grains; and to this we add one-third the quantity of sal-ammoniac. The salt employed in our experiments has been the crude commercial pro-

duct purchased for soldering and similar purposes, and we have tested this against pure chloride of ammonium without discovering the slightest difference in action. This is important, since the value of the innovation rests chiefly upon the efficacy of the cheap and easily obtained article.

If a solution of twelve grains of carbonate of soda and four grains of sal-ammoniac be made, sulphite of soda may be used or not, as preferred. It is not necessary, except perhaps with hydroquinone, to prevent the yellow stain, though when it is employed the colour of the deposit is blacker than when the sulphite is omitted. This may be used with either pyro, hydroquinone, or eikonogen, in precisely the same manner as if the sal-ammoniac were absent, but with this difference, that, given a "normal" exposure, more bromide must be employed; for, whether it is that the presence of chloride does actually accelerate the exposure, or that some fogging influence is set up when the ordinary exposure is given, the development requires some extra curb. For rapid exposures, especially when hydroquinone is employed, there is a decided advantage in the addition of sal-ammoniac; indeed, under those circumstances development with hydroquinone becomes as rapid as with pyro.

We have already stated that the employment of sulphite, so far as the prevention of stains is concerned, is optional. To prove this, we recommend the trial of the solution given above of washing soda and sal-ammoniac with the addition of *dry pyro* and *without bromide*. The resulting negative will convince, we think, the greatest sceptic of the value of the modification.

Most of the Photographic Societies are now arranging for their summer outing. The lantern has now become so popular with photographic societies that some of them are extending their ordinary lantern season. We are sorry to find that none of the societies have acted upon our suggestion, several times repeated, of having a lantern night for the benefit of the Photographers' Benevolent Association—a most deserving institution. Amateurs are frequently very glad to avail themselves of the professional's dark room and assistance, which often entails extra work and longer hours for the *employés*. One would have thought that at least some of the societies would do something in aid of the above Association, particularly when it is considered that an evening so spent would be an enjoyable one for themselves and friends. Up to the present, only the Photographic Society of Great Britain and the Photographic Club have recognised the Benevolent Association.

Our American friends will, as usual, have some marvellous novelties at the World's Fair; but, when a newspaper paragraph informs us Mr. Edison is preparing a surprise in presence of which photography in colours will be mere child's play, we naturally display some amount of incredulity. This paragraph is to the effect that the long-hoped-for reproduction of images at a distance by means of electricity will be shown by Mr. Edison, not only will the distant objects be visible, but in their natural colours, and every movement will be rendered perceptible to the eye. Most of our readers will remember at a dramatic fête a photographic booth, "run," if we remember aright, by Toole, where for a small sum everybody was instantaneously taken and presented with a picture of himself, which, upon unfolding, turned out to be a bit of looking-glass. Similarly we may expect Mr. Edison, if he show anything of the sort attributed to him, to exhibit to those who attend the séances the image produced in a camera obscura.

But, while such projects as the newspapers have been dealing with must be merely jokes or voyages into the realms of imagination, science has yet penetrated some distance into an unknown land which at no long distant period would have been termed fancy. At the Royal Society's *conversazione* held the other day, Mr. Shelford Bedwell, F.R.S,, exhibited an instrument which was one of the most attractive features of the Exhibition. This was a selenium lamp-lighter which lighted a lamp automatically as darkness came on. Another adaptation of the same principle was an electric alarm for calling attention to the accidental extinguishing of such a light, for instance, as a ship's light or a railway signal-lamp; even the mere shading of the light caused a bell to ring. It is conceivable that a modification of such an instrument might be made and be useful for dark-room purposes by signalling when by any means the margin of comparative safety in the "non-actinic" light of the room was passed.

Mr. Arthur W. Clayden's photographs of clouds taken by reflection from a surface of polished black glass placed at a polarising angle in front of the lens were also exhibited.

Two interesting theoretical and practical studies of the extent to which various rays of light pass through water have recently been published. Herren Hüfner and Albrecht by means of a new spectro photometer have thrown the spectrum of a beam of light that had passed through a column of known length side by side with a spectrum from a direct beam of sunlight. The intensities of the two spectra were then compared in a series of sections by means of the polarisation apparatus, and the coefficients of extinction noted. It was shown that the longer the wave length the sooner, as a general rule, was the light extinguished. There is, however, an apparent amount of irregularity in the extinguishing action. The Vienna Academy of Sciences had sent out a vessel for the collection of certain scientific facts, and amongst them it is seen that one hundred and forty-one feet was the extreme limit at which a white disc could be seen in the central basin of the Mediterranean. Photographic plates, however, were acted upon by light a depth nearly a dozen times as great (sixteen hundred and forty-one feet, to be exact). At the same time this fact has no necessary bearing upon the truth of Messrs. Hüfner and Albrecht's results; for, just as in photo-astronomical work, stars are shown on the negative that mortal eye had never seen, but whose light a sufficient exposure rendered able to impress itself on the plate, an invisible ray in the water would impress itself also if allowed to act for a sufficient length of time. The action of light on the eye is constant, or, if there be a change arising from duration of exposure, it is of decrease in perception, while on a sensitive plate the action is just the opposite—it is cumulative.

Those of our readers who took an interest in the Weights and Measures discussion at the last Photographic Convention will, we do not doubt, be interested by a novel and ingenious proposition by Mr. C. J. Haussen, a civil engineer of Copenhagen, which is to be found at length in the *Chemical News* for the 8th inst. Considerable doubt was expressed on the occasion in question as to the possibility of practically bringing into use the metric system with all its objectionable along with its elegant features. Mr. Haussen proposes that the English foot should be increased in length by about the one-twenty-five-hundredth part of its present length (from 1 to 1·00043), the pound avoirdupois, the ounce, the imperial gallon remaining unaltered. The cubic foot, as Mr. Haussen states, would then contain exactly one thousand ounces of distilled water, not four degrees Centigrade, and its inter-comparison with the metric unit of weight, length, and volume would become apparently easy.

IS PHOTOGRAPHY A FINE ART?

This problem, once more brought to the surface by the whirligig of Time, seems destined to find an established place—become a photographic perennial, in short—and bloom in the same border with our old and familiar friends, "What is an amateur?" "Is retouching immoral?" &c.

The question just now before us, however, is really worthy of careful consideration, or, perhaps I should say rather, of consideration

under different aspects and on its merits, *i.e.*, quite apart and separate from any preconceived idea or personal bias, if such be possible in human thought.

It would seem that this question, "Is photography a fine art?" can be profitably resolved into several other questions, more or less separate from, and independent of, each other. Of these, three at least present themselves at once, viz:—

1. What is included under the term fine arts?
2. What are the features or essential characters of each fine art?
3. Does photography possess *any* of the qualities of a fine art?

It is proposed for the present to limit our attention to the first (and apparently fundamental) inquiry, viz., What is a fine art?

It seems only fair and just in such an inquiry that we should first endeavour to find the origin or parentage of the terms we employ. Laying aside dictionary definitions as being usually too brief and vaguely general for our purpose, we must first collect instances of the customary usage of the term in its early days.

It would seem that, according to Parker, there were founded in Paris in the seventeenth century some two or three academies, among them being one chiefly devoted to painting and sculpture. Subsequently a similar institution, for the encouragement of architectural study, was developed. In 1793 the École des Beaux Arts absorbed and replaced these academies. Very soon after this the Institute was established, and music included and recognised as a fine art. It will strike us of the present generation as curious, to say the least of it, that the one art that we nowadays consider a fine art *par excellence*, viz., poetry, at that time held a very doubtful position. Despite what has just been said anent dictionaries, it will be most important to bear in mind the fact that the *Dictionnaire* of the Académie expressed a doubt as to whether poetry should or should not be dubbed a fine art.

Abbé Dubos (1670–1742), in his *Reflections critiques*, etc., pointed out that "the similarity between poetry and painting had produced a feeling of respect for the latter," and that the terms "Beaux Arts" and "Artiste" were the necessary outcome and response to this feeling, and the reluctance to speak of a poet or painter as an artisan.

It seems abundantly clear that these two terms are of French origin, and, although Dubos, perhaps, did not invent them, yet, in all probability, they were brought about by his much-admired essays, the fourth edition of which appeared in 1740. About twenty years after that date, Dandré Bardon's *Traité de Peinture* appeared, and in it the terms "Beaux Arts" and "Artiste" are familiarly employed. Dubos seems, however, doubtful about music being included. He appears to have been prompted to compose his essays by suggestions found in Dufresnoy's metrical treatise on painting. Dufresnoy, in turn, seems to have drawn his chief inspiration from the *Ars Poetica* of Horace. Beyond this point it will hardly interest photographers to penetrate.

To return to the early use of the term "Beaux Arts," and what it included, we find that the *Dictionnaire* is doubtful about poetry being a fine art (Académie Française, 1635; Académie Royale des Inscriptions et Belles Lettres, 1663). Dubos draws attention and respect to painting in his *Réflections* (1720–1740). Bardon's *Traité* (1760) freely uses the term "Beaux Arts." The *École des Beaux Arts* (1793) included painting, sculpture, and architecture. National Institute, 1795, included music, while Littré's list includes painting, sculpture, architecture, music, poetry, and eloquence, with dancing as a subsidiary art.

Turning now to our own country, we find that during the seventeenth century music was often greeted with the cold shoulder. This appears, both from Sir R. Steele's *Tatler* (1709), and *Spectator* (1711). Pope (1688–1744) asked Arbuthnot whether he thought the applause, &c., given to some of Handel's music was not pure affectation. As to painting, Goldsmith (1728–1774) says, "A person who shows no other symptom of his taste than his cabinet or gallery might as well boast to one of the furniture of his kitchen. I know no other motive but vanity that induces the great to testify such an inordinate passion for pictures."

Every schoolboy knows that the strolling players of Shakespeare's time, who gathered an audience of "the common people" in the inn-yard, with the lords and "the quality" in the gallery, were little or no better thought of than the travelling tinkers, in whose company they often enough journeyed. Yet nowadays few hesitate to speak of the dramatic art.

The general reluctance felt by parents in permitting their sons to adopt the calling of the polite arts, as they were called (in contra-distinction to the useful arts), on the grounds that such a path led to little honour and less pelf, only shows in what low estimation the fine arts were held by our fore-elders. It was sufficient if the priest or parson was clerk enough to write a letter. As for the baron or lord of the manor, he could make better play with a sword than a pen.

Now, with this and more of the same tune in our ears, it seems nothing short of preposterous for the brush performer to mount his high stool and dictate, there and then, for the rest of time, what is and what is not art. It is enough, and more, that he should so often quietly usurp to himself the term "Art" to the tacit exclusion of the sister arts.

None but the wilfully blind can shut their eyes to the fact that what may be excluded to-day may be included to-morrow. The wisdom of one generation is the foolishness of the next. That poetry (in the face of the nine Muses) should have been held doubtful is enough to make most men cautious in exclusive statements.

Furthermore, a very slender knowledge of any of the generally acknowledged branches of fine art of to-day clearly shows us that there are infinite grades of proficiency in that art. In short, we may without any great difficulty conceive the work of the President of the Royal Academy and the work of the man who applies pigment to his garden door to be connected by an almost infinite series of intermediate grades of work, and so treading upon each other's heels that it becomes no easy matter for any one to say where the fine art series begins. As the edge of a cloud-cast shadow melts by imperceptible degrees from light to dark, and we may say that no hard-and-fast line divides them, so in like manner no hard-and-fast line circumscribes pictorial or any other art. Every zoologist knows well enough what he means when he uses the word "type," but he declines to give any hard-and-fast definition to his type limits, knowing full well that to-morrow may bring to light an undescribed form, which is undoubtedly to be grouped near the type in mind, and yet having characteristics hitherto undescribed or found in any other members of he type gro up.

So far as photography is concerned, the moral of our note is plain enough. Undoubtedly photography does produce results which cannot be measured with either the painter's or etcher's yard stick; for even they themselves like to have their own measuring rod, and are not always without suspicion of each other, though, happily, they are generally in harmony. At the same time it may be remembered by the photographer, to his comfort and encouragement, that it is, after all, not so much a question of names, as it is whether photography can, in competent hands, be so employed as to produce that mental state that we often refer to as æsthetic pleasure.

In our very scanty inquiry no attempt has been made to define a fine art—that perhaps at best would be "flat, stale, and unprofitable"—nor to inquire as to what are the chief characteristics or factors which are common to the various branches of fine art, although this latter inquiry is of interest and importance, as forming a connecting link between the three parts into which we divided our primary question. This is, however, a separate question, and must, therefore, not be confused with the present inquiry; but, nevertheless, it must be considered before we can properly give any opinion on the question, "Is Photography a Fine Art?" F. C. Lambert.

THE CAMERA OBSCURA.

Writing to the *Scientific American*, under date New York, April 15, 1891, Mr. H. Carrington Bolton says:—"In your issue of April 11, Mr. Nicholas Pike has an interesting article on *Photography*. In this he ascribes the invention of the camera obscura to Baptist Porta. I send you some brief notes on the *History of the Magic Lantern*, to show you that an earlier date should be assigned to the discovery. You may reprint the notes if you please."

Notes on the History of the Magic Lantern.

The "magic" lantern is an outgrowth of the camera obscura, the origin of which is unknown. Its invention is usually attributed to

John Baptist Porta, but Libri (*Histoire des Sciences mathématiques en Italie*, Paris, 1841, four volumes octavo) has shown that it was frequently mentioned by authors of much earlier date.

The first mention of the camera obscura occurs in unpublished MSS. of the celebrated Italian painter, sculptor, and architect, Leonardo da Vinci. Da Vinci was born in 1452, and died in 1519. His reputation as an artist is immortal, but it is less generally known that he was well versed in music, military science, mechanics, hydraulics, astronomy, geometry, physics, natural history, and anatomy. In several of these branches he made original investigations, anticipating later philosophers.

In a MS. quoted by Libri, Da Vinci proposed a theory of vision which he seeks to explain by reference to the camera obscura (*Libri*, III. 54 and 233). This takes the invention back into the fifteenth century—say 1490.

In a work published in 1521 by Cæsariano, a Milanese architect, he attributes the invention to a Benedictine monk, Dom Panunce, which is, however, regarded as doubtful (*Libri*, IV. 303).

Cardanus, an Italian physician, mathematician, and author, also mentions the camera obscura in a treatise entitled *De Rerum Subtilitate*, published at Nuremberg in 1550.

All these references antedate John Baptist Porta's work, *De Magia Naturali*, of which the first edition appeared in 1553, when its precocious author was only fifteen years of age. While Porta was not the inventor of the camera obscura in its simplest form, he has the honour of first employing a convex lens to perfect the images, and of placing transparent drawings opposite the opening. To these drawings he attached movable parts, and thus produced astonishing effects, which the unlearned ascribed to magic, a term connected with the lantern ever since.

Porta's camera obscura consisted of a simple box with a small opening at one side, through which the rays of light entered and fell upon a white paper screen at the opposite side. The lens was subsequently inserted.

The difference between a dark chamber of this construction and a magic lantern is very slight, and consists chiefly in the relative position of parts and the source of illumination. By whom the great improvement was made, of substituting artificial light for sunlight in exhibiting transparent pictures, is unknown to the writer.

Deschales, in his *Mundus Mathematicus* (Leyden, 1674), states that a Dane, possibly the physician Thomas Bartholin, showed him in 1665 a *lanterna magica* having two convex lenses (*Pogg. Gesch. Phys.*, p. 436).

Athanasius Kircher, a learned Jesuit, professor of mathematics at the Collegio Romano (born 1602, died 1680), in his second edition of *Ars Magna Lucis et Umbræ*, 1671, describes the magic lantern.

The oxy-hydrogen light now commonly used in connexion with the exhibition of pictures by the lantern was the invention of Thomas Drummond, of the Royal Engineers (born 1797, died 1840), who employed it in 1824 in the trigonometrical survey of Ireland. The principle on which it is based had, however, been established in 1801, by Professor Robert Hare, of Philadelphia. To prevent explosions from the ignition of the mixed gases, Dr. Hare also applied the principle of Sir H. Davy's safety lamp, but this was not altogether satisfactory, for it did not prevent some disastrous explosions. Later the so-called "safety jet" was introduced, consisting of concentric tubes which prevent the gases, oxygen and hydrogen, from mingling previous to their issuing from the orifice. This invention is variously ascribed to Hemming, Maugham, and Daniell. The publication of the latter is dated 1833.

H. C. Bolton.

LANTERN PROJECTIONS IN NATURAL COLOURS.

[A Communication to the Manchester Photographic Society.]

This title may possibly seem an ambitious one to those persons who are acquainted with the very moderate degree of success which has hitherto attended the reproduction of camera images with their proper tints. The nature of light is very mysterious, being in itself invisible, impalpable, endowed with inconceivable velocity, and being only discoverable by its rendering visible everything which can arrest its passage, imparting to such objects the appearances which we call colours. These colours affect the eye in different ways; thus, red light is seen to be different from blue light, and hence, to reproduce colours, it is evident that we must employ some method by which red light will produce a result different from blue light. The use of coloured glasses in conjunction with isochromatic plates is the simplest way of distinguishing between the action of the various colours.

Sir Isaac Newton discovered, by the use of a prism, that white light can be divided into a series of seven colours—namely, red, orange, yellow, green, blue, indigo, and violet. Afterwards Sir David Brewster advanced the theory that there were only three bands of colour in the spectrum—red, yellow, and blue—and that other colours were produced by the mixture and overlapping of these. Later, Maxwell and others came to a similar conclusion, that there are three colours in the spectrum, but that these were red, green, and blue.

Acting on this last theory, Mr. Ives, of Philadelphia, has made efforts, attended with some success, to reproduce colours by making sets of three negatives through coloured glasses, with the view of sifting and separating the coloured lights of the camera image into their three primaries, which he terms red, green, and blue-violet. The three negatives present local differences of density corresponding to the colours, and positives made from these negatives projected on a screen by a triple lantern furnished with suitable tinting-glasses are found to be capable of reproducing the natural colours with some degree of correctness. The great difficulty in this class of work is to get the colours balanced; thus, red and green lights united make yellow light, but, if the red negative is a little over-exposed, the result is orange or scarlet, while, if the negative taken by green light is over-exposed, the result may be yellow-green.

The Verak process has been designed to render this balancing automatic; it also automatically registers the images on the screen to a great extent, and by making the process easy and simple it economises time and labour, and, it is hoped, renders the projection of lantern images in natural colour a thing of practical value.

The Verak is founded upon its own theory of colour; it assumes white light to be composed of four primary colours—red, green, blue, and violet. In the solar spectrum these colours are spread out in four overlapping bands, ranging from red at one end to violet at the other. Each of these bands is nearly half the length of the whole spectrum, and each is brightest near its centre, gradually fading off at the extremities. The colours of the spectrum are formed by the mingling of the four primary colours; thus the overlapping of the red and green produces scarlet, orange, yellow, and yellow-green. The green of the spectrum is the union of the bright part of the green primary, and the end of the blue primary. The blue of the spectrum is a triple colour, for green, blue, and violet here all unite, the blue being the brightest of the three at this point. Thus all the colours of the solar spectrum, with the exception of the two extreme ends, red and violet, are, according to the Verak theory, compound colours. The blue primary is really a blue-green tint, ultramarine blue being a compound of the blue and violet primaries.

In making a negative by the Verak process, we take four negatives, one for each primary colour. Coloured glasses are used to sift the coloured lights which form the image on the ground glass of the camera, and to separate them into their primary colours. Thus one glass is transparent to red, but opaque to green, blue, and violet.

The Verak camera is similar in appearance to the "Victoria" camera with four lenses, taking four pictures on one plate. The differences are that the Verak lenses are provided with diaphragms widely different in size, and that the Verak pictures are taken through differently coloured glasses, the stops being adjusted to the coloured glasses in such wise that the four negatives require exposures of equal length; and these, therefore, can be taken simultaneously.

It is obvious that, when the stops and coloured screens are perfectly adjusted, the making of a Verak negative is as expeditious and simple as an ordinary quarter-plate negative. The making of a positive is also an easy matter, as it is made by contact with the negative. A lantern plate should be used, capable of giving plenty of contrast, for a plucky image renders the differences of local density, due to colour, more pronounced.

This positive is a Verak lantern slide, capable of showing the natural colours when projected on a screen by the proper instrument, which combines the four black and white images into one coloured image by the aid of coloured light.

The Verak lantern is in size and appearance very similar to the ordinary single lantern; it has one light, and a four-inch condenser throwing out parallel beams of light, which, passing through four small convex condensers, become divided into four divisions, tinted differently by the aid of coloured glasses. The Verak slide is put in front of the small condensers, so that red light passes through the picture produced by red light in the camera; green light through the picture taken by green light; and so on for the other colours, blue and violet. A set of four projecting lenses, which are placed in the same relative position to each other, and the same distance apart, as the camera lenses, projects the four images on the screen, and combines them into one clearly defined picture, glowing with all the colours of the original object photographed.

When the projected image is not exactly life-size, a long-focus lens is placed in front of the slide, to enable the four images to unite and coalesce accurately.

If we light up the Verak lantern and remove the slide, we find that the four lenses, each throwing out a different-coloured light, produce a white disc on the screen. This is formed by the union of red, green, blue, and violet lights. If we now cover up the blue and violet lenses, we find the disc is bright yellow; if we also darken the green lens partially by wire gauze placed over it, the colour is orange; if we darken the red lens, instead of the green, we get yellowish green. In a similar way, we find that the blue and violet lights produce ultramarine; the red and violet produce pink; and thus all the colours can be imitated. The differences of local density in the Verak slide produce colours in precisely the same way.

Such is the rough outline of a process which is very young, and which

cannot be said to have passed the experimental stage. A few slides were produced last summer by the inventor during his experiments, but they were made with rough temporary adjustments, and are useful chiefly as signposts pointing out the right way to work. There can be no doubt that results much superior to these may be obtained after a little practice.

ALBERT W. SCOTT.

THE PHOTOGRAPHIC RESEARCHES OF MESSRS. HURTER AND DRIFFIELD.

IT is not difficult to open a box of sensitive plates and fill the dark slides in total darkness. It is not so easy to develop and fix the plate in the absence of all light. But to perform this feat on a transparency (printed by contact with a given negative) in such a manner that the negative and positive superposed shall give only a trace of an image through the balancing of the transparencies of the one plate and the opacities of the other, the total intensity remaining constant, is a problem which would tax the most expert. Obviously accurate previous research is necessary to discover the laws of the action of light and developers on the particular plates used. Even then some amount of error must result from unequal thickness of the sensitive film. Having made these researches, the successful accomplishment of the given problem will bespeak confidence in the accuracy of the methods of investigation, and of the measuring instruments therein employed. In short, success in practice will confirm the theory on which it is based.

The *Journal of the Society of Chemical Industry*, May 31, 1890, contains a communication by Ferdinand Hurter, Ph.D., and V. C. Driffield, dealing with these matters which is so instructive that a summary of their methods and results will surely be of interest. The authors at starting define what they mean by the terms, A perfect Negative, Transparency, Density, and Opacity.

"A negative is theoretically perfect when the amount of light transmitted through its various gradations is in inverse ratio to that which the corresponding parts of the original subject sent out.

"The negative is mathematically the true inverse of the original when the opacities of its gradations are proportional to the light reflected by those parts of the original which they represent.

"Before we can clearly understand this definition, it will be necessary to state shortly the laws of absorption of light by opaque black substances, and to define clearly the meaning we attach to the term opacity, transparency, and density of a negative.

"For substances which do not reflect much light, such as black opaque bodies, or transparent coloured bodies, the relation between the light absorbed and the quantity of substance present is very simple. If between the eye and the source of light we place a thin layer of dilute Indian ink, that layer absorbs light, and thereby reduces the intensity of the light transmitted."

A second similar film would reduce the intensity of the light falling on it *in the same ratio*, and so on for a third, fourth, or other number of interposed films. Is the law just announced universally true, or does it only apply to certain bodies, among which are photographic plates? The answer is thus given:

"These relations hold good for some substances with regard to ordinary white light, for others only with regard to monochromatic light, and for others they do not hold good at all. We have satisfied ourselves that they do hold good for the silver deposited as a black substance in negatives so long as the silver does not assume a metallic lustre, and reflects but a very small amount of light."

If instead of these successive films of Indian ink the same quantity of ink be incorporated in the first film, the resulting effect will be identical. Thus it appears that the intensity of the transmitted light is a relative measure of the number of black particles contained in the film. Taking a film which allows one-tenth of the light to pass as the unit of comparison, and calling its density 1, a film of double the amount of ink will be of density 2, a film of three times the amount will be called density 3, and so on. This is what the authors mean when speaking of a given density; they define *density* as the number of particles spread over a given area, multiplied by the coefficient of absorption. This coefficient of absorption is really a fraction, the reciprocal of the number of particles in a film transmitting one-tenth of the original light. Transparency and opacity are defined as the ratios of the transmitted to the incident light, and its reciprocal, severally. Thus a film of density 1 allows one-tenth of the incident light to pass, and has therefore a transparency of one-tenth, and an opacity of 10. Two such films superposed have the density 2, but allow one-tenth of one-tenth of the light to pass. Their combined transparency is therefore one-one-hundredth, and their opacity 100.

In like manner a film of density 3 (or three films of unit density), has a transparency of one-one-thousandth, and opacity 1000. These results show the relation between density and opacity, and prevent their confusion. The density is the logarithm of the opacity, and has to be found from tables or by other means from the observed opacity.

"By means of these definitions we are now in a position to trace the connexion between the densities of a theoretically perfect negative and the light intensities which produced them."

"Since the density is the logarithm of the opacity, and since in a theoretically perfect negative the opacities are directly proportional to the intensities of the light which produced them, it follows that each density must be proportional to the logarithm of the light-intensity which produced it. More correctly, the density is a linear function of the logarithm of the intensity of light and time of exposure."

"The result is this:—In a theoretically perfect negative the amounts of silver deposited in the various parts are proportional to the logarithms of the intensities of light proceeding from corresponding parts of the object."

"The question arises, Can such a negative be produced in practice?"

For a large range of tones the answer is practically in the affirmative, though for extremely small and unduly great exposures this is not the case. The action of various developers must be studied, to ascertain whether any one is more correct in its action than others, the standard of correctness being the securing of uniform accretions of opacity for uniform increments in the amount of light allowed to act on the plate.

For this purpose a plate is subjected to various amounts of light on its different parts by exposure in strips, one part being left unexposed. The plate is then cut into portions across the light-strips, the parts are developed, fixed and dried for comparison.

The unexposed portion of the plate is for the purpose of estimating fog or the density due to glass and gelatine, which is deducted from the density of the plate to ascertain how much density is due to the action of light. As to the result of this investigation, Messrs. Hurter and Driffield say:—

"There is a generally accepted belief among photographers that a great amount of control can be exercised in development over the density and the general gradations of a negative, and in this respect alkaline pyrogallol enjoys a special reputation. These experiments conclusively show that the only control a photographer has over development lies in securing a greater or less density of image (the former often only at the expense of fog), and that he has no control whatever over the gradations of the negative."

In other words, if two portions of a plate with graded exposures be developed by different developers, then (exclusive of fog), if two corresponding tints be developed to the same density, the whole of the other corresponding tints will also be alike. No developer can "bring out the details" or "subdue the high lights" more than do the others. To establish these results wide variations in the developers were resorted to in the amounts of each ingredient and in concentration of the solution. The general behaviour of a plate may then be referred to two factors, that due to various amounts of light; and that due to various periods of development. As regards the latter, the experiments show that development grows rapidly at first, becoming gradually slower, and . . . .

"The density due to light reaches a limit in about fifteen minutes. The continued growth of the total density is due to the action of the developer upon the bromide of silver which had not been affected by light."

The authors continue:

"This disagreeable property is common to all alkaline developers, and it renders them unsuitable for scientific investigations. In all our important work we use exclusively the ferrous oxalate developer, for the reason that it attacks unexposed bromide of silver so slowly that within one hour, and even more, no appreciable density can be developed upon a really good plate. Nor does its action vary much with its composition. The addition or omission of bromide from the constitution of this developer does not seem to have any great influence, and a greater or less concentration of the reagents within considerable limits does not affect its action; indeed, we have not found any variation to arise from alterations in its composition, excepting the length of time needed for completion of development."

Turning now to the influence of the light on the density of the plate, and remembering that in a perfect negative the density must increase as the logarithm of the intensity of the light (or time of exposure); plotting a curve of densities, marking the abscissæ with the logarithms of the time of exposure, and the ordinates with the densities produced, the points thus obtained must lie along a straight line.

The logarithms of the exposure are best obtained from an ordinary engineer's slide-rule, the slide being thus divided and marked with the natural numbers to which the logarithms belong.

It is found that at starting, and at what may be termed the period of over-exposure, this law does not hold, but for a wide range of exposures it does hold.

An alternative method of plotting is to divide the axis of abscissæ into equal parts, and to double the last exposure for each succeeding portion exposed. As before, if any part of the curve be straight, that part will denote the limits of the period of correct representation. The curve obtained is similar in shape to one of the *f* holes of a violin, or the long integral symbol *ſ*, sloped more or less, according to the make of the plate and circumstances of development. The curved beginning represents the period of under-exposure, the straight portion is the important period of correct representation, and the curved head is the period of over-exposure. The period of reversal would, if denoted, bring the curve downwards again in a sloping direction. Whether this descending branch would be similar to the ascending, if continued far enough, has not, seemingly, been decided.

A beautifully reasoned mathematical investigation elucidates the theoretical form of this curve, and its practical agreement with the curve as found by experiment is shown by tables and diagrams. One important result must be noticed:—The analytic expression for the curve involves the amount of emulsion per unit of area, indicating that the character of the plate is not independent of the thickness of coating; accordingly plates were prepared with various amounts of the same emulsion, and the results compared with the calculated results. The authors conclude:—

"It will be at once perceived that the more thinly the plates are coated the shorter is that portion of the curve which is a straight line. This means that the period of correct representation is very short, and great contrasts cannot be truly rendered by a thinly coated plate. It will also be found on closer inspection that the centre of the straight portion is in each curve in a different place, and that the thinner the plate the shorter is the exposure necessary to reach the centre portion. This means that a thinly coated plate is somewhat faster than a thickly coated one, though they are made of the same emulsion. A thinly coated plate, however, appears very much faster than it is in reality. It is incapable of rendering wide contrasts, and hence the negative always looks flat, and thereby gives to the eye the impression of over-exposure."

As another consequence following from these investigations,

"Thickly coated plates give also very much greater latitude in exposure. The plates used in experiments (21 and 22) would have given good pictures of subjects with constrasts varying from one to eighty, though the exposures had varied from one to two, so that an exposure of ten seconds, or one of twenty, would have resulted in but little difference in the negatives, excepting that one would have been much slower in printing, because generally denser. Thinly coated plates, on the other hand, need very accurately timed exposures."

The next investigation concerns the speed of various makes of plates, and here it is of the last importance to remember that the results concern only exposures embraced in the period of correct representation. Only a popular exposition of the results of these researches can be here attempted. Let us suppose that three different exposures be made on a plate, not less than nor exceeding the limits of the period of correct representation. Let the plate be cut into two or more portions, each containing portions of all the exposures, and be developed for different lengths of time or by different developers, so as to obtain images as unlike as possible.

After deducting the effect due to fog, let the various opacities be compared with the exposures that have produced them, and it will be found that, though the portions of the plate behave differently, they all agree in this point, that they apparently have required a certain exposure to affect them at all, and that, after reaching this point, uniform increments of opacity have been produced by uniform additional exposures. This minimum amount of light necessary to affect the plate is a measure of what the authors term the *inertia* of the plate, and is an inverse measure of the speed of the plate. This starting-point, be it remembered, is virtual only, not actual; for, if very small exposures be made on the plate, the proportionality of increments of opacity to increments of exposure no longer holds, the period of under-exposure is employed to which the law does not apply. With this reservation, the rapidity of plates varies inversely as their inertiæ, and may be thus numerically expressed.

The inertia of a plate being expressed in candle-meter-seconds, the authors adopt 34 as the dividend for the inertiæ to express the rapidity of plates, and give the following as an example:—

			Speed.
Ilford "Ordinary"	=	$\frac{34}{2}$	= 17
Ilford "Rapid"	=	$\frac{34}{1{\cdot}4}$	= 24
Ilford "Special Rapid"	=	$\frac{34}{0{\cdot}56}$	= 60

A point of both theoretical and practical interest is thus noted:—

"There is a theoretical possibility that a plate may be rapid to one developer and slow to another, so as to require different exposures, according to the developer used. . . . . We have not paid such close attention to this question yet as to enable us to decide it finally; but, as far as our experiments have gone, we have found very little difference, if any, between the various developers, and we do not feel justified in assigning to the small differences we have observed any great importance.

"If a developer could be found which would render a plate materially faster, that developer would strike a serious blow at the hypothesis that the latent image consists of sub-bromide of silver."

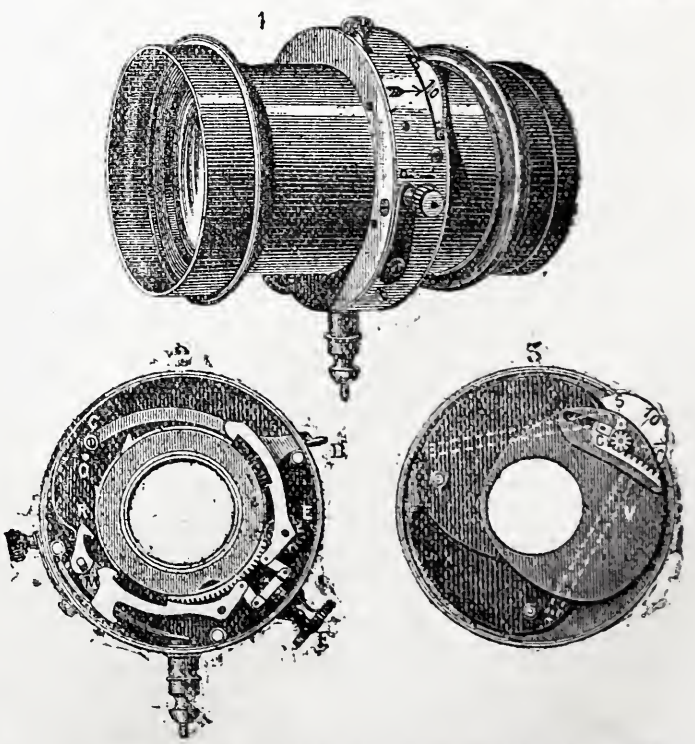
The results obtained by Messrs. Hurter and Driffield do not at all negative the conviction that for artistic effects certain contrasts may require and admit of exaggeration; they show to what extent accurate copies of a given subject may be obtained, and point out the inevitable results of the use of a given plate, exposure, and development. In many cases the worst lighted portions of a picture must be under-exposed, or the best lighted portions over-exposed; to minimise this evil, if such it be, use must be made of a thickly coated slow plate. This being done, the constitution of the developer and the time of its action will modify the density of the resulting image; but not, seemingly, the proportional gradations between the extreme limits. The negative having been obtained, the question arises what can be done with it. A faithful copy of the original may be obtained, to be viewed as a transparency; but it by no means follows that for ordinary pictures, viewed by their dispersed light, it is the best suited instrument of reproduction. The results of research in this wide field have not been yet published, if even undertaken; the accuracy of the results already obtained should stimulate others to follow up the masterly initiative now presented to them.

Only a meagre outline of the investigations is here presented; the original paper, which must stand as a classic in the literature of photography, should be diligently studied by those who hope to continue these investigations to their wider results. R. C. PHILLIPS.

A NEW SHUTTER.

IF we are now again about to describe a new shutter, it is because the apparatus which we are going to make known is remarkable for the originality of its construction and the new arrangement of its mechanism. The aim of the maker has been to construct a substantial apparatus, of the most useful kind, possessing just such rapidity as will enable the operator to obtain what he will oftenest want to photograph.

M. Gillon has achieved a result which we do not believe has ever been obtained before: he is able to vary the aperture of his shutter at any moment, and in this way to do without diaphragms, which photographers



so readily forget. The following is how he carries out his plan:—A metallic rim (fig. 2) provided with a trigger (B) encloses a spiral spring,

which—the reverse of the plan usually adopted in other shutters—is but slightly wound. It is of great length, and, further, it has only to travel a quarter of a revolution—two conditions which give it greater evenness of motion. The rim is toothed for a quarter of its circumference, and works in a pinion (E) carrying an eccentric, which transmits the movement to the shutter through a connecting rod (C). This connecting rod is bound to the shutter (V, fig. 3) by a rackwork (OC) closely sliding upon it. The use of the rackwork is to enable the point of attachment of the rim to the pivot of the shutter to approach or recede as required. The apparatus having three shutters (V), the one which is attached to the rackwork may be looked upon as regulating the two others, which are worked by two connecting rods, making the whole perfectly compact.

It may be understood that one may by this means partially or completely close the aperture in the sheets, *i.e.*, to stop down the lens. In fact, if we make the point of attachment of the connecting rod near the moving shutter, the range of the latter will be as large as possible, and the instrument will be quite open; if, on the contrary, we withdraw it, the angle will diminish, and we shall have a minimum opening of 2 mm. in diameter. A disc carrying a pinion, and scale 5, 10, 15, &c., allows the movement of the rackwork.

The instrument is opened by a catch, which, by means of a handle (M, fig. 2), can be raised or lowered so as to meet one or two notches fixed upon the rim. For instantaneous work the handle is put over a particular point (I, fig. 1), the catch is raised, and its raising by the pneumatic ball opens the instrument. By placing the handle in the contrary direction (P), the second notch rests upon the catch and thus holds it quite secure. The shutter remains open until a second squeeze of the ball closes it again. In order to avoid all shaking, one of the arms of the handle supports the break, so as to keep it in place when the instrument is in use. The break, which is composed of two jaws moving on the large diameter of the rim, is regulated by a graduated screw (F, fig. 2).

All jarring is arrested by the rim motor, which is strongly made, so as to offer a great amount of resistance. Bulk has also been considered, which is chiefly intended to destroy the moment of inertia of the shutters in their to and fro movement. These are also very light, not having any shock to sustain. They are only one-fifth mm. thick.

The size of this shutter is also remarkable, its exterior diameter for an aperture of 25 mm., which is quite large enough for a 5×7 or even a 10×8 lens, is only 68 mm. The inventor has in hand another model which, with a diameter of 95 mm., will allow an aperture of 45 mm.

The working parts being all placed outside the instrument, it would be possible to fit a lens of any diameter, the optical centering of which is facilitated by the circular form of the shutter.

When the shutter is fully open it is perfectly circular, but when it is stopped down, the shutter being only composed of three leaves, the aperture will always be inclined to the triangular. This, however, is no inconvenience, as small apertures are inconsistent with instantaneous exposures, and, as it is well known, the shape of the stop has no influence on the formation of the image, and we believe that such an arrangement will not interfere with the successful working of the instrument.

—*La Nature.* J. Ducom.

THE PHOTOGRAPHIC CHART OF THE HEAVENS.

The Permanent International Committee for the prosecution of the photographic chart of the heavens has met, deliberated, and adjourned. It will be generally admitted, when the result of their discussions has been digested, that the promise of much good work has been given, and the accomplishment of a photographic chart been brought nearer within the scope of practical astronomy. At a future opportunity we hope to give in some little detail an outline of the arguments that have succeeded in causing deviations from the plan originally contemplated. Now we can only give a brief account of the report of Admiral Mouchez and a summary of the more important results which have received the support of the Committee.

Admiral Mouchez's report may be considered as divided into three parts: first, that relating to the installation of the photographic instruments; second, to the methods and apparatus necessary for the measurement of the negatives; and, third, the manufacture and employment of *réseaux*. From the first of these sections we learn that all the participating Observatories are provided with satisfactory telescopes; but, unfortunately, the grave political events which have disturbed the Chilian Government are likely to operate adversely on the scientific advance of that country, and the station at Santiago may possibly have to be abandoned, M. Maturana, the Chilian astronomer, having received orders to report himself to his Government for military service. Some delay has been occasioned at Rio de Janeiro by the removal of the Observatory to a distance of six or eight kilometres, where, under more favourable atmospheric conditions, the photographic equatorial is being erected. With these exceptions, the Observatories declare themselves all ready for work.

With regard to the second section, we learn that the construction of the measuring instrument, generously offered by M. Bischoffsheim, has been delayed, owing to difficulties of correspondence between MM. Gill and Kapteyn; but, now that these gentlemen have had an opportunity of deciding the particular form the instrument should take, it will be rapidly proceeded with, and it is believed that the employment of such an instrument will greatly abridge the difficulties of measurement and calculation.

The manufacture of the *réseaux* has been definitely abandoned by the authorities at Berlin, but M. Gautier has constructed an instrument for the ruling of these necessary adjuncts, and he is now in a position to supply those Observatories which have failed to obtain *réseaux* from M. Vogel.

Three important points have been before the Committee, and it has been found necessary on these points to modify the decisions of previous committees. The first of these referred to the desirability of obtaining on the plates of shorter exposure, destined to form a catalogue, impressions of star images with one-fourth of the exposure found necessary to secure the impression of an eleventh magnitude star. The result of this decision would have been to give a picture of the heavens obtained with an exposure of a minute and a half, or a minute, or even less. This project has now been abandoned in favour of one arranged to give impressions, very feeble in character, of stars of the eleventh magnitude, while on the same plate will be exhibited a picture of the heavens obtained with an exposure of twice the length necessary for producing star images in the former case. Thus we may expect on these catalogue plates exposures of three to four minutes, and also of six to eight minutes.

Another interesting point, over which excitement waxed keen, arose on a proposal of M. Henry to substitute three exposures of equal length, arranged at the angles of an equilateral triangle whose sides are about 5″, instead of one exposure of three times the length. It was asserted that a photograph obtained in this manner, in which each of the exposures was continued for twenty minutes, would exhibit more stars than a photograph with a single exposure of one hour. It was eventually decided that the chart plates taken at the even degrees should have a single exposure, while the exposures of the plates taken at the odd degrees should be left to the discretion of the observers.

The third and last point to which reference may be made here is the length of time to be generally devoted to securing a plate for the chart. It was generally felt that, if the exposures were made long enough to secure the impressions of a fourteenth magnitude star, as generally understood in photometric work, the length of time required would entail too great a strain upon the capacity of the observer. It has therefore been recommended by a sub-committee to confine the exposures to about forty minutes, which, it is believed, will be about eight or ten times the exposure required to impress the image of an eleventh magnitude star on plates as at present employed, and under the ordinary meteorological conditions of the Paris Observatory.

—*Nature.*

NOTES FROM SCOTLAND.

The annual flitting or removal term is one of the national institutions in Scotland, where the tenure by which house and business property is held is very different from that in the southern end of the island, and Whitsunday is the great general removal day. The photographic business changes consequent on this and other causes are this year, and at this time, abnormally large. The representative of the earliest photographic firm here, dating back to 1840, Mr. Jas. Howie, removes from his place, 60 Princes-street, to a studio built on his own property, at the extreme east end of the same street, and his place is to be occupied by his near neighbours, Murray & Campbell, the male partner of which died very suddenly during the progress of the late exhibition. Close by, in what is the centre of the business district, a studio, which has had a most unfortunate business reputation hitherto, having been occupied by Cumming, L. H. Douglas, Ayton, Brown, Barnes, and Bell, and I know not how many more, is taken by the Parisian Photographic Company, where we may wish them better success than any of their predecessors. The position is a fine one, and with good work and the other requisites should command success. Mr. A. Swan Watson has acquired the well-known View Park Studios, so long occupied by Mr. R. Shaw, who has removed for health sake to the seacoast at Portobello, one of the favourite marine resorts of the Scottish metropolis, where his wonted success is certain to accompany him. Mr. Watson, although he was not fortunate enough to acquire a medal at the recent Edinburgh International Exhibition, did so at the Crystal Palace Show, and it may be noted here that he is one of the accepted British exhibitors at the Vienna International Exhibition, and has been awarded a special diploma for his work shown there. The statement about this exhibition which is freely made that only 600 works out of the 4000 sent in were displayed requires further elucidation than is yet forthcoming before any comment can be made about that matter. Messrs. Laurie & Mitchell are also removing to new and more commodious premises in the Dalkirk-road, whither Mr. G. G.

Mitchell, being secretary to the Edinburgh Photographic Club, will require their communications to be sent.

Still further alterations arise through the new University Photographic Society having acquired the premises long occupied by Mr. John Annan, whose brother, Robert Annan, the head of the Glasgow and London firms, died quite suddenly the other day, accelerated, I am informed, by a slight accident he had received. Both the latter-named gentlemen were brothers of the veteran and well-known Mr. Thomas Annan, who died a few years ago. Mr. Magnus Jackson, of Perth, has also passed to the majority. Few people were so successful as he in his tree studies as well as other work. He had been a respected member of the Town Council for a number of years before his death.

The list of changes and alterations will be about complete when it is mentioned that Messrs. Scott Brothers, who have hitherto confined themselves mostly to coloured enlargements for the trade, are constructing a new studio in the southern suburbs, where they will be able to do everything connected with their extensive business; and Mr. Shaw, brother of the previously mentioned of same name, is opening a studio in the extreme west end of the city.

Among the most notable incidents of the past season has been the steady increase of photography in many of its phases as a means of illustration among the learned Societies. The Royal Botanic has almost constant recourse to its aid through the optical lantern, and slides are made specially for its use. The latest examples among its lecturers are the Rev. D. Paul, M.A., who illustrated the characteristic vegetation of British Guiana, and Professor Balfour Baily, who discoursed upon the *Coarse Anatomy of Woods, of Trees, and of Shrubs*, illustrating these by micro-photographic slides and the limelight apparatus. The City Astronomer, Mr. Peck, who carries on the astronomical work for the city until the new Royal Observatory is built on the old site (so long the study and working place of Professor Piazzi Smyth), has just concluded a series of lectures on his special subject, fully illustrated by his own photographs, aided by the best of others available. Still more noticeable is the acceptance by the Royal Society of Scotland of papers, illuminating *them* by the same medium. There were times when even Sir David Brewster received scant courtesy by that body for his persistence on photographic topics. At the last meeting of this Society, Mr. J. M. Macfarlane read a paper on the minute structure of plant hybrids and their relative fertility, with the biological bearings thereof. He showed by diagrams and limelight lantern pictures the plant hybrid *Philageria britchii*, and its parent plants *Lapegeria* and *Philesia*, all of which are of South American origin, and received the grave thanks of that very grave Society, especially for the fulness and clearness of illustrations.

Foreign Notes and News.

We recently gave an account of the misfortunes of the Parisian photographer, M. Schlumberger, in regard to the fifty-franc note which he reproduced. It appears that the facts were not quite as then stated. M. Schlumberger's case was that of unappreciated public spirit, a state of mind which does not always meet with immediate appreciation as others besides he can testify. The Bank of France had recently brought out a new note—rose and blue tints on a yellow water-marked paper. This they imagined to be completely beyond imitation by photography or any other means. M. Schlumberger, however, thought otherwise, and wrote to the bank, explaining how, by means of orthochromatic plates, the note might be perfectly reproduced and suggesting some alterations which would render this impossible. The bank, however, after the manner of those in authority, paid no attention to his representations. M. Schlumberger, to prove he was correct, then reproduced the note, and sent the reproduction to the *Moniteur*. And it was for this piece of misplaced enthusiasm that he and the editor of that journal were fined 500 frs. and costs.

Messrs. Auguste & Louis Lumière have introduced a new developer—paramidophenol. They recommend the following formula.

Water	1000	parts.
Sulphite of soda	200	,,
Carbonate of soda	100	,,
Paramidophenol	12	,,

Or still better—

Water	1000	parts.
Sulphite of soda	200	,,
Carbonate of lithmus	12	,,
Paramidophenol	12	,,

These proportions are said to give a very energetic developer which keeps well and never colours the gelatine.

Another of the many instances in which Dr. Jeserich's researches have been of use in assisting the ends of justice was laid before the last meeting of the German Society of Friends of Photography. It is a well-known fact, namely, that fresh blood and blood which has been acted upon by carbonic oxide display very distinct peculiarities. The spectrum of fresh blood shows two dark bands, which on treatment with a reducing substance disappears, whereas blood which has been acted on by carbonic oxide retains them. A house was burnt down in Westphalia, and among the ashes was found a corpse with regard to the death of which suspicions were entertained that it had taken place before the fire, *i.e.*, that a murder had been committed. The heart of the corpse contained two drops of blood, and Dr. Jeserich found on examining them that the blood was fresh, and that the man consequently could not have been smothered by the conflagration, but must have been killed previous to it.

It is announced that a representation will shortly be given on the Berlin stage consisting of dissolving views accompanied by words set to music, the design apparently being to produce a sort of opera in which the scenery is to be supplied by the lantern.

The employment of flash-light photography on the Continent for obtaining impressions of striking scenes and situations on the stage is becoming more and more frequent. A number of scenes from the *Millionen Bauer* were in this way reproduced at the Thomas Theatre in Berlin, we understand, with good effect, the decorations especially being well reproduced. In Paris, the Photo Journal has extended the process to the dressing-rooms of the actors and actresses, particularly the actresses, and produced a number of pictures which, though charming and *poignant*, would here undoubtedly fall under the bann of *the* McDougall.

Max Jaffé recommends the employment of a solution of water-glass in beer for coating collotype blocks previous to the application of the gelatine. The proportions in which the two are employed depends very naturally, as we are informed, on the strength of the beer and the water-glass. As a rule, one part of water-glass is used in conjunction with ten of beer; this coating has the peculiarity, when rapidly dried, of cracking, although adhering firmly to the block in between the cracks. The film of gelatine fills up these cracks before forming a level surface, and so becomes practically undetachable.

M. V. Angerer has recently made a number of comparative experiments on rapid developers. The developers tested were:—1. Hydroquinone, with hyposulphite of soda and bromide of potash. 2. Hydroquinone and yellow prussiate of potash (Lainer). 3. Crystallis. 4. Hydroquinone-eikonogen (Angerer). Two rapid plates with different exposures (one and three seconds) were developed, the result being as follows:—1. Scanty in details—slightly fogged. 2. Good detail, powerful shadows, some fog. 3. Much detail, shadows too black, no fog. 4. Great detail, clear and delicate, no list of half-tones. M. Angerer consequently recommends, from the results of his experiments, a mixed hydroquinone and eikonogen developer of this composition;—

Solution A.

Water	1250	parts.
Sulphite of soda	150	,,
Eikonogen	22½	,,
Hydroquinone	7½	,,

Solution B.

Water	250	parts.
Carbonate of potash	75	,,

For use, five parts of Solution A should be mixed with one part of Solution B.

Our Editorial Table.

Adams' "Ideal" Camera.

The word "ideal" has various significations, among them being something "not perceived by the senses." In the ingenious hand camera bearing this name, which has been brought out by Messrs. Adams & Co., of 81 Aldersgate-street, E.C., and 26 Charing Cross-road, W.C., we are brought face to face with their definition, "The conception of a thing in its most perfect state." Let us see how this applies to the hand camera now before us.

First of all it can be carried in the hand without arousing any suspicion as to its real character, for it is free from any knobs or screws projecting from its sides or ends, the operating portions being situated on the bottom, and hidden from view. It forms, in short, an unpretentious black morocco-leather-covered little box, which might contain the samples of a diamond merchant for aught one knew to the contrary.

It is a little over eight inches in length, and its other dimensions or proportions may be estimated from fig. 1.

In its interior are stacked twelve plates, in sheaths, pressed forward by a spring behind, the front one of the series being pressed firmly against side faces, which form the exposing plane. When it has been

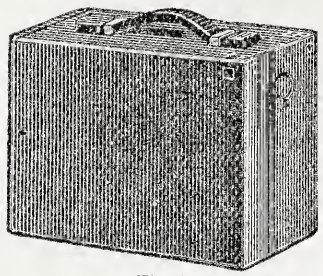


Fig. 1.

impressed with an image, it is removed (number two of the series taking its place) by the act of drawing out a knobbed rod in the bottom as far as it will come, and then pushing it home again. By this simple movement is effected everything necessary to the changing of the plate, storing away the exposed one in a separate reservoir, registering its number on a small plate visible only to the initiated, and placing *in situ* the successor to the exposed plate. For this movement alone the camera is well deserving of its name, for it is certainly "ideal" according to the definition given by the manufacturers.

Next, as to the shutter. We all know and recognise the ability of Mr. Newman in this department of mechanics, and when we are informed that the shutter of the "ideal" is specially devised and made by him, and is fitted with his latest patent regulation, we can rest satisfied as to this part leaving nothing to be desired. We shall, by aid of the cut, fig. 2, which is a bottom view of the "ideal," show how the shutter is actuated. By pressing the knob B, the shutter is opened,

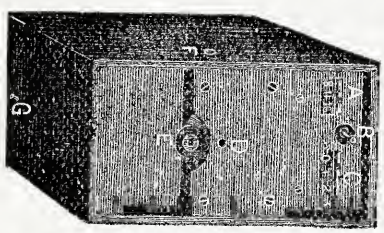


Fig. 2.

the plate exposed, and the shutter reset for the next exposure. An index at C determines the various degrees of rapidity at which the shutter may be worked. This varies from the extreme of rapidity down to a time exposure of minutes or hours, the latter being determined by the movement to one side of a button in the corner not shown, but which represents "instantaneous" and "time," according to the position to which it is set. At A is shown the end of a lever, by which either of the diaphragms in the lens can be brought into requisition. We have already said that the changing or transference of the plates is effected by pulling out a knob. This is shown at E, the index as to the number of plates being seen through a small hole at F, and a nut being shown at D for screwing the camera on a stand when time exposures are desired. There are two finders, one each for plates when in the horizontal and in the vertical position. The lenses are rectilinear, and, so far as our trial warrants us to speak, we have nothing but praise for them; the shutter works between them at the point at which the least motion is attended with greatest effect. Every part is well fitted and strongly made, and as regards its certainty of action we have not yet during all our trials of the "ideal" encountered the slightest hitch, it having worked with uniform certainty and without any jar.

Pictures of 1891.

Pall Mall Gazette Office, 2, Northumberland-street, Strand, London.

We all know the only alternative when the mountain will not come to Mahomet; roughly paraphrased, it means that those who wish to see the Royal Academy pictures of 1891 must come to London and see them. But there is still another alternative. The enterprise of the *Pall Mall Gazette* permits those who cannot come to London, to examine at their leisure and in their own homes, for the ridiculously small sum of a shilling, the works of over two hundred and thirty exhibitors, from those of Sir Frederick Leighton (President) downwards. They are all photographed from the originals, and are printed in phototype. There are 112 pages of these pictorial gems, and, although in some instances one picture only represents one page, in others there are three and four on a page, from which will be seen how numerous the collection is. We very strongly recommend this work to our readers in order that they may study the styles in composition of artists of recognised merit. Here they can see how MacWhirter, A.R.A., composes his *Highland Bay;* how Goodall, R.A., arranges a foreground for *The Isles of Loch Lomond;* how a *Fishing Village* is treated by Clayton Adams; how groups and many single figures are posed, and how even undraped figures of ladies can be rendered modest and retiring. Many of the pictures are, as photographs, well executed.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7282.—"A New and Improved Process for the Manufacture of Pyrogallic Acid." W. H. Claus.—*Dated April* 28, 1891.

No. 7312.—"Improvements in Photographic Printing Processes." W. W. J. Nicol.—*Dated April* 28, 1891.

No. 7360.—"Improvements by Combination of a Bull's-eye Tricolor Lantern with a Magic Lantern or parts thereof." W. Davies.—*Dated April* 29, 1891.

No. 7376.—"Improved Apparatus for Printing, Developing, and Finishing Photographic Prints." B. Krantz and H. Zeissler.—*Dated April* 29, 1891.

No. 7409.—"Improvements in Photographic Cameras." M. A. Wier.—*Dated April* 29, 1891.

No. 7586.—"Stop for Photographic Lenses."—A. M. Gillham.—*Dated May* 1, 1891.

No. 7615.—"New or Improved Light-tight Hinge for Shutters of Photographic Dark Slides." F. Shew.—*Dated May* 2, 1891.

No. 7635.—"Improvements in Magnesium Lights for Photographic and Signalling Purposes." Complete specification. E. Hackh.—*Dated May* 2, 1891.

No. 7785.—"Method of and Apparatus for Reproducing Photographs." Complete specification. B. Krantz and H. Zeissler.—*Dated May* 5, 1891.

No. 7795.—"The Champion Metal Film Carrier." D. Allan.—*Dated May* 5, 1891.

No. 7876.—"Improvements in Photographic Apparatus." F. W. Cory and W. Jones.—*Dated May* 7, 1891.

No. 7889.—"Improvements in Photographic Developing Frames or Baths." T. J. Perry.—*Dated May* 7, 1891.

No. 7905.—"An Improved Panorama Photographing Camera." W. Hoffmann.—*Dated May* 7, 1891.

No. 7918.—"Improvements in Photographic Camera Shutters and Combined Means of Registering the Number of Exposures." A. J. Buncher and G. Tucker.—*Dated May* 8, 1891.

No. 7942.—"For Automatically Changing the Sensitive Plates Inside a Photographic Camera." W. Beyer.—*Dated May* 8, 1891.

No. 7959.—"Improvements in Photographic Apparatus." E. J. Marey.—*Dated May* 8, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 7453.—"Photographing." Green and others.—Price 6*d.*

No. 7842.—"Photographing Machines." Hines and others.—Price 11*d.*

PATENTS COMPLETED.

Improvements in the Manner of Changing the Plates and Bringing them into the Proper Position for Exposure in Hand or Detective Cameras.

No. 8372. Henry Robert Dines, 100, Fortess-road, Kentish Town, London, N.W.—*April* 4, 1891.

This invention has for its object improvements in the manner of loading and holding the plates on other sensitised materials in hand or detective cameras, and other apparatus for taking photographic pictures, in a detachable light-tight box or magazine, and of bringing the plates or sensitised material into a position for exposure, and returning same again to the magazine, by means of handles on the outside of the camera, without opening the instrument in daylight.

The following advantages are alleged to be secured:—

1. The magazine being light-tight and detachable, extra magazines can be used to carry a reserve of plates when travelling, &c. When one magazine is exhausted it may be removed, and a fresh one substituted in sunlight without the plates being fogged.

2. As any plate can be withdrawn from the magazine that may be desired, the magazine may be charged with plates of different rapidities, or other kinds, and any plate withdrawn from the magazine for exposure that will best suit the object to be photographed.

3. A plate may be taken from any groove in the magazine that may be desired, and can be returned to the same or any other empty groove if it is so desired.

4. The ease with which the magazine is loaded. The plates being simply dropped into the grooves of the magazine box, and they do not require any backing or preparation, as in many hand cameras, but can be used in the same condition that they are received from the makers.

5. The simple manner of bringing the plate into a position to receive the

photographic image, there being no complicated mechanism, and thus a great saving in weight.

The claims are :—1. In hand or detective cameras and other apparatus for taking photographic pictures. A magazine or plate container, detachable and light-tight, which can be constructed to hold any desired number of sensitised plates or other materials, as hereinbefore described. 2. In hand or detective cameras and other apparatus for taking photographic pictures. An arrangement for bringing a magazine or plate container into position to discharge the sensitised plates or other material into an exposure frame, table, or carrier, either consecutively or otherwise as desired, and to restore the exposed plates or other material to the container, substantially as hereinbefore described. 3. In hand or detective cameras and other apparatus for taking photographic pictures. A device for opening the light-tight magazine or plate container whilst in position in a camera or other apparatus, substantially as hereinbefore described. 4. In hand or detective cameras and other apparatus for taking photographic pictures. An exposure frame, table, or carrier, which receives, holds, and discharges sensitised plates or other materials by a movement of ninety degrees, substantially as hereinbefore described. 5. In hand or detective cameras and other apparatus for taking photographic pictures. An arrangement for preventing light from passing from the exposure chamber to the magazine chamber, substantially as and for the purpose hereinbefore described. 6. In or for hand or detective cameras and other apparatus for taking photographic pictures, the combination of parts constituting an apparatus for containing and removing for exposure, consecutively or otherwise as desired, sensitised plates or other materials, substantially as hereinbefore described. 7. A combination of parts permitting the removal of a magazine or plate container from hand or detective cameras, and other apparatus for taking photographic pictures, and the substitution of another magazine or plate container in daylight, as substantially hereinbefore described. 8. The construction and arrangement of parts constituting an apparatus for use in taking photographic pictures, substantially as hereinbefore described and illustrated.

A Process for Photographing by Means of Organic Compounds.

No. 7453. Arthur George Green, 5, Thistlewaite-road, Lower Clapton, London, N.E., Charles Frederick Cross and Edward John Bevan, both of 4, New-court, Carey-street, London, W.C.—*April* 18, 1891.

Our invention relates to the production of designs on paper, textures, or other suitable receptive surfaces by means of organic compounds.

It is a property of the diazo-compounds, generally, to combine with most phenols and amines producing colouring matters ; it has been found, however, that by the action of light many of these compounds undergo a change or decomposition by which they lose this property. Upon these facts we base our photographic process for the production of coloured designs upon textile materials, paper, glass, xylonite, &c., which we carry out as follows :—We sensitise the surface by application of a diazo-compound, or we form the diazo-compound *in situ* by applying to the surface the corresponding amine or amido-acid, and subsequently treating with nitrous acid. We then expose the surface thus sensitised to the action of light under the object or design of which it is required to obtain an image ; it may be a natural object, a photographic positive, or any painted, printed, or photographic or other design upon transparent material. After a sufficient exposure the picture is developed by immersion in a suitable solution of an amine or phenol, or the sulphonic or carboxylic acids thereof.

The diazo-compounds which are most suitable for our purpose are those derived from the thio-amido compounds obtained by the action of sulphur upon para-toluidine, meta-xylidine, and pseudo-cumidine, and from the corresponding sulphonic acids. To this class of compounds belongs the yellow colouring matter known in commerce as "primuline" (see *Journal of the Society of Chemical Industry*, 1888, p. 179, and *Journal of the Chemical Society*, 1889, p. 227) sometimes also called "polychromine," "thiochromogen," "chameleon yellow," "sulphine," "aureoline," "carnotine," &c.

We have found that, owing to the affinity of these thiamido-compounds for the constituents of textile fabrics and their combination with such bodies, they become highly sensitive to light.

Moreover, the formation of the diazo-compound *in situ* and its fixation are particularly easy, and the picture, which may be sharply developed, remains permanently fixed on the material.

The amines and phenols employed for development may be any of those which combine with diazo-compounds under ordinary conditions to produce colouring matters.

Amongst them we may mention the following :—

(*a*) Alpha and beta naphthol and their sulphonic acids.
(*b*) The various dioxy-naphthalenes and their sulphonic acids.
(*c*) The various amido-naphthols and their sulphonic acids.
(*d*) The various diamido-naphthalenes and their sulphonic acids.
(*e*) Alpha-naphthylamine, alkyl-dialkyl-alpha-naphthylamines, and their sulphonic acids.
(*f*) Metamidophenol and its alkyl derivatives.
(*g*) Phenylene and tolylene meta-diamines and their alkyl derivatives.
(*h*) Resorcin and its sulphonic and carboxylic acids.
(*i*) Phenol, cresol, and pyrogallol.
(*j*) Salicylic acid and oxy-naphthoic acids.

The amines and amido-acids are employed in slightly acid solution, the phenols and oxy-acids in alkaline solution, and the amido-phenols either in alkaline or slightly acid solution.

As an example of the method of carrying out our invention we may take the production of a coloured design upon a textile material, paper, or other fabric, by means of the diazo-compound of "primuline."

The fabric is first dyed with primuline from a hot solution, or is coated or printed with primuline. After washing the fabric is immersed for about half a minute in a bath of nitrous acid, prepared by acidifying with sulphuric or hydrochloric acid a weak solution, say about one quarter per cent., of sodium nitrite in cold water. The fabric now holding diazotised primuline is washed and exposed to light, either in a wet or dry state, under the object or design to be printed. After sufficient exposure (as can be ascertained by a trial exposure of a portion) the fabric is passed through a solution of a suitable phenol or amine, which may, for example, be—

For red—an alkaline solution of beta naphthol.
For orange—an alkaline solution of resorcin.
For purple—a solution of alpha-naphthylamine hydrochloride.

If it is required to produce the design in more than one colour, the respective developing solutions are applied locally.

As another instance of the application of our process we may describe the production of transparent pictures upon glass by means of a sensitised gelatine film. One hundred parts of hard gelatine are dissolved in water together with from one to ten parts of primuline, according to the depth of colour desired, and one-half part of chrome alum.

The glass is evenly coated with the warm solution, and the film is left to set. The diazotisation, washing, exposure, and final development are carried out in exactly the same way as described in the previous example for fabrics.

It may in some cases be advisable to use various agents, such as metallic salts, mordants, or colouring matters for increasing the sensitiveness of the diazo-compound, clearing the background, fixing the colouring matter, or otherwise heightening or toning the effect, or improving the result.

Having now particularly described and ascertained the nature of this invention, and in what manner the same is to be performed, we declare that what we claim is :—

The herein-described process of photographic printing by sensitising a suitable receptive surface with a diazo-compound, exposing the sensitised surface to photographic action, and developing the design or picture by treatment with a suitable amine, phenol, amido-phenol, or with their sulphonic or carboxylic acids.

Improvements in and Relating to Automatic Photographing Machines.

No. 7842. James Hines, Dunedin Lodge, Lenzie, Dumbartonshire ; Edward Howell, Inglebank, Lenzie, Dumbartonshire ; and Alfred Howell, Ingleside, Pollokshields, Renfrewshire.—*April* 18, 1891.

This invention has reference to and comprises new or improved arrangements and combinations of mechanism or mechanical motions in and relating to automatic photographing machines, for the taking of photographs of persons and objects on the insertion of a penny or other coin or coins, being mainly improvements upon the circular rotating time-regulated machine and mechanism for which Royal Letters Patent No. 5140, April 6, 1888, were granted to the present applicants ; and which improvements will make these machines more simple and efficient in their movements than they have been as heretofore constructed.

The nature and novelty of the improvements consist all as follows :—First, in an improved mechanical motion or combination of mechanism for giving the circular motion to the central spindle and the arm which carries the plate, or card on which the photograph is to be taken round behind the lenses and over the several chemical and washing baths ranged in a circle under this arm, which is hereinafter termed the rotating plate arm, and in giving the up and down reciprocating motion to this arm and picture plate for lowering this into and raising it out of the baths while being turned with its spindle always in one direction. This mechanical motion or mechanism consists in mounting the central rotating spindle in the form of a tube for lightness within fixed vertical tubular bearings at top and bottom, with the plate arm projecting out from the spindle near the upper part through an annular cylindrical grooved cam supported on or forming part of the outer guide-bearing tubes. This annular cam part is considerably longer or higher than the arm requires to rise or fall while it and the spindle are turning, and the cam motion is formed by long vertical parallel cam slots at the lower part at the several radial divisions round the cam where the arm and plate have to make a pause to grip the plate and afterwards as it is turned round, where it has to be lowered parallelly down behind the lenses, and into the baths, and raised up out of them, this cam slot forming a guide for the arm in its up and down and forward rotating motion. For this turning of the lever and spindle these cam grooves are curved and angled forward at the top part in the direction the spindle and arm have to be turned, so as to turn these while being lifted to the highest position of the cam grooves into other short vertical grooves or recesses in advance of the long lower cam grooves, while the continuation of the cam groove is formed at this upper part downwards and forwards at an angle into the next vertical cam slot, and so on throughout the series of cam slots round the whole circumference of the cam. Thus the mere lowering of the spindle from the upper slot in the cam carries the lateral arm by their own weight down and forward into the advancing curved and angled cam groove which will turn the arm down into the next long lower vertical slot of the cam and so on, turning the arm to the several positions by the mere reciprocating of the central spindle vertically up and down in its guides and cause the arm to pass from the lower part to the upper part and *vice versâ* from the upper part of the cam to the lower part of the next position and slot of the cam. This simple reciprocation of the spindle up and down to the extent the plate arm has to be raised and lowered may either be done from the under side by a pointed rod, working up into a hollow conical centre formed in the under end of the tube spindle, or *vice versâ* a conical centre on the tube working down into a cup in the rod, the lower end of this rod being jointed to the inner arm of a lever which would carry the spindle and reciprocate it as the lever was reciprocated by its outer arm, which would be made shorter to have less up and down motion than that necessary to be given to the inner arm of the lever and to the rotating spindle and its plate arm. Or otherwise, instead of carrying and reciprocating the hollow spindle and plate arm from the lever at the lower side, it might be done from a lever at the top side, connected by a swivel-jointed hanging rod, and be actuated by this lever substantially as by the lower lever, except that the swivel joint on the hanging rod might be made with fine ratchet teeth, which would prevent the spindle from turning in the backward direction in the escapement at the top of each of the forward motions of the plate arm in

the cam, or this forward motion might be ensured by fulcruming the arm to the spindle with a slight motion counterbalanced by a weight, which would press the arm always in the forward direction as the weight of the pendulum does in a clock, or this might be effected by a spring, such as the hair spring of a watch escapement. In either case this outer short arm of the lever would be reciprocated by a vertical rod and pulley on its upper end, steadied by a suitable guide, so as to be acted upon by projecting curved or inclined teeth formed on a time-regulated disc wheel, that is secured on one of the spindles of the time-regulating mechanism of the apparatus, which made one revolution for the cycle of operations necessary to be given to the picture arm and its spindle during one revolution to take a photograph and deliver it, a raised tooth being formed on this time-regulated wheel only at the proper places and times it was required to raise the spindle and turn the arm in the cam. The parts of the periphery of the wheel between the teeth would be concentric or circular, and of different lengths to give the proper time pauses the plate arm was required to remain in each lower slot and division of the cam to take the photograph in front of the lens or give the chemical or other action required in the respective baths.

A further improvement consists in a simple arrangement of clip for gripping the plates or cards for securing at the end of the plate-carrying lever, formed of a light oscillating lever or hanging stem fully longer than the depth of the photographic plates to be held by it, and hinged near its upper end to the plate arm, and with a spring always tending to keep the stem clip against a stop vertically, and with a bevelled catch on its lower front end, and with a corresponding slightly sliding catch mounted on its upper end with a light spring tending to press it always down to catch the plate. This upper catch might be the whole width of the plate, or have two catches at its outer edges. Thus, when this clip was brought down with the arm, in its top position over each plate to be lifted and gripped, the lower end of the clip stem would yield and the lower catch glide down the back of each plate until the upper catch or catches came down and caught the upper edge of the plate, when the lower catch would spring in and grip the plate also at the lower edge between the two catches as the plate arm rose in its cam grooves as before described.

A further improvement consists in the modes and means for arranging the photographic plates in quantities or magazine form, so that each plate in succession would be caught by the plate clip as the previous ones were used up. One arrangement of the plates consists in mounting them in a vertical parallel column over each other on two vertical sliding frames with carrying and delivering strips at their lower ends, on which the plates would rest at their outer ends, while their inner ends would overlap each other to the extent of a fourth of the length of the plate or so between the said strips, and under these carrying and delivery strips a curved or conoidal shoot would be fitted, and a motion would be taken from the gearing of the clock mechanism to an oscillating arm spindle fitted and linked to the said sliding frames, so as to oscillate these the one up and the other down alternately just before the plate arm had come round to pick up a plate. This oscillation would allow the lower plate to fall off the carrying strips vertically from one side or the other into the angled shoot, so as to be delivered vertically into a V-shaped receiver below the shoot, just under where the plate clip would come down and grip it and raise it in its upward movement, as hereinbefore described. By another arrangement the plates would be mounted horizontally or parallelly at an angle by their edges in slots in the close sides of a long vertical or angled arrangement of traversing box, at about a sixteenth of an inch or so apart, the box being open on the other two sides for the removal of the plates, which would be effected by the pushing of the box downwards by a weight, or the rolling of it downwards over horizontal rollers on an inclined endless band, always as the previous plate was removed from the lower end of the box, the last plate always forming the stop for the lower position, where the plate would be successively removed by a reciprocating pusher, actuated by the time mechanism acting on the upper end of the plate, or it might be an indiarubber roughened or other friction pusher acting on the outer surface of the plate, either of which would push the plate down into the conoidal shoot and V-steadying holder ready for the plate clip to take hold of each plate as it was delivered, as before described. In like manner the plates might be so fitted nearly close to each other in slits radially in a horizontal rotated wheel frame placed in the upper part of the dark box, which would be turned round by a light weight until each last plate not used would come up to a stop, where it would be pushed or pulled downwards by the time mechanism into the angled shoot below and V-steadying guide, so as to be picked up by the plate clip, all as before described. Or in some cases the plates might be thus carried and fitted in close sets in slits formed in strips ranged horizontally on an endless band passed round two horizontal pulleys, so that the band and plates would be traversed vertically to bring each plate up and forward as required against a stop to the vertical position, for the plate clip to pick them up direct by the down and up motion of its reciprocating and rotating arm, and without requiring to be delivered into the shoot and steadying guide described in the former arrangements. A further improvement consists in giving a motion to the baths, or the liquid in the baths, while the plates are immersed in these for their respective purposes. One arrangement for so effecting this consists in mounting or fixing the bath on the top of a rotating disc, or it might be an oscillating disc, on or the top of a spindle mounted in an easy-working journal bearing and jointed footstep at top and bottom respectively of the spindle, and in giving this spindle either a rotary or oscillatory motion by a light pulley and band or lever action from any rotating shaft of the time mechanism, put in action by the rotating plate arm while a photograph was being taken, or while the arm was in its lower position with the plate in the bath, and in the rotating arrangement the bath might be made with an angled vane in it to ensure the agitation of the liquid by the rotation of the bath. Or by a converse arrangement the baths might be left stationary in the rotating circle of the plate and its arm, and have a small rotating or reciprocating vane mounted on a spindle and portable bracket fixed in the bath, with a small pulley or lever on it to be actuated in the manner described for rotating or oscillating the bath, which spindle arrangement might be easily screwed portably to the side of the bath for removal when cleaning and renewing the bath. Or this agitation of the liquids might be done by blowing a jet of air into the baths from a fan or other equivalent set in motion by the time mechanism while a photograph was being taken. And a jet of this air might also be used for drying the photograph by being blown through a tube or duct heated or not by a gas jet to act on the surface of the photograph, which gas jet would also be set on and off by the time mechanism just before and after the photograph was taken.

Another improvement consists in the mounting of two, three, or more sets of lenses in the front of the case and picture plate, to take two, three, or more small photographs on the same plate, instead of one larger photograph filling the plate as hereinbefore described, in these automatic photographic machines, having the light shutting off diaphragms of the whole of the lenses opened and closed by the automatic mechanism, all substantially as described, in reference to the diaphragms of the single lenses in these automatic photographic machines.

A further improvement consists in mounting in the front or central upper part of the case of these automatic photographic machines a powerful incandescent or glow electric light within a close separate box or chamber, which would emit the light outwards to shine on the person or object to be photographed, but not emit light within the photographing case, or through from the outside. The electric light would be supplied by any of the electric light companies, and the current put on at night and when the daylight was insufficient. The electric light arrangement would have a switch automatically put on and off by a lever actuated and set on by the time mechanism started by the insertion of the coin, a little before the lenses had to take the photograph on the plate, or this would be done by the insertion of the coin itself moving a switch lever to put on the light. Or otherwise this switching on and off of the electric light might be effected by the insertion of the coin in a different slot and by a different automatic coin-lever mechanism than that used for the taking of the photographs by daylight, and made to control its setting on time mechanism, by the greater number or weight of coin required in the electric light arrangement.

In the improvements of our said former patent, a special electric bell mechanism was brought into action just before the light diaphragms of the lenses were opened, to notify to the person to put himself in position and stop the mechanism for a few minutes before the lenses would open automatically, or by the person putting his hand on a handle to set the mechanism going again. By a further improvement this automatic bell mechanism might be made to only give the alarm sufficiently early to give the person time to place himself, before the machine automatically opened the diaphragms of the lenses, and take the photograph and shut the diaphragms and move on without requiring to be touched or interfered with by the operator, in the same manner as the time mechanism automatically places the plates into the baths and removes them without stoppage, the stopping of the ringing of the bell or the shutting of the diaphragms indicating to the person that his photograph was taken.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 25	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 26	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 27	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 27	Burnley	Bank Chambers, Hargreaves-street.
,, 27	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 28	Burton-on-Trent	The Institute, Union-street.
,, 28	Halifax Photographic Club	Mechanics' Hall.
,, 28	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 28	Oldham	The Lyceum, Union-st., Oldham.
,, 28	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 14,—Mr. P. Everett in the chair.

Mr. G. W. Atkins showed some results of negatives taken at the last outing of the Society.

A question from the box was read inquiring how the numbers marked on the stops of a Dallmeyer lens should be understood so as to render them comparable with the universal standard, and it was replied that if one-third was deducted from the number marked, the relation of rapidity as affected by aperture would be nearly enough expressed on the basis of the system adopted by other makers and by the Photographic Society of Great Britain.

Mr. F. C. Kellow showed a rapid shutter, in the construction of which the shock caused by the stoppage of the shutter at the end of the work was taken up by a spring.

This being the last lantern night of the season, a large number of slides were exhibited, including many of those recently shown at the Crystal Palace, and of several of these it was remarked that, although right in density for the present display, they would have been better to have been somewhat thinner for such a large disc as that covered at the Crystal Palace, unless the light had been more powerful.

Amongst the slides now shown were a great number by Mr. F. P. Cembrano, and these included views of the Alcazar and Alhambra, as well as of more domestic subjects taken at home. Mr. Freshwater showed views of Hastings and some slides of insect subjects; Mr. Everill, views amongst the home counties, as were those of Mr. A. Cowan and Mr. Atkins. Mr. Cooke's exhibit was principally of scenes at watering-places. Messrs. Teape, Kellow, and Chang also were amongst the exhibitors.

CAMERA CLUB.

THURSDAY, May 14, was a lantern evening at the Camera Club. Slides were shown by various members.

The subject on Thursday, May 28, will be a short paper, communicated by M. Léon Vidal, on *A Process of Mechanical Colouring for Carbon Transparencies, Stereoscopic Views, and Lantern Slides.* At this or the subsequent meeting a paper by Professor W. K. Burton on *A Modified Silver Printing Process* will he read, and examples shown.

HOLBORN CAMERA CLUB.

THE monthly "instruction to beginners" night of the above club was held on Friday last,—Mr. R. Luxton in the chair.

Mr. A. J. GOLDING first demonstrated on the platinotype process. In the course of his remarks on the process, he said it would recommend itself to all amateurs for its simplicity and also for its permanence. He developed, by the hot-bath process, six prints which he brought up with him, all turning out successfully, although had the bath been of a slightly lower temperature, perhaps better results would have been obtained.

Mr. E. H. BAYSTON then demonstrated on bromide paper, printing from the same negatives as Mr. Golding had used for his platinotype prints. Using the hydroquinone developer, he obtained some excellent results.

Taken on the whole, the evening was a very instructive one, and very satisfactory to the members who had attended the meeting.

HACKNEY PHOTOGRAPHIC SOCIETY.

THE Annual General Meeting was held last Thursday. Mr. Walter Wesson presided.

The following gentlemen were elected for the ensuing twelve months:—*President:* Dr. Roland Smith.—*Vice-Presidents:* Dr. Ambrose Kibbler, Messrs. I. Hubert, Frank Jolly, and J. A. Sinclair (the latter gentleman was formerly of the Liverpool Society).—*Council:* Messrs. W. L. Barker, H. J. Beasley, Walter Wesson, A. Dean, T. Houghton, C. F. Hodges.—*Curator:* Mr. S. H. Barton.—*Treasurer:* Mr. J. O. Grant.—*Hon. Secretary:* Mr. Fenton Jones, 6, Victoria-street, Hackney.

The report (third year) was a very satisfactory one, and progress is being made. The retiring officers were duly thanked for their services.

After the election the HON. SECRETARY read a short paper on the different developers now used and preferred, for pyro development, Wratten's, Lange's, and one by the President, in which a saturated solution of sulphite of soda was used. The best quinol formulas he thought were the Ilford and one given by Mr. McCormack, and eikonogen that of Warnerke's.

A lively discussion ensued in which Messrs. Gosling, Reynolds, Gilbert, Dean, and others took part.

The absent members are requested to note that there will be an excursion on May 23. Train, Liverpool-street (G. E. R.) to Wood-street at sixteen minutes past two. Meet at Wood-street, forty minutes past two, and at Whips Cross at fifty minutes past two.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

AN extra lantern evening on Friday, May 15, Mr. Edward Lovett (president) in the chair, when Mr. J. A. Sinclair, of the Liverpool Amateur Photographic Association, gave an illustrated lecture, entitled "*A Scamper Across Normandy with the Camera.*"

Mr. SINCLAIR started his tour (in company with two friends) from Liverpool to London, and from thence to Dieppe, Rouen, Caudebec, Bournville, Pont Audmer, Lisieux, Falaise, Caen, Bayeux, St. Lô, Coutances, Mont St. Michel, and from thence home. He interspersed his lecture with highly interesting, curious, and laughable incidents that occurred during his travels. The pictures were taken on "Ilford ordinary" plates, and the fine interiors of the French cathedrals that Mr. Sinclair had taken were particularly noticeable for their freedom from halation, and the whole series of pictures illustrating the lecture were of the highest technical excellence. The final picture of the evening, entitled a *Farewell to Normandy and the Seine*, a sunset picture, was worthy of special notice.

On Saturday, May 23, a half-day excursion to Groombridge, conducted by Mr. J. A. Carter. Train from London Bridge (L.B. & S.C.R.), forty minutes past one; East Croydon at three minutes past two p.m.

ENFIELD CAMERA CLUB.

MAY 13.—Annual general meeting.—The President (Mr. D. G. Pinkney) in the chair. There was a good muster of members.

The PRESIDENT, in moving the adoption of the annual report and balance-sheet, referred to the satisfactory position of the Club, and considered that the members might reasonably congratulate themselves on the credit balance of 8*l.* 15*s.* on the first year's working of the Club.

Several members expressed the pleasure they had experienced and the benefit derived during the past season.

The President and Secretary and the Committee (with two exceptions—gentlemen who had left the neighbourhood) were then unanimously re-elected, and votes of thanks given for their past services.

One new member was proposed, and it was arranged that the next field day should be held at Leigh, near Southend, on Saturday, May 30.

MANCHESTER PHOTOGRAPHIC SOCIETY.

MAY 14,—The President (Mr. Alan Garnett) in the chair.

Mr. E. Birkhead was duly elected a member.

The CHAIRMAN made some observations on a visit paid by himself to M. Lippman, of Paris. He also showed a photograph taken by himself in a Paris studio with a lens of remarkable covering power. The lens, made thirty years ago for hand camera work, had suffered from ill-usage and age, but its work was still as good as need be.

Mr. Robinson brought to the meeting a dark slide which he used in 1858. This slide very much resembled the now popular Barnett slide.

Mr. J. SCHOFIELD related his experience of recent hand camera work, and showed results on different makes of plates. He also exhibited the "Name it," a set of rubber type and materials for naming negatives and prints, which he had found to work very well.

Attention was called to the list of summer rambles, the first being on May 30 to Liverpool, special mention being made of the proposed outing to Shrewsbury on June 27. Mr. Schofield, the leader, gave the general arrangements, and hoped the members would turn up in good numbers, as the Secretary and others of the local Society had been at a deal of trouble to insure a successful day for their Manchester friends.

Other members handed round prints from hand camera negatives taken during the last few months.

A paper contributed by Mr. A. W. Scott, of Weston-super-Mare, on *Lantern Projection in Natural Colours*, was read by Mr. WHITEFIELD, who also described the Verak lantern sent by Mr. Scott to illustrate his paper. The demonstration of Mr. Scott's method of projecting photographs which followed was highly interesting and very successful. The lantern being only in experimental form, and the photographs, as Mr. Scott puts it, only "his apprentice work," the results were all the more instructive, and promise well for future development in this method of exhibiting photographs with colour. The light from a single mixed jet is projected through a four-inch condenser on to four smaller condensers arranged on one plane, thus being split into four beams, which then pass, first through four colour screens—violet, blue, red, and green—one for each ray of light, then through a single lens slightly convex; this is for diverting the rays properly through the four compound objectives on to the screen, where the four coloured beams of light are superimposed, producing a white disc. On the insertion of the Verak slide, consisting of four photographs, at the front of the small condensers, and each against the colour-screen it was photographed through, the effect on the sheet is a curious confusion of picture and colour until the images are properly focussed and registered by a very ingenious lever, when pictures immediately coalesce and stand out with a remarkably natural appearance. The slides shown were of a varied character, and well displayed the capabilities of the process, the sunsets and cloud effects being very effective, whilst an advertising hoarding and shop-fronts exhibited in a more distinct manner the light-analysing power of the slides. The only defect in the pictures, as seen on the screen, is a slight fuzziness of outline, which will, no doubt, be obviated when better means of registering and more transparent colour-screens are used, those at present employed being partly made of stained collodion or varnish.

Altogether the demonstration was greatly appreciated by the meeting, which, on the motion of the PRESIDENT, seconded by Mr. HEYWOOD, passed a hearty vote of thanks to Mr. Scott for his contribution to the evening's enjoyment and instruction, and by a unanimous request the names of Mr. Whitefield and the Hon. Secretary (Mr. W. H. Farrow) were coupled with Mr. Scott's for their part in the success of the demonstration.

MAY 16.—A special out-door meeting was held, when, by the courtesy of Mr. Jennison, the proprietor of the Belle Vue Zoological Gardens, eighteen members and friends had an opportunity of trying shots at the fine collection of animals in this well-known northern pleasure resort.

EDINBURGH PHOTOGRAPHIC SOCIETY.

MAY 16.—The first of the Saturday afternoon half-holiday rambles came off on the above day, having been delayed from that first announced in consequence, among other things, of the backward state of the weather. On Saturday, unfortunately, there was a recurrence of severe wintry weather, extreme cold—in fact, it was altogether a boisterous, blowy day, with occasional bright intervals of sunshine between slight showers of snow and hail. In spite of the weather, however, about thirty members turned out for this, the first trip, which was to the ancient royal burgh of Inverkeithing, the route taken being, of course, by the Forth Bridge. This old and very interesting little town, with its old palace and church, its market-place and cross, and the quaint bits of old Scottish domestic architecture, afforded full play for the selective affinities of many of the members, and there was also good work found at the picturesque little harbour, with its shipping and surroundings, and the neighbouring old ruin of Rosyth Castle, of which only one tall square tower now remains, which must have been the north-eastern angle of an extensive fortification on the island on which it is built, but which is now connected by a causeway with the mainland. There are armorial bearings much defaced, and an "M. R., 1561," with the Royal crown, showing its relation with Queen Mary of Scotland. A very quaint inscription, which is worth reproducing, is on the south side of the castle:

"IN DEV TYM DRAW YES CORD. YE BELL TO CLINK
QVHAIS MERY VOCE VARNIS TO MEAT AND DRINK."

There is a tradition that the wife of Oliver Cromwell was born here, which, however, may be taken as doubtful. It is not so doubtful, however, that Arabella, widowed queen of Robert III., lived in the old mansion called Rothmell's Inns, and had a private chapel there for herself and family. It is a most unpicturesque bit of a building, although of so old a date. The extensive and well-wooded grounds of the fine old mansion of Fordell were also open to the members. The shores of the Firth of Forth, with its noble haven of refuge, St. Margaret's Hope, where at present, and, indeed, almost always, there is a flotilla of all kinds of craft, from the huge guardship and its attendant tenders and boats, with others of all sorts of rigs passing up and down to the various harbours and places of call above and below the Forth Bridge, afforded fine scope for ship, sea, and sky effects. The cloud scenery was singularly fine and effective during a great part of the ramble.

The President and Council, with the object of encouraging these trips and reviving what used to be a notable feature of the Society, viz., outdoor trips and work, desire it to be known that they have resolved to offer several silver medals for the best examples of work taken by members during these rambles, as well as for other outdoor work taken during the next season, and, judging by the turn-out and high spirits of the party on Saturday last, they are sure to be popular. It is said that *all* the work done at these outings will be exhibited at the first meeting in November next, but that must be taken with a pinch of the Attic. All that are considered by their producers worth showing will likely be exhibited, and, by a wise arrangement, the Society itself is to be constituted the direct judge of the quality of the works shown and awarder of the medals granted.

EDINBURGH UNIVERSITY PHOTOGRAPHIC SOCIETY.

This new Society held a meeting on Monday evening, the 11th inst., in the Lecture Hall, Chambers-street, under the presidency of Dr. Thomas W. Drinkwater, F.C.S.

Mr. Hume gave a demonstration of the various workings of his cantilever lantern. These comprised, in addition to the ordinary photographic slides and enlargements on bromide paper up to the largest size, technical and class drawings and diagrams. There were also included some original designs enlarged from a small up to full working size.

The fullest explanations were asked and given during the course of the demonstration, and at its close Dr. Rhymer Paterson said he hoped, in their new meeting-place, to have still further information of a similar kind.

This Society has secured rooms and a studio in Bristo-place, and is thus so far the best-equipped in the city.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.

April 29,—Mr. W. M. Smith in the chair.

The Secretary (Mr. Pitkethly) read the third of a series of elementary papers, this being upon *Composition and Exposure*. In dealing with the double subject he gave a few principles which should be adopted on choosing a view, with reference to the light and the position of the camera in order to getting the best effect upon it. In speaking of exposure, while he considered exposure tables useful as a guide thereto, he deprecated an absolute dependence upon them, as so many different factors had to be considered and acted upon according to the quality of the subject. A very prevalent error among amateurs was the adoption of very small stops to secure excessive sharpness, as it would be found that for most general work the lens would do best when not stopped below *f*-22, while for many subjects *f*-15 would give the best results. A good picture could never be got with insufficient exposure, and the proper exposure should always be tried for, as it would be found to be a great mistake to try to make up by development what should have been got by a full exposure for the deepest and darkest parts of the picture.

GLENALMOND PHOTOGRAPHIC CLUB.

The second meeting of this Club for the midsummer term took place on Saturday, May 16, at eight o'clock p.m.,—the President (Mr. A. S. Reid) in the chair.

The President gave a lecture on *The Development of Instantaneous Photographs by a Mixture of Hydroquinone and Eikonogen*. He showed some prints, the negatives of which were developed by that mixture.

Mr. R. Johnstone also showed some prints, one of which was a photograph of the Club taken at the end of the Easter term.

The meeting adjourned at nine o'clock till Saturday, May 30.

At the previous meeting, held on Saturday, May 9, the officers for the term were elected thus:—*President:* Mr. A. S. Reid.—*Keeper of the Books:* Mr. W. H. Maxwell.—*Keeper of the Album:* Mr. W. G. Harrison.—*Treasurer:* Mr. L. H. Maxwell.—*Hon. Secretary:* Mr. E. H. C. Craig.

Five new members were elected.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

A meeting of the Photographic Society of Japan was held in the Masonic Hall, No. 60, Yokohama, on the 18th ult. From a little after midday there was an exhibition of prints on the bromide paper that Mr. Cocking had presented to the Society a few months ago. Mr. Cocking offered three prizes at the time that he presented the paper, and these were awarded by ballot of members and of the public on Friday—Mr. K. Ogura, amateur, the first prize; Mr. A. Futami, professional, the second. For the third prize there were so many prints that received an equal number of votes that no decision could be come to.

Mr. Cocking showed a large number of "Kodax" cameras. These instruments are highly ingenious and are excellently made. The larger sizes, which have, we believe, reached Japan for the first time, relieved the instrument from the stigma of being only a toy.

In the evening there was a regular meeting of the Society, when Mr. W. K. Burton gave a demonstration of a modified silver printing process. Briefly put, the process consisted in making one solution of nitrate of silver, and another of "salt" (preferably chloride of ammonium), citric acid, carbonate of soda, and a little gelatine. The solutions are warmed and mixed, when an "emulsion" that is immediately ready for application to any surface that can be sensitised results. The process of making the emulsion, sensitising the paper, and toning prints by Clark's platinum method, was shown. Specimens of finished prints were also shown.

Mr. Burton said that the process had not yet been long enough in use to know whether it had any real advantages, but the possible advantages that he saw were that a single solution that would keep fairly well could be prepared in a few minutes, and was at once applicable to any surface, whereas in all other silver printing-out processes there were either two operations—that of salting and that of sensitising—or a washed emulsion, which was comparatively troublesome to make, had to be used. This process was a cheap one.

Mr. West thought the saving of trouble was not great. So far as he could see, the advantage of the process was that it made it possible to get a blacker colour—one more nearly approaching to an "engraving black" than by the ordinary process.

Correspondence.

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

WARM TONES ON BROMIDE PAPER.

To the Editor.

Sir,—Will you allow me to correct an error in the printing of the toning formula for the above process, the word grains having appeared as grammes. The formula should read as follows:—

Water	8 ounces.
Glacial acetic acid	90 minims.
Potassium ferridcyanide	4 grains.
Uranium nitrate	4 ,,

—I am, yours, &c., J. Weir Brown.

To the Editor.

Sir,—Mr. J. Weir Brown, in his demonstration before the London and Provincial Society *re Toning Bromide Prints*, discounted seriously something I have written *re* their permanency. Now, I still adhere to my original statement, and say that the results are not permanent; and in proof thereof I enclose a print (supplied me by Mr. Weir Brown) which has been cut into several pieces, and you will see that, besides simple washing, the fumes of ammonia and exposure for ten days to daylight both spoil the picture.—I am, yours, &c., John Howson.

Ilford, London, E., May 16, 1891.

Having an opportunity of showing Mr. Howson's exhibits to Mr. Weir Brown—a course to which Mr. Howson, we knew, would not object—this gentleman replies:—

"If Mr. Howson will refer to your first issue of this year he will find that I have never claimed that the tone of these bromide prints will withstand prolonged washing. Sufficient and only sufficient washing to bring the prints to the colour desired is necessary. My contention is that more than sufficient is not required, and will not be resorted to by those who wish to use the process, and that, exposed to the conditions of climate to which our photographs are usually subjected, the tone of the finished print will be sufficiently permanent to satisfy any but those who wish to put it to tests such as our pictures are not likely to meet with in the ordinary course of their existence. I do not think that sprinkling with water or ten per cent. ammonia would improve any of our pictures, and I do not think that the inability of these toned bromides to bear such treatment will stand in the way of those who wish to produce some of their enlargements in warmer tones than the usual black and white."

EMIGRATION TO CANADA.

To the Editor.

Sir,—By two correspondents in your last issue Mr. J. G. Ramsey's opinion on the above subject is ascribed to the sordid motive of professional jealousy. Will you allow me to correct this suggestion? Mr. Ramsey is the head of a large firm of photographic material dealers, and anything he may say on this debated question is worth ten times more than all that its promoters may say for it. His opinion is utterly unbiassed, and is given in the interests of your readers, to save them from disappointment. The promoters of the scheme suggest that *clever men* can succeed in Canada, although they admit hundreds can barely make a living there now. Clever men can succeed here also, where the competition in this special branch is less keen than in Canada.—I am, yours, &c., H.

P.S.—If Mr. Henry found Canada such an El Dorado for the photographer, why did he come and settle down as a *trade printer* in England?

To the Editor.

Sir,—As I see two letters in your issue of May 8 which condemn the above undertaking, I think a few lines from one who has six years' experience may tend to outweigh the overdrawn and erroneous statement of your correspondent Mr. Oakley. Perhaps he has not gone into the proposed arrangements of the Federation as deeply as I have, and in addition to that I have had six years' experience in the "West." My experience of the class of people which are (as I take it) the chief customers of the Federation is this. All Europeans gladly avail themselves of any opportunity to get photographs of their homes, families, &c., to send home, and the undertaking cannot fail to make a success in that department. Again, Mr. Oakley states that the farmers always want to give "trade" in payment, but that idea must emanate from an insufficient knowledge of them, though at the same time I will admit that a great many transactions are carried out that way. The object of the Federation is not to populate the towns with photographers, but seek work in the newly opened districts. I never had the slightest trouble in getting as much as ever I could do, and at good prices too, $3 a dozen for *cartes* and $6 for cabinets being a price which I never was asked to

reduce, and but seldom had to leave work through scarcity of cash with the farmers. If any man fails to make a success of the "fascinating art," it is either because he is incompetent or that he is lacking in energy. I have myself every confidence in the scheme under discussion, and am certain that it will prove a great financial success if the members have what the Yankees call "go" enough.

Your correspondent, Mr. Ramsey, evidently has not seen the preliminary prospectus, or he would not advise people so strongly to "hang on to their 50*l*.," as every member will receive good value for their outlay. During the whole of my six years I never once heard of such ridiculous prices as 75 cents or $1 a dozen.

I may state that I have no personal interest whatever in the concern, and only send you my views, as I think the letters referred to are very misleading. I greatly admire the idea, and wish it every success.—I am, yours, &c., UBIQUE.

Newcastle-on-Tyne, May 13, 1891.

To the EDITOR.

SIR,—In your last issue, 'Amateur' says there are two sides to the question; evidently there is only one side with him, and its object is to "come down with a rush" upon Mr. George Oakley. He also accuses Mr. George Oakley of casting an imputation upon a man for wishing to take pay for an equivalent. All I can gather from Mr. George Oakley's letter is that he, like myself and two other correspondents, thinks the man, or men, have no equivalent to offer.

As regards emigration to Canada, Friend "Amateur," there is only *one* side to the question. There is an opening or there is not.

I say there is nothing but bitter disappointment for photographic emigrants to Canada. I do not *dub* myself "Official Photographer to the C. P. R. Co." all the same. I have supplied the Canadian Pacific Railway Company with a very large number of Canadian photographs, which they use for advertising purposes in this country, also in their pamphlets, one of which I enclose. I have also been engaged by the Dominion Government to make views and photographs of public buildings, &c., and, having had twenty years' experience of Canada, I think I know something about the country.

There is plenty of room for emigrants of the right class, also for people with money to speculate with, but not for photographers, clerks, or counter men. "Amateur" says he does not know and has never seen Mr. Heney, and that Mr. Heney's words are honestly put and have the ring of truth. How does he know, and who has accused him of knowing Mr. Heney? "Amateur" compares Mr. Oakley to the man who returned on the same steamer. Well, Mr. "Amateur," I did not return on the same steamer. Mr. Ramsey has not returned yet, and the other correspondent was seven years in the country. I wonder what Mr. Carlyle would say of some of the modern amateur photographers?

"Amateur" says that the *bonâ fide* of the proposal can be looked into; he seems pretty well up in the scheme—remarkably so in my estimation, but let me tell him that those who know the country have no need to look into a scheme concocted in a very few weeks in England.

"Amateur" says Mr. Ramsey can be understood. (Can he?) He would be competed with. (Would he?) I should like him to be understood. I am personally acquainted with him, and think as he cannot speak for himself just yet, I may speak for him. Mr. Ramsey is one of the largest photographic stock dealers in Canada, and thinks the scheme a cruel piece of business. Surely forty more photographers introduced into the Dominion would do Mr. Ramsey more good than harm. I shall be very sorry if any poor photographer goes to Toronto to compete with any one. Mr. Ramsey feels the same, or he would not have written.

Now I wish to ask Messrs. Percy Lund & Co. a very serious question, Do they, as *photographic journalists*, really think Mr. Ramsey is a Canadian photographer? Have they never sent their little journals to Mr. Ramsey? I have seen them in the Toronto Galleries, and if they did not know anything of Mr. Ramsey, the principal stock dealer, they must have missed business, and it is a great pity. Let me tell Messrs. Percy Lund & Co. that it is not the 50*l*. that either myself or Mr. Ramsey is in trouble about; it is the poor photographic Canadian emigrants we are thinking of.

Messrs. Percy Lund & Co. say surely Mr. Oakley must think that Englishmen are absolutely without information as to the capabilities of the Dominion. It is very evident that he did not intend to see a lot of Englishmen leave this country without that information. Mr. Henry says in his article, entitled *The Canadian North-West*, he pointed out in the strongest terms the utter folly of photographers emigrating to Canada "alone" and without capital, simply on "spec." How good of him! What had he got in his head? Mr. Henry points out the pitiable condition of photographers in the lower provinces. Thanks, Mr. Henry. Personally I know very little of the lower provinces. It is no place for an Englishman. The population is mostly French Canadians. Mr. Ramsey is not in the lower provinces; neither have the two other correspondents spoken of the lower provinces. I presume they, like myself, know but little of them. Mr. Henry takes the trouble to say his scheme was not designed with a view to drafting forty photographers into the lower provinces, there to wander at large without aim or object. Who in the world thought or said it was?

Mr. Oakley's assertion that farmers do not handle much money is quite correct. A lot of their business is done by the way of barter.

Your correspondents don't like Canadian slang, but let them remember that Canadians are a pretty smart lot of "coons," and if there is a dollar to be found lying around they won't let the wind blow it away, you bet. You could not go along a line of railway, when photographing navvies, and take a few railway men's shanties, and make Canadians think it was a town or city, or even a rural village. You could not make them believe a lot of drunken railway navvies constituted a Canadian gambling-hell, or that such men would run after a man with a camera, and thrust dollar bills into his pocket. I guess not.

When I read those articles a few months back I felt very much disgusted, and wrote a letter expressing my disgust, but neglected to post it. Thinking it was another amateur gone wrong and wishing to gain notoriety, I passed it over, little thinking what the way was being prepared for.

In the May issue of the *Practical Photographer* I note that the editor thinks it a pity that a respectable journal should lend its columns to advertisers who wish to buy and sell specimens. So I guess they are solid on this Canadian business.—I am, yours, &c.,

MANAGER,
Canadian Photographic Company, Rawtenstall.

14, *Alder-bank, Rawtenstall, Manchester.*

P.S.—I could write an amusing account of how I bought, sold, and travelled with a photographic van in Canada nineteen years ago. Would you like to have it?

[Yes, certainly.—ED.]

To the EDITOR.

SIR,—Will you kindly allow space for me to say a few words in reply to your three correspondents in last week's JOURNAL. Mr. "Amateur" comes down on me rather heavily for a disinterested party, and his principal objection seems against me using slang. I would like "Amateur" to remember that I did not say Mr. Henry lied about the prospects in Canada; I simply implied that the state of things in Canada is somewhat different now to what it was when Mr. Henry went prospecting with a camera amongst shanty men. Mr. "Amateur" compares me to the man who stayed in America ten days. What about Mr. Ramsey and the other gentleman in the last item of "Answers to Correspondents?"

It seems to be the general idea of all three correspondents that Mr. Ramsey is a Canadian photographer. Allow me to enlighten them on the subject. Mr. Ramsey is not what they seem to think. He is the principal in the largest firm of photographic stock dealers in Upper Canada, and I scarcely see in what way it would be detrimental to his business having forty additional photographers to supply. "Amateur" says he knows the United States and Canada (so does any schoolboy), knows there are such places. Perhaps "Amateur" will tell us what he knows of the two countries, and possibly he might be induced to come forth and let us know who he is. "Amateur" gives us no idea of any particular person. There are so many of them.

I notice that Messrs. Percy Lund & Co. are perfectly aware of many of the facts mentioned by me. I believe they are, and it was my wish to make English photographers acquainted with those same facts. They say that they are aware that there are hundreds of men out of employment both in England and Canada, but that they do not interfere with men of talent. Bosh! The wage-rate in Canada is not more than half what it was ten years ago, and Messrs. Percy Lund & Co. know perfectly well that there are plenty of good men in England working for two guineas per week who not long ago could get their four and five guineas a-week.

Messrs. Percy Lund & Co. say that I seem to have gone to Canada on the very lines they deprecate, and to have returned after making a failure of it with a very black opinion of the whole Dominion.

Things are not always what they seem. Gentlemen, you have not got your lines plumb this time! My mother carried me on to Canadian soil before I could walk. I am not a disappointed man. I am only a spring chicken (excuse me), twenty-two years of age, and my four years' experience has been on my own hook with a camera and brains. And, more than that, I had photographic apparatus to play with as soon as I could walk. In fact, my mother did the printing before I was born.

Mr. Henry uses a rather strong term in reference to one or two of my remarks. I think, if I had been in Mr. Henry's place when he made 60*l*. in four days out of a gang of drunken shanty men, that I would have kept it up for a while. Surely having money thrust upon you is better than taking in printing for amateurs.

Mr. Henry thinks we are in trouble about his remuneration. "Nothing of the kind, Mr. Henry. We care nothing about you or your pay." My idea was to prevent hard-working men from breaking up their homes, and perhaps leaving wife and family, and to meet with nothing but disappointment and hopes blasted. I could not see them go away without a note of warning.

Mr. Ramsey has not seen the prospectus, perhaps he has by now; anyhow, it is very evident that this scheme has been planned for months back. Then, why not have published particulars before, so as to give photographers more time to think the matter over and make home arrangements? But, then, Mr. R. and other jealous photographers would have had time to throw stones.

I have had my say, Mr. Editor, and I think that any right-minded

person will see what my object was when I first wrote to you on the subject; and I don't think any blame can be put on to me for what I have said here after the way I was raked over by the three correspondents last week.—I am, yours, &c., GEO. OAKLEY.

Accrington, May 18, 1891.

Exchange Column.

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

Wanted, first-class optical lantern, Oakley's Metaphoser preferred; exchange, first. class half-plate camera, &c.—Address, T. BEVAN, 2, Bewdley-street, Kidderminster.

Wanted, 12×10 landscape camera, with modern improvements, in exchange for tri, cycle or Safety bicycle.—Address, H. H., Photographer, Esplanade, Minehead Somerset.

International half-plate camera, swing and reversing back, three double slides, rapid rectilinear lens with iris diaphragm and Kershaw shutter, all in waterproof case, value 7*l.*; exchange for whole-plate modern camera and rapid rectilinear lens. Cash balance.—Address, W. L. SPENCE, Winterfield, Higher Broughton.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:

John Davis, Lancaster.—*The Lancashire County Eleven cricket group.*

TUDENT. Any of the shilling manuals now being published will answer your purpose.

TYPO.—Print on bichromated gelatine, and swell it by water, taking a cast before it dries.

E. LIESEGANG.—The address of the Secretary of the Physical Society is Burlington House, London.

J. GERRARD.—1. The lens will answer for all the purposes you name. 2. The focus in this case is measured from the centre of the lens mount.

X. V.—Try the effect of adding a little iodine to the collodion until it is of a very deep sherry colour, and keep the bath sufficiently acid.

SULPHITE.—Mr. Berkeley never published the full details of his sulphite developer. Apply to the Platinotype Company, who hold the secret.

J. G. HUDSON.—The lamp you describe will answer very well, judging by the behaviour of one of a similar nature known some years since as Larkin's magnesium lamp.

A. C. TOWNSEND sends us examples of his work with a hand camera. Some of these are very good, while others are considerably under-exposed. With more experience he will yet attain to high excellence.

B. (Liverpool).—The art knowledge of the gentleman you name was questioned at the meeting when his paper was read. Many artists now paint their pictures from photographs which they themselves take.

C. A. COLMAN.—There are no fixed proportions for the combined eikonogen and hydroquinone developer. They may be mixed in different proportions to suit different brands of plates. See "Foreign Notes" in present number.

C. A. S.—You will learn much by a visit to the exhibition now open at the Photographic Society's rooms, Great Russell-street, with regard to photographs in colour, that is, photographs printed in colours by mechanical means.

S. WILLIS asks if there are any means by which the sensitiveness of carbon tissue can be increased so that pictures can be taken with it in the camera? If so, he says he can see a great advancement in photography.—At present we know of no such means.

W. COTTON.—Prints from the late Mrs. Cameron's negatives are now getting very scarce. The majority of them are widely different from those recently shown. A few months ago some correspondents indicated places where original prints were to be seen.

R. WELLS.—See answer to "S. W." It is impossible to obtain good negatives under such conditions. Had you turned your attention to clouds, you might have secured some excellent effects after the rain ceased. These would have been of value for future use.

EMPIRE.—1. If you put top light on both sides put glass in both sides, with ample arrangement for regulating the light by blinds. 2. Try some American bookseller for a small work on *Lighting in Studios*, by P. C. Duchochois, of New York. It was published about a year ago.

LOUIS JEFFERRY.—Unquestionably the best method of producing direct positive portraits at a bazaar at night by the flashlight is by the old glass positive or ferrotype process. They may be taken, developed, fixed, and finished off in a few minutes. The results are far superior to anything that can be produced on dry plates.

SECRETARY, DUNDEE AND EAST OF SCOTLAND SOCIETY.—We cannot under the circumstances insert your report of last meeting. The journalist to whom you sent it, either dishonourably or through ignorance of journalistic use and wont, after using it himself for last week, retained it until all the other journals were published, and then sent us the MS., with a request that we would forward it to the others!

W. MOSES.—Your query is unintelligible. You ask, "Which two sizes of portrait lenses are most suited to general use?" without saying what size pictures are required, while quoting three makers' names. Although it is against our rule to recommend any particular maker, we shall be pleased to tell you the kind of lens best adapted for particular work. Say the size of picture required, and we will tell you the lens best adapted for its production.

S. W. sends us some prints from negatives taken on Bank Holiday, and complains that although it was not raining at the time, the pictures convey the impression, by their blurred appearance, that it was. They were all sharply focussed.—The unsharp, or blurred, appearance is entirely due to the wind. A strong, gusty wind prevailed in most places on Monday, which, with anything but instantaneous exposures, rendered sharp pictures an impossibility.

VINDEX asks: "1. Can an exposed plate fog another, or have any influence upon it, if stored in the same box without anything opaque intervening? I can fancy it may if in actual contact or in extremely close contiguity.—2. I shall also be pleased to know if the use of a mirror placed at an angle of forty-five degrees in the camera is covered by patent, as I believe I saw the same proposed many years ago."—In reply: 1. We invite the expression of experience on this subject.—2. There is no patent for placing a mirror at an angle inside a camera.

A. W. must not be discouraged by failures in commencing with the wet collodion process, however successful he may be with dry plates. The two processes are widely different, and the former is far more difficult to work in perfection, while the knowledge gained in the latter is of little value in learning the wet collodion process. Indeed, we recently heard an old hand say that if he had to teach the wet collodion process to a beginner, he would prefer that his pupil knew nothing whatever of photography rather than that he had a knowledge of dry plates alone.

H. H. C. says he is a professional of fifteen years' standing, and complains that business has been worse during the last six months than he has ever known it before. He attributes this to there being so many amateurs. Our correspondent should bear in mind that it is rarely that we have experienced so many months of unpropitious weather as those just past. Also that most businesses, from the same cause, have experienced an equal depression. He must not be quite so hard on the amateurs, although it must be admitted that they sometimes take work away from professionals.

WILTSHIRE AMATEUR asks which is the easiest for an amateur to learn, collotype, photogravure, or half-tone block printing, as he wishes to reproduce some paintings by one or other of these methods, and adds, he would be obliged if we would give him full working details of whichever process we consider best adapted for his purpose.—Either process will answer well, but to give full working details of any of the processes would occupy many pages of the JOURNAL. We cannot afford the space. All that has been published on the subject has appeared in back volumes. The most successful workers keep their methods as trade secrets.

MISS MIRIAM TWYMAN, of 3, North-villas, N.W., is an exhibitor at the Royal Academy of Arts this year.

WE have received from Cook, Shaw & Co., West Green, a small sample of papier vermiel for dark-room windows. They guarantee that it will retain its present colour.

ELECTRIC STORM.—Mr. G. E. Thompson was busy with his camera during a storm which occurred at midnight in Venice recently, during which the church of S. Giorgio was often lit up as though by the sun. He obtained several photographs.

FIRE ON A PHOTOGRAPHER'S PREMISES.—A serious fire occurred at two o'clock on Wednesday morning on the premises of Mr. Lafayette, Dublin. Much damage was done, and, owing to the breaking down of a ladder, two firemen were killed while rescuing the inmates.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, May 26. Subject for discussion, *Influence of Development on Gradation*. June 9, Ordinary meeting, paper on *A New Sensitometer*, by Mr. Leon Warnerke, and adjourned discussion on M. Vidal's paper.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 27, *Cameras and Dark Slides*. June 3, *Platinotype Processes*. May 23, Saturday outing at Carshalton. Train from London Bridge at eighteen minutes past two. Meet at Carshalton at three to fifteen minutes past.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—There is on view at the Society's rooms, 50, Great Russell-street, W.C., a collection of prints in colours illustrative of the application of photography to chromo-lithography, chromo-typography, chromo-collotype, and chromo-photogravure. The specimens exhibited show the nearest approach that is possible in the present state of our knowledge to the solution of the problem of photography in colours. The exhibition will be open daily to the end of June between two and nine p.m. Admission on presentation of visiting card.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1621. Vol. XXXVIII.—MAY 29, 1891.

CHLORIDES IN THE DEVELOPER.

In speaking last week of the addition of sal-ammoniac to the developer, we alluded chiefly, if not entirely, to its use with carbonate of soda for the purpose of correcting some of the faults of that salt when employed in conjunction with pyro. But the addition of chloride of sodium, when first recommended some years ago, was intended to be of universal application, and independent of the alkali employed, the function then claimed for it being that of an accelerator. If its use is permissible with carbonate of soda, it follows that it may be employed with any other form of alkali, and it remains, therefore, to decide whether any advantage is to be gained by the complication.

Since our previous remarks were penned we have continued our experiments, and have extended them to the caustic alkalies, ammonia, as well as potash and soda combined with pyro, hydroquinone, and eikonogen. With ammonia, in conjunction with pyro at least, there appears little, if any, advantage, so far as we can see, nor, indeed, any difference in the behaviour of the solutions, with and without the addition; though a slightly more satisfactory development is obtained when hydroquinone and eikonogen are employed than usual when those agents are combined with ammonia in the absence of the chloride. It is difficult to account for this, except on the supposition that ammonia requires the presence of some restraining agent to assist in giving a vigorous deposit when either of the last-named substances are used, but that the retarding action of bromide is too great to permit of its practical addition in sufficient quantity; whereas the chloride exerts the needful action in preventing fog, while it exercises none of the violent retarding influence of the bromide. In fact, we may consider it in the light of a mild "restrainer" without being a "retarder," using the distinctive terms in the sense in which they were understood ten years ago.

Employed in this manner, and with this object, of course any chloride—at least those of ammonium, sodium, or potassium—may be supposed to act with equal efficiency, and to produce practically similar results; but in combining chloride of ammonium with carbonate of soda, as mentioned last week, the effect produced is due entirely to the interchange of elements that takes place, and not to the virtue, if any, of the addition of a combination of chlorine. Chloride of sodium, for instance, would utterly fail in bringing about the result we specially referred to, namely, the prevention of the yellow stain of the carbonate, since the latter would still be present, unchanged in the solution.

But there is another direction in which the addition of sal-ammoniac, or either of the other soluble chlorides named, has been found of use, and that is in conjunction with potash or soda in the caustic state, combined with pyro. It has long been known, or at least considered, that ammonia is the only one of the alkalies that can be successfully employed with pyro except in the form of carbonate, and where pyro is used ammonia has retained its position as the best for general purposes. Such, no doubt, it is, and especially for rapid exposures, on account of its superior energy, assuming, of course, that an addition of bromide is made in all cases. It is possible to employ the carbonates of potash or soda in the pyro developer without bromide, though the best effect is gained when bromide is used, at least, in small quantity. The carbonic acid seems capable of exercising a sufficient restraining action to prevent fog or veil when a sufficiently prolonged exposure has been given to admit of rapid development without forcing; but, when forcing is necessary, the aid of bromide becomes necessary, in order to preserve the integrity of the film. In like manner ammonia may be employed without bromide under similar conditions, but no advantage accrues, and practically the addition of bromide may be said to be absolutely essential, whether with ammonia, carbonate of soda, or of potash.

But with the hydrate of sodium or potassium in conjunction with pyro it has hitherto not been found possible to produce practically satisfactory results. As a rule, the image produced is bad in colour and gradation, thin, and foggy, conveying the impression of excessive energy not amenable to the ordinary restraining influence of bromide. But, if the bromide be added in sufficient quantity, any degree of density is obtainable, but at the cost of slowness of action and great loss of gradation, the results being, in fact, what are commonly known as "hard," and resembling those produced with hydroquinone over-restrained with bromide.

Bearing these facts in mind, and looking at the general behaviour of the hydrates when employed with hydroquinone, it seemed probable that the effect might be set down to causes similar to those we have supposed in connexion with hydroquinone and ammonia, and that the same remedy might prove effective. On putting the matter to the practical test the result proved as we anticipated, or at least hoped, and we were able by the addition of chloride in considerable quantity, as well as bromide, to produce as perfect images with pyro and caustic soda or potash as with liquid ammonia or the carbonates. Here it would seem that the *restraining* action of a considerable quantity of the chloride is required in addition to the *retarding* action of a comparatively small proportion of bromide. We say "comparatively" small in speaking of the bromide, meaning the comparison between the respective quantities of chloride and bromide, not that the proportion of

bromide is smaller than when the alkali employed is ammonia; for it is a remarkable circumstance that when a chloride is added to the developer, whatever it may consist of, a somewhat larger proportion of bromide is needed to produce the same amount of contrast or vigour than would be required in the absence of the chloride.

The first trial was made with the soda solution given last week, consisting of twelve grains of washing soda and four of sal-ammoniac to the ounce of finished developer; that is to say, a solution of double strength was mixed in equal proportions with a solution of six grains pyro and twenty of sulphite of soda to the ounce of water. This gave a standard negative with which to compare succeeding results.

To compare with this, solutions were made containing respectively six grains of sodium hydrate and eight of potassium hydrate, each with eight grains of sal-ammoniac; and for use these were mixed with equal volumes of the pyro and sulphite solution mentioned above. The developer, as applied to the plate—without bromide—would be as follows :—

Pyro	6 grains.
Sulphite of soda	20 ,,
Caustic soda	6 ,,
Or caustic potash	8 ,,
Sal-ammoniac	8 ,,
Water	2 ounces.

It will be observed that though the proportion of real alkali present in this last deleloper is slightly greater than that in the carbonate solution previously mentioned, it is about equivalent to that represented by three minims to the ounce of a ten per cent solution of ammonium hydrate—that is to say, of the real hydrate, not the solution. Or, again, to put it in other words, it represents the same strength as three minims to the ounce of a "one-in-three" solution of ammonia of specific gravity ·880, the full ordinary strength of the pyro ammonia developer.

Plates were exposed, and after cutting into three portions were developed separately in the above solutions without bromide. All three exhibited more or less fog, and generally thin and unsatisfactory, but especially the two developed with the caustic developers. Bromide was then used in gradually increasing doses of one-eighth of a grain to the ounce of developer, and repeated exposure made. The first addition of bromide sufficed to arrest the fog in the carbonate-developed film, but the quality of the image was better with a quarter of a grain. After that, each successive addition only increased the length of development, and towards the latter trials caused loss of detail. With the other two solutions the fog did not disappear until half a grain of bromide was used, and the best result was obtained when the quantity was a little over a grain to each ounce. Full density was then secured, and perfect gradation, though the appearance led to the impression that a shorter exposure would suffice.

Accordingly another plate was exposed for two-thirds the time previously given, and divided as before, the first portion being treated with the carbonate solution with the addition of a quarter of a grain of bromide to the ounce, the proportion that had produced the best result in the former trials. The result was slight under-exposure. The other two, developed with one grain of bromide to each ounce, produced bright, clear, well-exposed negatives, full of detail, gradation, and with good density.

Finally, ammonia, potash, and soda were compared all in the free state, the two last according to the formula given above, the ammonia being used in the proportion named, three minims to to each ounce of a one-in-three solution, the bromide being employed in the same proportions throughout. With "normal" exposures, the only difference was that more bromide was necessary to secure clearness and density with soda and potash; but, when the exposures were curtailed, the ammonia-developed plates were the first to begin to show signs of loss of detail, and were the least capable of bearing the necessary pushing or forcing. It is quite possible that, if soluble chloride had been present in the ammonia developer, this difference might not have been discovered; but, from other experiments on the comparison of the behaviour of ammonia with and without chloride, we are by no means certain that such would have been the case.

At any rate, these trials show that it is quite possible to develop successfully with pyro and caustic potash or soda, if the necessity should arise, or if these substances be preferred to ammonia. It is further possible that, for rapid work, an actual advantage may be derived from the employment of the two fixed alkalies.

THE WASHING OF NEGATIVES AND PRINTS.

We have, at various times, had many complaints as to the charges made by water companies in different parts of the country to professional photographers for the water consumed in their dark rooms and printing departments, complaints which might be classed under three heads. First, it is asserted that an ordinary householder, with a bath in his house, consumes far more water than does the photographer, and that, therefore, the charge is unfair. Secondly, that no extra charge is made to an amateur, who already, in some senses, a rival, is thus enabled still further to injure the professional by being able to produce his pictures at a lower cost. Thirdly, that only leading houses are selected for the impost, thus unfairly handicapping them when they desire to issue prints under the most favourable conditions for permanency. The charge is levied by the indications of a water-meter, and it is asserted its tendency is to cause the photographer to use a dangerous minimum in washing his silver prints, to limit his expenses.

Taking the charges *seriatim*, we must confess that we cannot see the justice of the first complaint. Every one pays for his gas by measure; why should he not pay in a similar way for the water he uses? If those who complain could ascertain the amount of water per head of the population consumed in his own district, we have a shrewd opinion that it would be found that the water is charged at a higher rate per thousand gallons than the photographer pays for his meter-calculated quantity.

Secondly, as to amateurs not being charged extra, there is no doubt that if they were engaged upon their amateur work every day, or nearly every day, it would be perfectly legitimate to expect them also to pay; but what is the proportion of amateurs who, taking them all the year round, indulge in what is to them a pastime on an average once a-week? As a rule, water companies are particularly clever in detecting improper consumption, and if they discovered that such cases existed they would promptly act, for wasting water is an offence under their Acts of Parliament.

Thirdly, that only leading studios should be chosen is a legitimate grievance. With them, as, indeed, with amateurs, it is no doubt true, within reasonable limits, that as much water is consumed in washing a dozen prints as a hundred, seeing that,

as a rule, the plan is to put the number in a certain receptacle, and then turn on the tap, at the same rate and for the same time, whether the larger or the smaller quantity be placed to wash.

We do not think that the ethics of water companies' charges is touched by the assertion of the tendency to use too little water; that is entirely a question between the photographer and his conscience or his reputation.

With regard to the actual amount of water needed, the question can receive no definite answer. The general consensus of opinion is to the effect that it must be copious, and continued for many hours, at least in the case of prints whether that opinion will ever be modified remains for the future to decide. It cannot be doubted that an arrangement, by means of which the whole body of water the prints are submerged in can be periodically changed, is to be preferred before one in which there is simply a continuous flow. This is easily shown by the old experiment of putting an ounce of ink in such a vessel, and observing how long a time the water must run through before the colour is gone, compared with the small amount needed if the vessel be periodically emptied and filled. Then, again, whichever plan be adopted, it should be remembered that prints on albumenised paper lose brilliancy if immersed in water for too prolonged a period. Some authorities say that three or four hours should not be exceeded, others, half a day; but all unite in saying that beyond a day they are materially injured. The exact time it would be difficult and unnecessary to define, but on no account should the washing be on this account the mere perfunctory proceeding which we know it to be in too many cases. The purpose of washing is to remove the hypo and the soluble silver compounds accompanying it, produced in the operation of fixing. This should ever be remembered. It is less the sodium thiosulphate that we wish to remove than the silver thiosulphate, though, of course, their removal is nearly equal and contemporaneous.

The chief extremes in washing are to be found in the treatment of gelatine negatives. The old hand is too apt to treat a gelatine film like one of collodion, which, porous as it was, was quickly freed from "hypo" by washing under a tap for "a few minutes." This will not do for gelatine: we do not think that two hours is any too long a time during which a negative should be covered with a sufficiency of water, changed at intervals. But we do think the practice of an exceedingly clever amateur we are acquainted with, of giving always thirty hours, is carrying precautions to the opposite extreme, not to speak of the danger to the film. Few photographers are unacquainted with the results of badly washed negatives—black corners, rotted varnish, crystalline markings over the surface. A coat of varnish covers a multitude of sins, but it will not cover any considerable amount of "hypo."

WARMTH OF TONE IN DEVELOPED BROMIDE PRINTS.

The need of easily imparting warm tones to enlargements made on gelatine-bromide of silver paper has long been recognised, and has once or twice found expression lately at the hands of Mr. J. Weir Brown, who has just supplemented the interesting letter on the subject which he contributed to our columns in January last by a paper and demonstration given before the London and Provincial Association, the former being printed in our issue of the 15th. Mr. Brown, some time ago, exhibited to us some pictures toned by his method, when we took occasion to praise the beauty of the effects produced. We also gather from the Societies' reports that at least one firm, with whom bromide enlargements are a speciality, have submitted specimen pictures toned in a similar if not an identical manner, that is, with a compound of uranium, which were much admired. In selecting this opportunity of making a few remarks upon the present position of the process, we have no doubt, therefore, that we have anticipated the wishes of many of our readers who are interested in the subject.

By careful exposure, added to certain modifications of the constituents of the developing solution employed, we already possess some influence over the resultant tones of developed bromide prints, so that, for example, in place of the blacks and greys usually obtainable, we may produce a more or less pleasing sepia colour. So far, however, it has not been shown that this method is either capable of giving uniformly reliable results, or that such of the latter as are produced quite meet our requirements, which, indeed, are unmistakably for a warmth of tone, just as distinct from sepia effects as the latter are from blacks and greys. These remarks also closely apply to an alternative toning method occasionally recommended, namely, the conversion of the developed picture into chloride of silver and redevelopment. We shall consequently not be going very wide of the mark in laying down the proposition that the kind of picture for which so many are aiming must be sought by other means besides those of development and redevelopment, and that the process which seems likeliest to meet the case is one which will allow of the developed image being "toned" or "intensified" to the required colour. Such a process must be simple, capable of yielding uniformity as well as variety of tone, and must not diminish the permanency of the picture.

The lines upon which Mr. Weir Brown proposes to work are partly new and partly old, and it may be interesting to point out in what respects he has already been anticipated. In the autumn of 1888 Mr. H. M. Elder read a paper before the Camera Club on the toning of bromide prints, which will be found at page 776 of our volume for that year. Mr. Elder found that by passing a thoroughly washed and cleared-iron developed print into a bath, containing equal parts of a one per cent solution of uranium nitrate and a similar solution of potassium ferricyanide, a change in colour was produced, the final appearance of the picture after it had been washed, treated with hypo, and washed again, being that of a "burnt sienna drawing," while the whites were stained. Proceeding with his experiments, however, he found that alum and sulphuric acid cleared the whites, and, omitting the hypo, also gave a rich brown colour to the picture. Mr. Elder recommended a toning bath made up of twenty parts water, one part of a ten per cent solution of uranium nitrate, and one part of a ten per cent solution of potassium ferricyanide, to be applied after the fixation and washing of the print. When the toning had proceeded far enough, the print was "rinsed under the tap" and transferred to a new hypo or alum bath according to the colour desired. It was claimed that, besides altering the colour of the finished print, a greater range and gradation could be given to it.

Since that time the development of bromide pictures with ferrous oxalate has been, although, perhaps, only among amateurs, largely superseded by hydroquinone, so that by the exclusion of the iron compounds the danger of their possible admixture and consequent reaction with the ferrocyanides and ferricyanides is removed. There are also slow as well as rapid

bromide papers on the market, so that now an old complaint of many that with the latter they could never obtain results except of a soot and whitewash character, with no intermediate degree of gradation, is less excusable than heretofore, since with the slow papers a greater latitude of exposure is obviously permissible, and increased power given in development to produce more harmoniously graduated pictures.

Mr. Weir Brown, finding that, although the application of the uranium toning solution to an ordinary developed bromide image—we presume, one of the character usually produced by iron—gave a pleasant tint to the half-tones and lighter details, the shadows remained heavy and blackish brown, struck out what seems to us, under the circumstances, a quite new line of experiment. He endeavoured to produce a brown image by development, doubtless of less force and vigour than the ordinary picture, calculating "that it would be more amenable to the toning process." This was an ingenious idea; but it appears to us that a picture of the ordinary dark colour, having the details and middle tones delicate, but still forcibly, expressed, with the shadows carefully kept back from any approach to heaviness, would have served just as well as a basis for the toning action. We are disposed to question the assumption that for toning purposes a brown image has, *per se*, any advantage over a black, conceding such conditions as we have referred to.

The brown-coloured prints favoured by Mr. Weir Brown are, he says, produced by considerably longer exposures than those required for iron development, and a hydroquinone developer well, if not excessively, restrained. After fixing and washing, the prints are placed in the toning bath. In his letter of January 2 Mr. Weir Brown gives this as—

Uranium nitrate	20 grains.
Potassium ferricyanide	20 ,,
Acetic acid	440 minims.
Water to	20 ounces.

In his paper he gives, presumably as the result of further experiments—

Water	8 ounces.
Acetic acid	90 minims.
Uranium nitrate	4 grains
Potassium ferricyanide	4 grains.

The material reduction in strength will be noticed, while compared with the toning formula recommended by Mr. Elder the relative proportions of both are worth studying.

Mr. Elder in his paper makes no mention of the difficulty that seems to have beset Mr. Weir Brown in his experiments, namely, the solvent action of the wash water upon the toned image, and the inference is tenable that the presence of the acetic acid in the mixture is responsible for it. We ourselves have subjected negatives intensified with uranium to a soaking for five and six hours without noticing any loss of density, and quite recently a friend exhibited to us some charming lantern-slides in gelatine, toned with plain uranium nitrate and potassium ferricyanide, which were perfectly clear, and had a warm tint as beautiful as we have ever seen in such pictures; they were soaked for considerably longer than this without any loss. Probably, after a slight washing, Mr. Weir Brown might find that the acidified alum solution, mentioned by Mr. Elder as clearing the whites and producing a rich brown colour of picture, would act as an effective "fixing" agent. In his letter of January 2 Mr. Weir Brown seems to infer that the solvent action of water on the uranium-intensified image was always a known drawback of the latter process, but we do not remember that this was the case; still, as it is six-and-twenty years ago since it was introduced, we may be at fault here.

The "permanency" of these uranium-toned prints can only be settled by the time test; but it is obvious that they run even greater risks of yellowing than negatives, which are known to be soon degraded in this manner if the image retains any free potassium ferricyanide. Of their high artistic merits we have had opportunities of judging, and we feel sure that workers of bromide enlargements will hail a simple toning process that would give them such charming effects. We should, however, like to point out that the larger number of professional workers are not yet likely to abandon the iron developer for this kind of work, and hence a process involving its desuetude would not perhaps stand as good a chance of adoption as it otherwise might. The "fixing" difficulty would also have to be surmounted before the method would be assured of a fair trial. However, the path of experimenters has been well cleared by Messrs. Elder and Weir Brown, and to those who are thinking of following them we recommend a study of both gentlemen's methods and papers, since it is very probable that a good working toning process for developed bromide prints is to be built up from the interesting materials there furnished.

A FEW weeks ago we announced that Mr. J. B. B. Wellington had succeeded in making a collodio-bromide emulsion equal in sensitiveness to gelatine plates. It is now reported that other workers, on the Continent, have achieved the same end. Such things are by no means uncommon in photography. Analogous inventions or processes are frequently introduced about the same time, although the inventors may be in utter ignorance of what others are doing.

THERE is no doubt that, if collodion dry plates could have been made as sensitive as gelatine ones when the latter were first introduced, gelatine would have met with less success than it has. At that time photographers were familiar with collodion and its characteristics, and only took up gelatine on account of its greater sensitiveness, notwithstanding that the plates then yielded inferior results. Now the case is different. The manufacture of gelatine plates has improved during the last ten years, and they can now be fully relied upon. The standard of negatives has been altered during the past decade. The collodion standard of excellence is no longer sought for; excellence is now often judged from a gelatine standpoint.

MANY experienced workers, who style themselves "old hands," know collodion only in name. Will they hastily eschew gelatine for collodion, seeing that they are quite unfamiliar with its nature? If collodio-bromide plates can be made of the same quality, and of the same sensitiveness, as gelatino-bromide, it is questionable if they will oust the latter from the field as quickly as did the former—that is, with those whose experience is confined to gelatine alone, whatever may be the case with their older *confrères*.

A CASE that is now before one of the London police-courts in which a man is charged with fraud, pretending to be able, not to make gold, but to increase its quantity threefold, has been exciting some little attention amongst the general public, particularly as the charlatan did accomplish what he professed to do. The trick was this: a certain quantity of gold, with some flux added, was placed in a crucible together with "a dark-coloured powder." This dark powder turned out, as every one with even the slightest chemical knowledge surmised, to be precipitated gold, such as that obtained from the precipitation of old toning baths, minus the silver.

MOST photographers would like to know how to increase the quantity of their chloride of gold threefold, but it is by no means difficult for

many to make it go three times as far as they now do simply by care and cleanliness. By lack of these far more gold is wasted than there is deposited on the picture. One of the most frequent complaints from amateurs is that after once or twice using the bath becomes discoloured and a black sediment is thrown down. In the majority of cases this is entirely due to contamination with some reducing agent. We have frequently seen prints being toned in dishes that have just before been used for developing or fixing negatives, and which have received but a perfunctory washing; also the fingers of the operator frequently contaminated with the developing agents, or with the fixing solutions. Often the toning bath is placed in a bottle that has been previously used for developer without being properly cleansed with acid. Under conditions such as these, and which are of frequent occurrence, there is no wonder that toning solutions rapidly become useless.

From a pamphlet recently issued by the Miners' Association it appears that there are three forms of eye disease amongst the miners in the Derbyshire district arising from the dim light in which they are compelled to work. It is stated that by far the largest proportion of the sufferers are those who have to work with safety-lamps, while with those using naked candles the diseases are far less prevalent, and with torchlight there is practically none at all. It is stated that the safety-lamp emits but half the light of a candle, and has to be placed at a greater distance from the worker; hence it becomes still dimmer. Operators who spend much of their time in the dark room should consider their eyesight, and always work in as much light as permissible. It is astonishing the large amount of light that may be admitted into a "dark room" provided it is not allowed to fall directly on the plates while being changed or in the early stages of development. Retouching and gelatine plates have done much in the interests of ophthalmists.

Many months ago it was stated in financial circles that, owing to the compulsory monthly purchases of large quantities of silver by the American Government, the cost of the metal would be permanently greatly enhanced, and that its price in future might be expected to range between forty-nine pence and fifty-two pence per ounce. This prediction seems very unlikely of fulfilment at present, as the price of silver has, for some months past, stood at from forty-four pence to forty-five pence per ounce. So much the better for photographers and dry-plate makers. Sixpence an ounce on the cost of the metal is a considerable item to large consumers.

Long as they were in making their appearance, there is now no dearth of automatic machines, at least at the Naval Exhibition, where there are about a score. A writer in a suburban contemporary says that on Whit-Monday they were out of order, and that it was very amusing to see people, after dropping their pennies in the slot, and stand gazing into the looking-glass for the specified forty seconds, look into the box and find to their astonishment that no photo had come! It was a great joke, the writer says. If this were the case, the Automatic Machine Company must have had a profitable day.

Apropos of the remarks upon the fact that there is no attempt now to disguise "detective cameras" from being photographic apparatus, we wonder if the different park-keepers yet recognise them as such? Photography in the royal parks is strictly forbidden, except with a special permit, as any one will discover who attempts to erect a tripod. From the number of hand cameras to be seen in the parks, it is clear either that a great number of permits must have been granted of late, or that the park officials are not yet so familiar with this form of apparatus as we are told are those at the famous Deal pier.

"Who is Rembrandt?" asks an evening contemporary, who says a work, under the above title, has created great excitement in the artistic world of Germany. In this work the author, Max Lautner, contends that a large proportion of the paintings attributed to Rembrandt are really the work of one of his pupils, one Ferdinand Bol By "a new photographic magnifying process" he has, so he says, on a great number of works bearing Rembrandt's name, discovered clear traces of that of Bol scratched in the fresh paint before varnishing. The author states that in the celebrated picture, *Joseph and Potiphar's Wife*, in the Berlin Museum, he has discovered a very clear impression of Bol's name to the left of the raised foot of Potiphar's wife. Perhaps, after all, these scratched names are only the act of a frolicsome student. Anyhow, the alleged discovery is not comforting to those who have paid high prices for Rembrandts.

THE CAMERA CLUB SOIRÉE.

It was on the whole rather fortunate that on Monday evening the weather was decidedly inclement, for, as we are aware of many who were prevented from attending the formal inaugural opening of the Club's new premises, and as the attendance was very great notwithstanding, we conclude that with more genial weather some discomfort might have prevailed. The whole of the rooms in the building were had in requisition, and thus the members and visitors had an opportunity of inspecting the admirable arrangement of the whole. It is scarcely saying too much when we state that in efficiency and general commodiousness the new Camera Club is the most perfect of its kind now existing.

The entertainment provided was of a varied nature. The walls of the club-room were adorned with choice examples of the works of members and others. In this room there was a concert of vocal and instrumental music, together with recitations. Here, also, was given a lantern entertainment.

The library was relegated to the phonograph, which was a source of great attraction to many.

In the billiard-room the microscopes, stereoscopes, and the Thaumatrope for reproducing the movements of animals taken by photography, were appreciated by many. Lenses in their various stages of manufacture were also shown by Messrs. R. & T. Beck.

The studio was occupied by Mr. F. R. Broadbridge, whose exhibitions of sleight of hand were warmly applauded by numerous spectators who could not possibly see "how it was done." Here, too, were shown Chladni's sound figures and Newton's coloured discs; admirable examples of mechanical work, comprising ornamental turning in ivory, mechanical models, &c., the work of members, were shown in the lathe-room.

When to these attractions we add that the refreshment departments were on the most elegant and profuse scale, we have afforded an outline of the opening *conversazione* in the Camera Club's new premises.

DEFECTIVE EXPOSURE-SHUTTERS.

In the course of last year I pointed out the fallacy of the supposed advantage accruing from the use of shutters constructed on the principle of opening and closing at the centre of the lens. It has been claimed for these that they give greater sharpness than the ordinary shutter moving in one direction, by reason of their acting as a stop during the greater portion of the time of exposure. But, as I showed by figures, the real result is a very serious waste of the light that ought to reach the plate, without any corresponding gain in definition; in fact, as I demonstrated, a comparatively small stop might be inserted, and improved definition thus secured, without very materially increasing the exposure that would be required with the full aperture of the lens.

Those remarks referred to the form of shutter in which two square apertures cross one another in the direction of their diagonals, the exposure taking place through a square aperture gradually increasing and decreasing in size, and such shutters are almost invariably placed between the elements of a compound lens. Under any other circumstances, I cannot imagine a worse form. But there are several shutters in existence in which the movement of the two rectangular (not necessarily square) apertures takes place in the direction of one of the sides, and in such the exposure takes place through a gradually widening and narrowing slit. This form is, of course, practically useless as a diaphragm, even in theory, so it is not as a rule placed between

the lenses, the only theoretically correct position for a shutter attached to the lens. If it were, there would be no objection to its use, for the loss of light resulting from the opening in the centre is partly compensated for by the extra rapidity gained when that is a necessity, and where it is not it is an easy matter to work it less rapidly.

The loss of light in this latter form of shutter is far less than in the first-mentioned. As I pointed out in my article last year, in the case of the apertures crossing diagonally, when one-eighth of the total motion of the shutter has taken place, only one-sixty-fourth of the full aperture is at work, whereas with the other form one-eighth of the motion brings one-eighth of the aperture into work. The loss that occurs then is no greater than with other forms, but the double shutter works with twice the rapidity of a single one. There is, however, another direction in which to look for a serious defect.

A few weeks back, in writing on hand cameras, I described one of my own devising, to which was fitted a shutter on this latter principle, namely, two rectangular openings passing one another in opposite directions, the exposure commencing and finishing as a narrow vertical slit. This shutter, I may say, was fitted to a $7\frac{1}{2} \times 5$ camera for use with the longer dimension of the plate, mostly in the horizontal direction. I mention this because it has an important bearing on the matter.

When the shutter was constructed, it was intended for use with a single lens, working with a comparatively small aperture, a little less than one inch, while the diameter of the two apertures in the shutter was an inch and a half. Under those conditions I had no fault to find with its behaviour. But presently I changed the lens for a doublet of similar focus, working at full aperture of one inch and a quarter, when, to my disgust, I found that practically I lost nearly three-quarters of an inch at each end of the plate, the picture being entirely cut off at those limits.

I imagined at first that the shutter was too far in front of the lens, and altered its position accordingly, but with no result. Examined closely to see how the cutting off was caused, I found that when fully open—or before it was fully open—the whole of the plate was exposed, and yet on developing the same objectionable result invariably obtained. It was some time before the explanation struck me. Working the shutter slowly, and watching the ground glass the while, I noticed that the exposure commenced in the centre of the plate, and the image gradually spread until it reached the edges, and then *immediately* began to close in again, finally disappearing at the centre. The mystery was now made clear, for it was plain that the extreme edges of the plate received only an infinitesimal proportion of the exposure that reached the centre. In the case of the former lens with smaller aperture, the full exposure had continued for at least an appreciable time, and the marginal rays had had time to do *some* work, and this I found to be the case when I stopped down the more rapid lens, for then the ends of the plate showed an image more nearly approaching the vigour of the centre as the size of the diaphragm was reduced.

Where such a shutter as this is used it is clear that the apertures must be very considerably larger than the opening of the lens, in order that the marginal rays may have some time to work. But it is equally clear that under any circumstances the exposure of such a shutter, whether working in front of or behind the lens, must be more or less uneven, the marginal rays, always the most heavily handicapped, suffering most severely.

The space inside the camera did not permit of the enlargement of the shutter apertures, so I soon had the double slides replaced by a single one; but then, owing to the increased distance it had to travel, I was only able to have the single aperture one-half the diameter of the double ones, and consequently little more than half the diameter of the full aperture of the lens. Notwithstanding this, on trial I found that it not only gave a fuller exposure to the plate, but, what was of more importance, perfectly even illumination. Calculated out in the same manner as that adopted in my article of last year, already referred to, this second form of shutter, supposing the diameter to be half that of the other, is equally quick and passes more light, besides having the inestimable advantage of evenness of illumination. I write this as an explanation, in case any of the readers of my former article may be contemplating making a shutter on that principle.

The double-action shutter need not, however, be altogether condemned. In my case, for instance, if it had been possible to reverse the position of the shutter, so that the exposure slit opened and closed horizontally, the cutting off would have occurred altogether outside the plate. This cutting-off action might, in fact, be utilised under such conditions for graduating the exposure between foreground and sky, for, by setting the centre of the shutter below the axis of the lens, the best part of the exposure might be made to take place on the foreground, while a large portion of the light would be cut off from the sky.

W. B. Bolton.

THE PHOTOGRAPHY OF COLOURS DESCRIBED ONE HUNDRED AND THIRTY YEARS AGO.

Our readers (says *Revue Scientifique*) know that quite recently M. Lippmann succeeded in photographing the colours of the solar spectrum. For that he lets them fall on a well-polished mirror, formed by the surface of a coating of liquid mercury, which reflects them. These reflected colours are then retained by a series of thin sheets, which, under the influence of the pose, are formed little by little in the interior of a sensitive film, thin and transparent, placed before the mirror.

M. A. de Rochas relates in the *Intermédiaire des Chercheurs et des Curieux* that in 1760 a dreamer, Tiphaigne de la Roche, published under the title of *Giphantie*, anagram of his name, a curious little work, where the process is almost exactly described, as one will be able to judge.

Tiphaigne supposes himself transforted into the palace of the Genii of the Elements, the chief of whom says to him, "Thou knowest that the rays of light reflected from different bodies form a picture, and paints these bodies on all polished surfaces—the retina of the eye, for example, water, and ice. The elemental spirits have endeavoured to fix these fleeting images, they have composed a very subtle and very viscous substance which dries very quickly and hardens, by means of which a picture is formed in the twinkling of an eye. With this substance they smear a piece of cloth, and place it before the objects they wish to paint. The first effect of the cloth is that of the mirror; therein is seen all the bodies near and far the image of which the light can convey.

"But, what a glass could not do, the cloth retains, by means of its viscous coating, the images. The mirror portrays faithfully the objects, but does not retain their images; our cloths render them equally faithfully and retain the image. This impression of the images takes place during the first instant of their reception on the cloth. It is at once taken away and placed in a dark place; an hour later you have a picture, the more valuable as no art can imitate its truthfulness, nor can time in any way injure it. We take in their purest source, the substance of the light, the colours which painters draw from various materials which time indubitably changes.

"The accuracy of the design, variety of expression, the more or less heavy strokes, the gradation of shades, the rules of perspective, all these we leave to nature, who, with that certain step which never fails, traces on our cloth images which delude the eye, and make reason doubt whether what is called reality is not another kind of phantom which deceives the eyes, ears, touch, and all the senses at one and the same time."

The elemental spirit next entered into some details regarding physics, firstly concerning the glutinous substance which intercepts and retains the rays; secondly, the difficulties of its preparation and employment; thirdly, the action of light and this dried substance; three problems which M. de Rochas proposes to the physicists of our day and submits to their discernment.

THE FLASHLIGHT AND ITS FUTURE.

When in the winter of 1887, along with my friend Mr. Hugh Reid, I brought before the notice of the members of the Glasgow and West of Scotland Photographic Association the extraordinary actinic power of a flash of light produced by simply blowing by means of an ordinary wash bottle a few grains of magnesium powder into a common gas flame, the entire photographic world was aroused to the probable results that would accrue from such a source of obtaining illumination for photography at night, or in dull, dark weather, and before many months had elapsed the market was flooded with all sorts of contrivances for igniting magnesium powder. Among amateurs especially the novelty and simplicity of the arrangements met with a considerable amount of popularity; while, on the other hand, professionals, as a rule, were slow to move in the way of adopting it in their studios, and I can well remember one at least of our leading portraitists at the time being so sceptical as to its future as to simply

laugh at the idea of its ever being seen in professionals' studios. Strange, however, as it may appear, this same gentleman has now seen it necessary to introduce the flashlight into his own business, and is now one of its warmest advocates.

Since its introduction by me in 1887 but little difference in the method of using it has been adopted; the lines I worked on then have been, to a certain extent, closely followed ever since the first demonstration given in public was conducted before the Glasgow Photographic Association. When, in conjunction with Mr. George Mason, a small extemporised studio was used, the sitter was illuminated by means of a magnesium lamp (ribbon) placed on a level with the sitter's head and slightly in front. This lamp was actuated by clockwork, and enabled all preliminary focussing to be done. At the same time it did good service in the way of preparing the sitter for the sudden intense flash of light which was to follow. The flash was given at a gas bracket considerably higher than the sitter, and the light was diffused by the intervention of a screen of book muslin stretched over a wooden frame. The reflector used was a white sheet. Perfect negatives were obtained in this manner, but the one and great drawback was the smoke and dust, and so, during the winter of 1888, I set about trying a means of overcoming these drawbacks, and through the kindness and courtesy of Mr. George Bell, of Glasgow, who placed his studio at my disposal, and also spent much time and expense himself in experimenting with me, we devised a plan whereby the smoke was almost entirely overcome. The dust certainly was a thing of the past. These experiments were conducted with the aid of a large lamp some three feet by five, carrying a blow-through limelight jet, the light from which was, previous to exposure, thrown on to the sitter, and the flash was caused by blowing the magnesium powder on to the face of the lime cylinder by means of an ordinary rubber tube and ball. The light was diffused by means of a muslin screen, acting like a window blind outside the lamp. The smoke was got rid off by means of a spiral tube, covered with cloth, the end of which was led to an open window in the roof of the studio. A demonstration on these lines was given at the time also before the Glasgow Photographic Association in the rooms of the Philosophical Society, and showed how any ordinary room could be utilised, and the smoke got rid off by leading the spiral flexible tube to the top of an ordinary window. It was about this time that those professional gentlemen who had stood aloof began to turn their attention to the matter, and before long results were shown which made it quite apparent that when used under suitable conditions the flashlight would prove of immense service to those who could make the necessary arrangements for overcoming the smoke.

So much for a rapid *résumé* of the flashlight. At no time was it argued or claimed, by myself at least, that results obtained were equal to the best daylight work, but it was claimed that for balls or evening parties, where a makeshift studio had to be improvised, good business could be done with its aid, and those professionals who struck out this line of business must have no reason to regret their venture, for a fancy-dress ball pays well as a rule.

Since my last demonstration before the Glasgow Photographic Association I have given much thought to the utilising of the flashlight for evening work in a professional way, and have conducted not a few experiments with a view of softening down the harsh shadows so liable to arise when using the flashlight by itself, and to this end would advise those desirous of bringing its use within the range of practical photography to employ the flashlight not merely by itself, but in conjunction with a good blaze of ordinary house gas. Of course to those gentlemen who content themselves with the amusement of a toy lamp my remarks can be of no service, but to those who care to expend some little time and money, and who are desirous of working the flashlight in such a way as to yield really good results, I would suggest that when possible a flashlight stage or studio should be erected for night work only. To do this properly means the employment of a good flood of standard light from ordinary gas jets, and this can be best and conveniently obtained by means of a double row of gas piping arranged much after the manner of lighting up the stage of a theatre—viz., by foot, side, and top lights going entirely round the front of the stage, while at a convenient distance inside the front row of piping at the sides a supplementary row of lights is also placed, by means of which the dense shadows are overcome and much done in the way of securing nice middle tints in the pictures. These gas jets are easily shielded from the front by a system of common reflectors, and when the walls of such a room or extemporised stage or studio are lined with white sheeting the light in itself is of no mean order, and when illuminated up will yield, in conjunction with a well-arranged system of burning magnesium, pictures soft, and harmonious results.

In cases where preparation can be made beforehand for fancy-dress balls, &c., a little preliminary outlay in the shape of gas piping is easily fitted up by any intelligent gasman, and, once acquired, may be utilised over and over again anywhere, provided a plentiful supply of gas can be obtained, which, as a rule, is nearly always easily got in large public halls or such places where balls are held.

The most successful negatives I ever saw taken by artificial light were obtained by such a method of illumination as I have described, and I have seen over two hundred negatives taken during one ball, with but an infinitesimal amount of failures.

The smoke is best got rid of by burning the flashpowder in lamps overhead, having a good large spiral tunnel to conduct the smoke out of some well-placed window. The use of ordinary gas helps in a marvellous degree to prevent a sudden start or stare of the sitter at the moment of exposure; and, where possible, everything should be done to cause a satisfactory draught or ventilation, so as to carry off the fumes or smoke.

Of course for ordinary house practice this method is not suitable; but, if the flashlight in the future is to be of any great service to professionals, then I have no hesitation in saying that a few pounds expended in gas piping, &c., would soon repay itself and bring the flashlight within the scope of practicable photography.

T. N. Armstrong.

HYDROQUINONE *VERSUS* EIKONOGEN.

We have noted lately a considerable amount of discussion in the foreign journals about the relative merits of hydroquinone and eikonogen. Two French experimenters, Balagny and Reeb—the former on hydroquinone, the latter on eikonogen—have been making quite a number of tests that are of special interest to the working photographer.

Balagny says that he has been using hydroquinone for two years, and has found its reducing power so great that he has not had to abandon it once since he has studied it. But he also says that the first formulæ given when the hydroquinone was introduced caused two difficulties. First, the bath soon became brown, and stained the negative; and, second, the development with a new bath produced hard negatives. After experimenting on these difficulties, M. Balagny has come to the conclusion that the carbonates of the alkalies are responsible for the colour of the negative, especially sodium carbonate, while the hardness of the results is due to alkaline carbonates generally. To overcome these defects he recommends the use of caustic potash as an alkali. The formula given consists of two parts, as follows:—

Solution No. 1.

Sodium sulphite	250 grammes.
Water	1000 c.c.

Dissolve with heating, and add—

Hydroquinone	20 grammes.

Solution No. 2.

Potash (by lime or by alcohol)	100 grammes.
Water	900 c.c.

After solution is complete, add the following mixture, which is best made with heat:—

Potassium ferrocyanide	50 grammes.
Water	100 c.c.

This last gives softness and preserves the whites.

It is also well to have on hand a ten per cent. solution of potassium bromide.

The method of using these solutions is as follows:—

For a plate 13 × 18 centimetres (5 × 7 inches) take—

Solution No. 1 (hydroquinone)	80 c.c.
Bromide solution	1 ,,
Water	40 ,,

This constitutes the developing bath for instantaneous exposures.

The above mixture is poured over the plate in the developing dish, and allowed to remain till the film is thoroughly soaked, say thirty seconds. The fluid is now poured out of the dish into another vessel, and two c.c. of the potash solution No. 2 are added, and the mixture returned to the plate in the dish. Allow the fluid to act on the plate a few seconds to see if the image will appear. If the image does not appear, add another two c.c. of the alkali, and wait again for the appearance of the image, adding the solution in this manner until the picture just begins to appear; the development will now proceed without further additions. As a means of bringing out the last details in the shadows, two c.c. of the alkali solution may be added when the development appears complete to the eye.

The bath given above will develop one dozen negatives, if care is taken. After use, the bath should be returned to the bottle, and the latter carefully closed for exclusion of air. To start the development of a new series of instantaneous exposures, a bath may be made as follows:—

Bath already used	60 c.c.
Solution No. 1	60 ,,

The addition of bromide is not necessary, as the bath contains enough from the former development. But solution No. 2 must be added with the same care as before, using only two c.c. at a time, until the high-lights begin to appear. This last bath will answer for a new lot of exposures.

For time exposures the bath is made up as follows:—

Solution No. 1 (hydroquinone)	40 c.c.
Bromide solution	4 ,,
Water	80

The method of using is exactly the same as with instantaneous exposures, always searching for the limit of development, the additions of No. 2 being always two c.c. at a time.

Working in a somewhat different line of research, M. Reeb has determined, by a series of careful experiments, the best proportions to mix the hydroquinone with sulphite of sodium and potassic hydrate to give the most satisfactory results in development. For this purpose he determined the actual reducing power of hydroquinone upon a given quantity of silver oxide, also the best quantities of alkali or alkaline carbonate to use under these conditions, and at the same time the quantity of sulphite of sodium for the best working of the developer.

Taking silver nitrate as a standard, he found that 0·08 grammes of hydroquinone would reduce one gramme of the salt.

In the case of sulphite he found the use of too much was injurious, and finally came to the conclusion that the following proportions are the best to use:—

Hydroquinone and Potash.

Hydroquinone	1 gramme.
Potassium hydrate	4 grammes.
Sodium sulphite	7·5 ,,

Hydroquinone and Carbonate.

Hydroquinone	1 gramme.
Sodium carbonate	10·5 grammes.
Sodium sulphite	5 ,,

If other alkalies are desired, they may be used in the following proportions:—

Sodium hydrate	2·85 grammes.
Potassium carbonate	4·92 ,,

To be used with one gramme of hydroquinone.

Applying the same set of tests to eikonogen, M. Reeb found that one gramme of silver nitrate requires 0·33 gramme of this developer to completely reduce it, together with the same quantities of the alkalies found necessary for hydroquinone. As with the last compound, sulphite of sodium affects the development within certain limits. A mixture of sulphite and eikonogen without alkali will have some reducing power, but the action will be slow.

Using the sulphite as a preservative of the eikonogen, five parts of the salt are needed for one part of eikonogen. If, on the other hand, an alkali is used, this amount is increased to ten parts.

Commenting on the results obtained in these experiments, M. Reeb comes to the conclusion that hydroquinone is better than eikonogen, and he gives the following formulæ for comparison.

To reduce one gramme of silver nitrate, using hydroquinone, the following proportions are required:—

Hydroquinone	8 grammes.
Potassic carbonate	40 ,,
Sodium sulphite	40 ,,
Water	1000 ,,

Using eikonogen, one gramme of silver nitrate requires—

Eikonogen	33 grammes.
Potassic carbonate	40 ,,
Sodium sulphite	300 ,,
Water	1000 ,,

It will be noted that in the last formula there is four times the amount of eikonogen that there is hydroquinone in the first. In the last formula the sulphite is eight times that used in the first.

M. Reeb acknowledges that hydroquinone is slower than eikonogen, but only under the ordinary conditions and not when used properly. As a rule its action is retarded by the use of too much sulphite.

Drawing our own conclusions from the above-mentioned results of both experimenters, we should say that the developer of Balagny, with a reduction of the sulphite to 150 grammes, would prove the most desirable to use, and his method of development is one that we can strongly recommend from our own experience. The use of ferrocyanide was advocated by Captain Eugene Himly in the *International Annual* several years ago, and Dr. Eder and Professor Lainer, of Vienna, have confirmed his results quite recently.

When the question of economy is of no importance, a mixture of hydroquinone and eikonogen will be found very effective, but the hydroquinone alone is only a trifle behind it when used with potassic hydrate.

Now is the time for the amateur to experiment with developers, and not wait till the fine weather comes. For him we would strongly recommend an attack on the hydroquinone and eikonogen question on the above lines.

—*Anthony's Bulletin.*

Foreign Notes and News.

On the first of October next the new German patent law will come into force. Several of the altered provisions will affect intending patentees to a considerable extent. The principal among them is the alteration in accordance with which a patent may be taken out in Germany *three months after* publication in another country, provided the applicant be the original inventor or his assignee. Hitherto English inventors who have taken out patents in Germany have been a good deal bothered by the necessity of lodging the application there *before* their complete specification is published here. We have known cases occur in which the German patent was actually invalidated by publications in this country having been proved to have taken place *one day* before the application was lodged with the German Patent Office. The amended law will put a stop to this.

Another amendment, which is suggestive rather of Teutonic thoroughness than practicality, provides that proof of publication shall not be allowed to invalidate the patent if the publication preceded it by more than 100 years! We venture to think there are not many patents that it would be worth while trying to invalidate have been anticipated by more than a century. The amendment, however, in accordance with which any one who has had in use, or prepared to use, an invention which is subsequently patented by another, shall have the right to employ such invention for his own use, is a practical move in the right direction, and might with advantage be introduced into English patent law.

We understand from a leading article in the *Photographische Mittheilungen* that Prof. Vogel is also among the collodion dry-plate prophets, as he there claims to have succeeded in manufacturing a collodion dry plate which, in respect to the ease with which it may be handled, equals gelatine plates, and in regard to sensitiveness *nearly* equals them.

According to the *Photographisches Wochenblatt* the already low price of aluminium is destined shortly to undergo a still further fall. Thus, while, till recently, the manufactory at Neuhaus on the Rhine have charged 9*s.* per pound, the Americans are now putting refined aluminium into the market at half that price, and raw aluminium cheaper still. It thus appears that aluminium if reckoned by volume is cheaper than brass, and in consequence is sure to find more and more employment for the manufacture of photographic apparatus.

Alessandro Sobacchi, in the *Annales Photographiques*, recommends the following method of preparing chloride of silver gelatine plates. Several solutions are first prepared, namely, (1) 35 parts of gelatine and 500 parts of distilled water; (2) 20 per cent. silver nitrate in distilled water; (3) a 5 per cent. chloride of strontium solution; (4) 10 per cent. solution of acetic acid. Thirty-five parts of solution 2 are poured into solution 1, and well mixed. The mixture is milky, and somewhat red in colour. An equal amount of No. 3 is added to it, whereupon it becomes opalescent, and finally thirty-five parts of No. 4 are added. Three parts of concentrated ammonia are then added to the mixture, which is stirred the while, and the plates are coated with the emulsion so prepared.

M. Bourgeois has recently laid a new aristo paper before the Photographic Club of Paris. The peculiarity of this paper is that it may be employed *both* for printing out and for development, by which latter method it is said that as good results are obtained as by the former. (Why, then, print out?) The prints should be exposed in the sun for from fifteen to thirty seconds, in cloudy weather for from five to ten minutes. The development may take place at once, or may be delayed for several days. The developer employed is:—

Water	1000 parts.
Gallic acid	7 ,,
Acetic acid	7 ,,

When the solution is complete ten parts of nitrate of lead (one in ten) is

added. For very thin negatives an energetic developer consisting of the above with 500 pints of water instead of 1000 is employed. The prints, when developed, are sepia brown, and should be toned in the following bath:—

Solution A.

Water	100 parts.
Ammonium sulphocyanide	20 ,,

Solution B.

Water	400 parts.
Chloride of gold	1 part.
Chloride of potassium	1 part.

B is poured into A, and allowed to stand for twenty-four hours before using.

A PALLADIUM toning is given by M. Fourtier in the *Photographic Gazette*. Good thick salted paper or Whatman's paper is employed and dipped in six and a half parts of ammonium chloride, two of gelatine, and 100 of water. After it is saturated it is hung up to dry. It is silvered in a fifteen per cent. bath. After printing the paper is laid on a glass plate, and a solution of—

Palladium chloride	1 part.
Water, acidulated with H.Cl.	100 parts.

The image gradually assumes a very artistic sepia hue. The deep shadows must have more of the toning solution painted on. The fixing takes place in an ammoniacal toning bath, after which the paper is well washed.

PHOTOGRAPHY AND FICTION.

"TWO YEARS AGO." KINGSLEY.—No. II.

THERE was a book written by Charles Kingsley and published in 1857 entitled *Two Years Ago*. Many interesting scenes in this work are devoted to photography, and the vivid descriptions given by the author show that he had a thoroughly practical knowledge of the art-science of his day. He gives, in clear and lucid language, the strong and weak points of the young art as they commended themselves to him. And he, like many others at that date, believed that photography was bound to revolutionise the artistic world. But, save for the blotting out of the miniature painter, the world of the portrait and landscape painters holds a higher and wider field than ever after these thirty years. So ends that dream of long ago. The following scenes culled from this work are the thoughts of a master mind on the subject, penned when photography was looked upon as a wonderful invention, and at a date when it was beyond the comprehension of most people. The following conversation takes place between two friends in the story:—

"'Not paint what is there, and you are the man what talks about art being highest where it copies nature!'

"'Exactly, and therefore you must paint not what is there, but what you see there. They forget that human beings are men with two eyes, and not Daguerreotype lenses with one eye, and so are contriving and striving to introduce into their pictures the very defect of the Daguerreotype which the stereoscope is required to correct.'

"'I comprehend. They forget that the double vision of our two eyes gives a softness, an indistinctness, and roundness to every line.'

"'Exactly so; and therefore, while for distant landscapes, motionless, and already softened by atmosphere, the Daguerreotype is invaluable (I shall do nothing this summer but work at it), yet, for taking portraits in any true sense, it will be always useless, not only for the reason I just gave, but for another one which the pre-Raphaelites have forgotten, "Because all the features cannot be in focus at once."'

"'Oh, no! I'm not speaking of that. Art, for aught I know, may overcome that, for it is a mere defect in the instrument. What I mean is this, it tries to represent as still what never yet was still for the thousandth part of a second, that is, the human face, and as seen by a spectator who is perfectly still, which no man ever yet was. Don't you see that what some painters call idealising a portrait is, if it is wisely done, really painting for you the face you see, and know, and love; her ever-shifting features, with expression varying more rapidly than the gleam of the diamond on her finger; features which you, in your turn, are looking at with ever-shifting eyes, while perhaps, if it is a face that you love and have lingered over, a dozen other expressions, equally belonging to it, are lingering in your memory, and blending themselves with the actual picture on your retina, till every little angle is somewhat rounded, every little wrinkle somewhat softened, any little shade somewhat blended, with the surrounding light, so that the sum total of what you see, and are intended by Heaven to see, is something far softer, lovelier, younger, perhaps, thank Heaven! than it would look if your head was screwed down in a vice to look with one eye at her head screwed down in a vice also, though even that, thanks to the muscles of the eye, would not produce the required ugliness, and the only possible method of fitting the pre-Raphaelite ideal would be to set a petrified Cyclops to paint his petrified brother.'

"'You are spiteful!'

"'Not at all; I am standing up for art, and for nature too. For instance, Sabina has wrinkles; she says, too, that she has grey hair coming. The former I won't see, and therefore don't; the latter I can't see, because I am not looking for them.'

"'Nor I either,' said Stangrave, smiling. 'I assure you that the announcement is new to me.'

"'Of course! Who can see wrinkles in the light of those eyes, that smile, that complexion?'"

The following conversation treats on a more scientific phase of the art:—

Tom Thurnall was introduced to Major Campbell.

"'You seem to be a naturalist, Major,' Tom said.

"'A dabbler,' said the Major, with eye and hand still steady.

"'I ought not to begin our acquaintance by doubting your word,' said Tom, 'but these things are no dabbler's work,' and he pointed to some exquisite photographs of minute coralines, evidently taken under the microscope.'

"'They are Mellot's.'

"'Mellot turned a man of science?' Tom exclaimed—'impossible!'

"'No, only photographer. I am tired of painting nature clumsily, and then seeing a sun picture outdoing all my effects; so I am turned photographer, and have made a vow against painting for three years and a day.'

"'Why, the photograph only gives you light and shade.'

"'They will give you colour, too, before seven years are over, and that is more than I can do or any one else. No, I yield to the new dynasty. The artist's occupation is gone henceforth, and the painter's studio, like "all charms, must fly at the mere touch of cold philosophy." So Major Campbell prepares the charming little cockyoly birds, and I call in the sun to immortalise them.'

"'And perfectly you are succeeding,' Tom said. 'They are quite new to me, recollect. When I left Melbourne the art had hardly risen then above guinea portraits of bearded desperadoes, with a nugget in the one hand and a fifty-pound note in the other; but this is a new—and what a forward step for science!'"

A sketch of outdoor photography in 1857 is given thus:—

"Meanwhile Alberalva Pier was astonished by a strange phenomenon. A boat from the yacht landed at the pier-head, not only Claude Mellot, whose beard was one of wonder to the fishermen, but a tall, thin-legged box and a little black tent, which, being set upon the pier, became the scene of various mysterious operations carried on by Claude and a sailor lad.

"'I say, lads, this won't do,' quoth one of the fishing elders; 'we can't have no outlandish foreigners taking observations here.'

"'Maybe 'tis witchcraft; look to mun—putting that man's head under that black bag now. He'm after no good, I'll warrant. If they ben't works of darkness, what be?'

"'Leastways, he's no right to go spying here on our quay, and never a with your leave or by your leave. I'll just goo and mak him out.'

And Claude, who had just retreated into his tent, had the pleasure of having the curtain suddenly withdrawn, and, as a flood of light rushed in, spoiling his Daguerreotype plate, hearing a voice as of a sleepy bear,—

"'Ax your pardon, sir, but what be you after here?'

"'Murder! shut the screen!' cried Claude. But it was too late, and he came out, while the eldest son of Anak stood sternly inquiring,—

"'I say, what be you after here, mak so bold?'

"'Taking sun pictures, my good sir, and you have spoilt one for me.'

"'Bless my heart, what vuiles we be. 'Tis a painter gentleman, lads; round ta.'

"'What did you take me for? a Russian spy?'"

And Claude continued his work, making both friends and pictures of them.

The schoolmistress of the village was loved by old and young all over the village, and a deputation came in secret to Claude to see if they could arrange to have her picture painted, and the following is the rustic description:—

"'We want it drawd out all natural in paints, and her bonnet, and her shawl, and all just like life. We was a going to ask you to do one of they garrytypes, but she would have'n noo price; besides, taint cheerful looking they sort. With your leave, too much Black-a-moor-wise, you see, and overthick about the nozzes most times to my liking, so we'll pay you welcome all you ask.'

"'Too much Black-a-moor-wise, indeed,' said Claude, amused; 'and how much do you think I should ask for painting a portrait?'"

They really, in their ignorant innocence, had no idea of the value of an oil painting by Claude Mellot when he so kindly arranged to paint it for them.

They had a decided notion, however, that the garrytype was not quite the thing they wanted.

In reading over these, one cannot but feel that the interest and pleasure in the art of photography possessed by the writer peeps out in every line of his varied descriptions. And the single eye theory is well argued out.

Not long ago a gentleman came to me with a new theory for portrait taking, worked out on lines as if trying to cure this defect noted by Kingsley. His object was to take in the camera a negative composed of two impressions, one on the top of the other on one plate, this by means of a special arrangement of his own, in which two lenses were used.

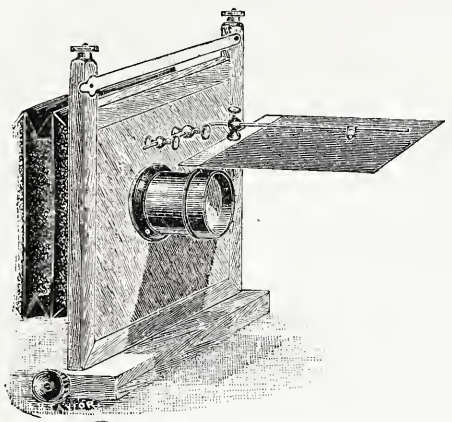
The idea was to give the result of a stereoscopic effect to a single picture; but it never came to anything. I suppose the theory broke down when it came to the practical working.

Kingsley seems to have had a firm conviction that colours would be found and fixed at no distant time from that at which he wrote, for he prophesies that photographs in natural colours would be taken within seven years from that time. Five sevens have come and gone, and still it is not.

MARK OUTE.

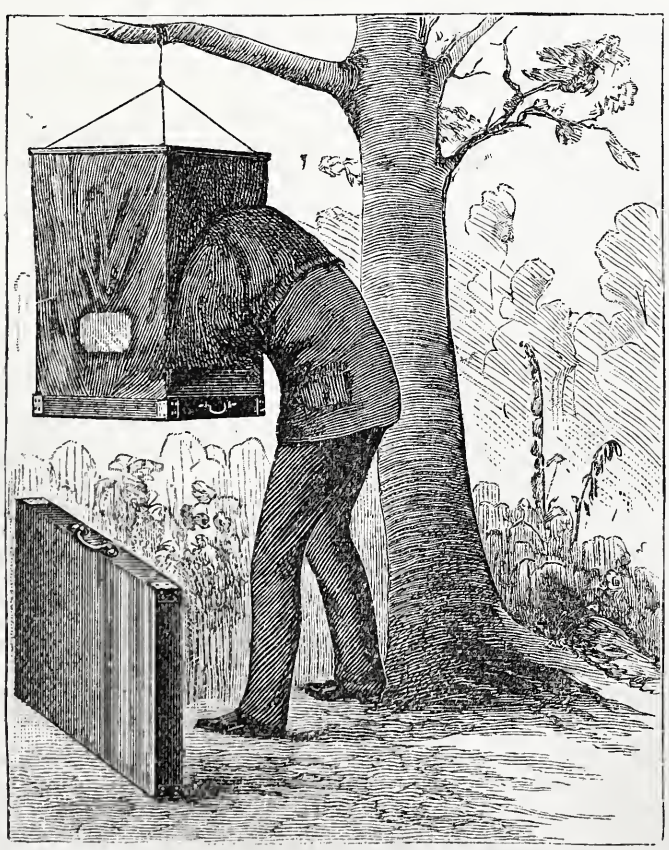
THE UNIVERSAL LENS SHADE.

UNDER this designation, Messrs. Marion & Co., of Soho-square, have introduced something which, when attached to the front of the camera, will be useful in shading off a dominant skylight from the lens, and save photographers the oft-experienced trouble of holding their open hand, or perchance their hat, over the lens to keep out extraneous light. The



above cut shows it so well as to render description unnecessary. The shade can be adjusted to any angle, and when not in use packs flat on the top or side of the camera.

The same firm sends us particulars of "Claringbull's Portable and Practical Changing and Developing Tent," the nature and method of use of which is shown in the cut.



There is no doubt that, since the introduction of dry plates, there has been a want of a light, portable, and at the same time thoroughly practical changing and developing tent. This tent fills, it is claimed, this requirement. When closed the tent measures only $26\frac{1}{2} \times 20 \times 3$ inches in thickness, and weighs only 12 lbs.; it opens out, without any trouble of fixing, to $26\frac{1}{2} \times 20 \times 30\frac{1}{2}$ inches deep; therefore it will be readily seen that any size of plate up to 12×10 inches can be changed and developed inside it. It will be seen from the woodcut that the body, as far down as the waist, is inside the tent during operations, giving perfect freedom for the movement of the arms and body.

Our Editorial Table.

THE PHOTO-AMERICAN REVIEW.—No. 1.

New York: Harry C. Jones.

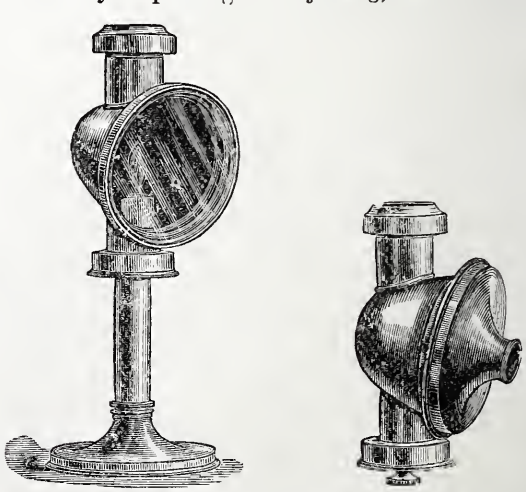
THIS, the first number of a monthly, similar in size to Harper's and other American monthlies, is to be the official organ of the American Photographic Conference and of the Society of Amateur Photographers of New York. Considering that it is to sell at only twenty-five cents a copy, we are quite astonished at its richness in illustrations. Think of thirty-eight charmingly printed phototypes, many of them full-page, with a large mass (ninety-six pages in all) of literary matter for one shilling! for this is the practical equivalent in our money of the American price mentioned. Among the illustrations are several illustrative of life in Florida, several of the scenery around Plainfield, New Jersey, two of the Bergen Mansion in Long Island, views in the Catskills, views in and around Hackensac, and others. The literary portion embraces various themes, both topographical and technical, among the latter being a paper on "Lantern Slides," by W. M. Murray; "Bromide Prints by Contact," by Wynyard Bellhouse; "The Kallitype Process," by James H. Stebbins, jun.; and others. It contains "Official Notes" of the *then* forthcoming American Conference, which is being held in New York during the present week, and of the Society of New York Amateurs, including the account of their annual dinner, concerning which we are glad to perceive the *Review* has the good taste, not always displayed by some American journalists, of not giving a detailed account of the *menu*, as if the public cared to know what kind of soup, fish, and joints were partaken of.

The *Review* also contains a copious list of new books, not necessarily photographic, recently issued in America.

THE "TRAVELLER" CHANGING AND DEVELOPING LAMP.

By Benham & Froud, Limited, Chandos-street, London, W.C.

THIS new lamp savours in some respects of the same inspiration under which the well-known "Perfection" of these makers was constructed. But this differs from the other in being strictly portable, much ingenuity having been displayed in rendering it so. First, we have the body, formed of a parabola, which, being brightly silvered inside, and highly polished, forms a reflector of the most perfect nature. The radiant is a candle possessing special characteristics, which is acted upon by a spring to force it up to the burning position. The tube in which it is enclosed can be withdrawn from the body for facility in packing or adjusting, and the cover or cap



which protects the orange glass is removable, and forms the base of the stand when the lamp is unlimbered and set up for use.

The cuts show the "Traveller" when packed up, and also when opened out and expanded ready for use, the latter operation occupying only a few seconds. It really makes an invaluable *vade mecum* for the photographic tourist, and we shall take care to make it our travelling companion when abroad with the camera.

The special advantages it possesses are well summed up by the makers as follows:—

"*Its portability.* It is so constructed that the base of the lamp forms a protecting cover for the front, and the tube slides up into the reflector, the whole thus folding into a compact compass for travelling.

"That by means of the parabolic reflector a very powerful light is obtained.

"That candles are used which are cleanly to handle, and greatly superior in every way to oil.

"That, by means of the reflector, the lamp can be so placed that the light falls only on the work, and the *eyes are not fatigued.*

"*Its suitability for lantern readings,* and for ordinary reading purposes, clear glass being supplied as well as the developing glass.

"*Only one coloured glass is required,* the glass supplied being quite safe for working by with sensitive films."

A Photograph, and How to Make it.

E. G. Wood, 74, Cheapside, E.C.

The thirty-first edition of this hand-book and price-list combined is quite as useful as any of its predecessors, containing as it does all the necessary instructions and formulæ for making the photograph, added to which is a compendious price-list of photographic requisites supplied by the publisher.

Sun Artists.—No. 7.

Kegan Paul, Trench, Trübner & Co.

The subject of the essay in this number, written by Mr. John Addington Symonds, M.A., is the photographic works of Mrs. F. W. H. Myers (*née* Eveleen Tennant), who began to study photography only at the end of 1888, with the view of taking portraits of her children. The four photogravures by which this number is illustrated are most admirable, two of them, the portraits of *Robert Browning* and *W. E. Gladstone, M.P.*, being exceptionally excellent, and worth each much more than the price of the number. *Rebecca* is also a charming picture, although we would like to have seen a space of about half an inch more between the head and the top of the picture.

The author, who writes from the æsthetic point of view, says:—

"It is obvious that photography enters the sphere of the æsthetic as distinguished from the mechanical arts, under the same conditions as monochromatic painting. I say 'painting' rather than drawing, because photography, in reproducing the solid objects of the world, can never work by outline. The surface-picture produced is modelled in all its details; with far more literal accuracy, indeed, and far less power of selection, than the art of painting possesses. I say 'monochromatic,' because, up to the present date at least, photography has not been able to reproduce colour. As is notorious, it even falsifies the hues; nor are any of the orthochromatic methods in use for correcting this defect, so far as I have yet observed, quite satisfactory. Under these circumstances photography loses the colour-values of the world, and relies for imitation of reality upon values of light and dark, which it is able to render with almost unerring subtlety, variety, and gradation."

The essay will prove of much value to photographers. The author's ideas are clearly and temperately expressed.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8055.—"An Improved Photographic Magazine Camera, and Appliances used therewith." H. J. Tear.—*Dated May* 11, 1891.

No. 8121.—"Improved Method of Photo-etching on Zinc and Copper. Complete specification. B. Krantz and H. Zeissler.—*Dated May* 12, 1891.

No. 8210.—"Improvements in Dark Slides to Cameras." W. Griffiths.—*Dated May* 13, 1891.

No. 8232.—"Improvements in Photographic Cameras." B. G. P. Möller.—*Dated May* 13, 1891.

No. 8243.—"An Improved Automatic Stereoscope." S. Ritter.—*Dated May* 13, 1891.

No. 8272.—"Electro-magnetic Inductography, and the Electric Transmission of Light Images or Telephotography." J. C. Richardson.—*Dated May* 14, 1891.

No. 8283.—"Photographic Sculpture, Carving, or Engraving." G. W. Hart.—*Dated May* 14, 1891.

No. 8401.—"Improvements relating to Electro-photography and to Electro-photographic Apparatus, applicable also to the Preparation of Printing Surfaces." C. N. Staniland and C. J. Staniland.—*Dated May* 15, 1891.

No. 8557.—"Improvements in Photography." Communicated by J. North. Complete specification. A. J. Boult.—*Dated May* 19, 1891.

No. 8628.—"Improvements in Photographic Printing Frames." W. G. Honey.—*Dated May* 20, 1891.

No. 8660.—"A New Hand Camera." C. H. Offord.—*Dated May* 21, 1891.

No. 8761.—"Improvements in the Production, by the Aid of Photography, of Surfaces for Use in Printing Colours, and in Means or Apparatus employed therein." G. T. Teasdale-Buckell.—*Dated May* 22, 1891.

SPECIFICATION PUBLISHED.

1890.

No. 9497.—"Photographic, &c., Stands." Walton.—Price 8*d.*

Improvements in Photographic Printing Frames.

No. 6607. Frederick Taylor, 16, St. Petersgate, Stockport, Cheshire.—*April* 30, 1891.

My invention relates to improvements in photographic printing frames, and has for its object to facilitate the placing on to, and removal of, the hinged back from the print without disturbing the same, and to prevent the index finger from accidentally being moved, as heretofore has been the case.

To this end I form the edges of the hinged back, and the portion of the printing frame into which it is placed, with bevelled edges, which permits of the hinged back being readily placed unto or removed from the print without disturbing the same.

In order to prevent the hinged back from disturbing the print when placing the spring bars in position over the same, I engage or release the free ends of the spring bars by means of a movable staple or catch. This staple or catch, which, if deemed necessary, may be brought under the influence of a spring, permits of relieving the hinged back and print from the pressure heretofore exerted thereon by the spring bars on moving the same in or out of position, and thus prevents the hinged back from being moved and the prints thereby disturbed.

To prevent the finger of the index, fixed in front of the printing frame, from changing its position accidentally, I form the dial opposite each number with notches, holes, or indents, and the finger with a suitable projection to enter the said notches, &c., successively when placed in position.

Improvements in Photographic Apparatus.

No. 9542. Lorenz Koch, 5, Rue Mazagran, Paris, France.—*May* 2, 1891.

This invention relates to the frames which hold the sensitised plate in the camera, and the invention consists in a novel construction of frame whereby a number of plates will be provided to take a number of pictures or portraits in succession.

The apparatus consists of a case or box, the front of which is provided with a sliding shutter. In this case slides a frame intended to receive a number of plates, say, six or eight. This frame has a solid back provided with springs which press against the plates, and fitted to work in grooves in this frame is a flexible curtain, one end of which is secured to the upper part of the case.

The frame is provided with a handle by which it can be drawn out of the case, the extent of its motion being limited by suitable stops.

When the frame is drawn out, the curtain is caused to cover the plates, and when the frame is pushed in the curtain passes down the back of the frame; so that, when the shutter of the case is raised, the plates will be exposed.

The sensitised plates being placed in the frame, which at this time is pushed into the case, and the shutter being closed, the apparatus is placed in the camera.

The frame is then drawn out, and the front plate is left in the case, and on this plate the picture will be taken, when the shutter is raised and the cap taken off the lens.

The frame is then lowered, and the plate is caused to pass to the back of the case, and behind the series of plates. On raising the frame, the then front plate is left in the case, ready to take another picture, and this operation is continued until all the plates in the frame have been used up, when they will be taken out of the frame, and developed in the usual way.

Improvements in Vignette Mediums for Photography.

No. 10,012. George Joseph Sershall, 373, Lodge-road, Birmingham, Warwickshire.—*May* 2, 1891.

This invention relates to the production of improved mediums to be employed in printing photographic vignettes, and is intended to supersede the use of vignette papers for photography, similar to those described in the specification of an invention for which a British patent was granted to me in the year 1886, and numbered 9155.

During a practical test, extending over a considerable period of time, of vignette papers produced by the method described in the specification of my patent of 1886, I found that the ultimate or complete drying of the varnish employed in that process caused the transparent, or partly transparent, parts to become much obscured, and that spots and patches were formed and appeared on those parts of the said vignette papers where the transparency or partial transparency was required, and intended to be regular and uniform.

To obviate or remove this great objection, and in accordance with this invention, I combine, by lithographic printing or other suitable means, non-actinic colour with the surface or surfaces of transparent or partly transparent celluloid films, so as to render or make certain parts, as may be required, of the said celluloid films either opaque, or partly or sufficiently opaque for use in the process of the photographic printing of vignettes; and I obtain the required gradations of tint from the opacity of the said non-actinic colour to

transparency or partial transparency at it faintest edge by the "softening off" by hand by means of a brush, or other suitable medium, to transparency or partial transparency as aforesaid.

The claim is :—The combination of non-actinic colour with the surface or surfaces, or transparent or partly transparent celluloid films, substantially as and for the purpose herein described.

Improvements in Shutters for Photographic Cameras.

No. 10,635. John William Smith, 10, Otterburn-terrace, Jesmond, Newcastle-on-Tyne, Northumberland.—*May* 2, 1891.

This invention has reference to a construction of shutter for a photographic camera, and means for setting and operating the same, the arrangement being such that the shutter can be used for obtaining an instantaneous exposure or a time exposure, at the will of the operator.

A photographic shutter, according to this invention, comprises two thin circular discs, each formed with an opening, preferably of elliptical form. These discs are mounted on spindles geared together, whereby they can be caused to rotate simultaneously, and in opposite directions, between two fixed plates of suitable material, such as ebonite, in each of which is a circular hole, these holes being opposite each other and of a diameter corresponding to that of the lens in the camera. The elliptic openings in the discs are so arranged that when they cross each other directly opposite the holes in the fixed plates an opening is produced opposite the centre of the lens, which is speedily opened to full aperture, remaining so until the exposure is nearly complete, when the opening again closes to the centre.

Each disc may have a slot in it wide enough to allow the spindle attached to the other disc to pass through it, and long enough to allow sufficient turning movement of the disc in which it is cut. By extending the spindle of one disc only through the front plate and the spindle of the other disc only through the back plate, the slots can be dispensed with, and the two discs brought close together, one or both of these discs being dished or recessed to receive these toothed wheels, which are placed between them, and fixed to the respective spindles.

To one of the spindles which projects through the back plate, and hereinafter called the first spindle, is attached a lever, to which is fixed one end of a coiled spring—the other end of which is fixed to a drum that can be rotated and fixed in any desired position. Or, instead of this lever, there may be fixed to the first spindle a small toothed wheel, into which gears a larger one, to which one end of the coiled spring is fastened, the other end of this spring being fastened to, and coiled around, a drum riding on the same spindle as the larger wheel. The drum is capable of being turned to wind up the spring and then fixed in any position, so that the tension of the spring and the consequent time of exposure can be regulated to suit requirements.

To the end of the first spindle projecting through the first plate is fastened a milled head for setting the shutter, and also a projecting piece or catch which engages a notch formed in a releasing lever pivoted to the front plate. When the spring is wound up, if the releasing lever be raised, the catch will be released, and the discs will be caused to rapidly revolve in opposite directions by the action of the spring.

The releasing lever may be released directly by hand, or by a pneumatic releasing device. In the latter case, a small knee or bracket is fastened to the front plate of the shutter, and between this plate and a projecting piece, fastened to the free end of the releasing lever, is placed an indiarubber bellows connected by a tube to an air ball, as well understood. The end of the releasing lever is kept pressed towards the knee piece or bracket by means of a suitable spring.

For obtaining "time" exposures the following construction is adopted. To the front or outer end of the second or driven spindle is attached a small disc, to which is fixed a pin, arranged to engage with a short catch lever pivoted upon the same spindle. To the releasing lever is pivoted another lever (hereinafter called a stopping lever), in one end of which is a slot, in which works a pin secured to the front fixed plate; or the stopping lever may be pivoted to a pin on the front plate, in which case it is connected to the starting lever by a pin and slot connexion. The other end of the stopping lever is formed with a projection, which, when the shutter is set for time exposure, engages with the free end of the catch lever when the two revolving discs are in positions in which they uncover the lens. The free end of the catch lever can move past the end of the stopping lever when the latter is in its normal position. For a time exposure the catch lever is turned upwards until it passes the free end of the stopping lever, the shutter being set as before. When the air ball is compressed the free end of the releasing lever is raised, as also is the free end of the stopping lever. The releasing lever consequently releases the projecting piece or catch on the first spindle, and the two discs are allowed to revolve until the lens is fully uncovered, when the pin on the small disc of the second spindle will engage the catch lever, and cause the same to engage with the projection on one end of the stopping lever, and will arrest the motion of the discs. This lever comes to rest on the indiarubber bellows, which forms an air cushion that serves to decrease vibration to a minimum. The lens will be kept uncovered so long as the air ball remains compressed, but immediately the pressure is removed the discs will continue their motion and recover the lens.

According to a modified arrangement the coiled spring is dispensed with, and the larger of the toothed wheels is provided with two pins, placed at a suitable distance from the centre of the wheel and jointed to two connecting rods, the ends of which project slightly beyond the edge of the shutter, so as to be capable of being operated by hand. By pressing the one or the other of these rods, the discs are revolved and the exposure made, the shutter being at the same time set for the next exposure.

According to another arrangement, I use a coiled spring tightly wound upon a drum and from each of the revolving discs with two or more openings, so that, by means of a suitably shaped lever placed preferably on the front plate, a series of exposures can be made without the necessity of resetting the shutter for each exposure. The lever is formed with two notches, or it may carry two pins which engage alternately with a projecting piece fastened to one of the spindles which carry the revolving discs. A rod arranged to be reciprocated may be used instead of this lever.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 2	North London	Wellington Hall, Islington, N.
,, 2	Holmfirth	
,, 2	Sutton	Sutton Scientific Society's Rooms.
,, 2	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 3	Coventry and Midland	The Dispensary, Coventry.
,, 3	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 4	Leeds	Leeds Mechanics' Institute.
,, 4	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 4	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 5	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 5	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

May 26.—Technical Meeting.—Captain W. de W. Abney (Vice-President) in the chair.

The Chairman showed a flash-lamp by Nadar, of Paris. The characteristic of this instrument was that magnesium powder was contained in an air-chamber, into which a blast was continuously forced by a caoutchouc bulb and a reserve ball, in the same way as scent is sprayed out. The effect of this arrangement is that a continuous stream of magnesium is forced through the flame, so that much greater effect can be produced than by a momentary flash, unless the latter is of very large dimensions. In a letter accompanying the lamp M. Nadar stated that with its aid the halation and over-exposure usual in such scenes as included an interior with a window might be avoided. Examples of this kind, in which the lamp had been used to illuminate the darker portions of interiors, so that the windows and any view through them might not be over-exposed, were handed round.

M. Léon Warnerke inquired how much magnesium was consumed in the lamp.

The Chairman had not been informed.

Mr. W. E. Debenham noted that the clearness of view seen through the windows was not entirely due to any lamp arrangement, as the negative had manifestly been masked to allow the street scene to print deeper than it otherwise would do.

The Chairman agreed that this was evidently so.

Mr. W. England remarked that M. Nadar's magnesium flash photographs were some of the finest that he had ever seen.

The Chairman assented, and, in thanking M. Nadar for his communication, added that he had also seen a collection of hand-camera photographs by that gentleman that included some of the finest productions of the kind that he had ever seen. They were taken on Eastman paper, which he preferred to the films.

The subject announced for the evening, *The Influence of Development upon Gradation*, was introduced by Mr. G. L. Addenbrooke, who said that he could only repeat what he had said at a meeting of the Society in January, 1883, when the subject was down for discussion. He had made a lot of experiments with plates exposed, under a sensitometer screen, to the light of a standard candle for such a time as to get the No. 25 with a normal developer. He had found that, after a certain amount of pyro, more had very little effect in the production of density, and that under that limit there was a general proportion between the strength of the pyro and the time required to get up a certain amount of density. Then, again, with ammonia, more than a certain amount was of no use.

Mr. Atkinson inquired whether, independent of density, Mr. Addenbrooke had got better gradation by slow development?

Mr. Addenbrooke replied in the negative.

Mr. A. Mackie then showed a series of plates in the lantern. These plates had been made on the same general lines as those of Mr. Addenbrooke, but the development in each case had been carried on until the No. 25 was just visible, both by reflected and transmitted light, different times of development being required with different proportions of the components. He had found in practice that increasing the amount of ammonia had the same effect as decreasing the quantity of bromide or pyro.

Mr. Chapman-Jones said that he would have to refer to the paper published by Messrs. Hurter & Driffield, and to his observations thereon, which had been much misunderstood. What he had objected to was that the statement by Messrs. Hurter & Driffield to the effect that the ratios of density were unalterable by development had been made without limitations. Their paper was a valuable one, and there was a great deal of truth in some of their propositions, but the particular statement in question required, he thought, certain limitations before it could be accepted. If two plates, exposed for the same time on the same subject, were developed, the one for a very short time, and the other prolonged until all the detail that could be developed was out, and if the first were intensified until the density of the highest lights was equal in the two, there ought to be, according to Messrs. Hurter & Driffield's proposition, a bringing out of detail equal in the two cases; but this certainly was not so. He could get no detail on the intensified plate that was not there to start with. There was another matter to which he had taken exception, it was the statement that formula would not alter the ratio of density. He had found differences that he would expect to find; but Messrs. Hurter and Driffield had set down these differences to errors of experiment. When,

however, all the assumed errors were in one direction, he thought their indications should not be ignored. There was another matter to which he wished to direct attention. Although the exposure of the highest lights worked for some depth into the film, and that of the shades lay on the surface, yet the latter were the last to appear.

Mr. F. HURTER then addressed the meeting. He said that his colleague, Mr. Driffield, would have been with him had circumstances permitted it. Photographers generally were under the impression that they could overcome the effects of under and over-exposure by treatment in developing. A gentleman had recently assured him that there was not a photographer in existence who thought that the effects of under and over-exposure could be overcome; but with every box of plates sent out there were instructions included as to what to do in development when either of these was anticipated. He thought there would not be these instructions if it was not believed that something could be done in that way. He thought the mistake arose principally from trusting to the eye instead of to exact measurements. As to Mr. Chapman-Jones's proposition with regard to a plate developed in a short time, he would say that his own and Mr. Driffield's experiments did not include any in which a part of the plate was left undeveloped. The fact, too, that no silver was visible on parts of the negative in the case cited by Mr. Chapman-Jones was no proof that silver was not there. It was not the case, too, that all the errors in the experiments pointed in one way. The instrument which they used was not absolutely correct, but the errors did not amount to more than five per cent. In Captain Abney's hands, the errors of the instrument did not amount to more than three and a half per cent. Their paper had been misunderstood, partly by their own fault. They had used the word density in a way that photographers had not been accustomed to use it. Mr. Hurter drew diagrams on the blackboard, illustrating the curves of density, and stated that, while differences of density altered the curve, they did not alter the ratios of the ordinates; so that the ratios remained the same, although the whole might be weaker, or stronger, in one case than the other. As to Mr. Mackie's experiments, he had varied two conditions at once, and thereby rendered the experiments incompatible by altering the time of development when altering the proportions of the components of the developer.

Mr. MACKIE replied that, if he had developed the same time in all cases, in some there would have been no image at all.

Mr. ADDENBROOKE thought that a difference of development did produce a difference in the result. In the case, for instance, of photographing a lady in a white dress, with some dark objects in the picture, he would employ a developer which would not get up too much density in the dress before the darker details were visible. On the other hand, in photographing dark foliage, with a piece of bright sky, he would employ a different developer, so as to bring up the details of the foliage before the sky was overdone.

Mr. COWAN pointed out that the requirements of the two cases were not opposed, but the same.

Mr. WARNERKE said that Mr. Hurter had said that Mr. Mackie had altered two conditions at once by suiting the time of development to the strength of the developer. He (Mr. Warnerke) considered that it would have been introducing a second condition to make the time of development equal, as in that case the developer would in the one instance have done its work and not in the other instance.

Mr. DEBENHAM thought that so far as the examples shown on the screen that evening went, they were in favour of Messrs. Hurter & Driffield's view, as, although there was a considerable difference in the density of Mr. Mackie's results, there was no apparent difference in the ratio of density, and if the weaker negatives were intensified the ultimate result might be the same. It was of the utmost importance to photography to remove the deficiency of gradation at the two ends of the scale, which had long been pointed out by the Chairman very forcibly as the great weakness of photography. He would like to have the Chairman's view as to the hope there might be of lessening this deficiency by development.

Mr. BENNETT said that by difference of development in two similarly exposed negatives of a subject, including white marble and dark woodwork, he had brought out details in one not visible in the other. He was asked if these negatives could be produced, and he undertook to do this. The difference in development was that in one case the ordinary method had been adopted, and in the one where the detail was obtained there was first a faint image produced by using very little pyro and bromide and a full dose of ammonia, and the image was afterwards intensified with more pyro and bromide.

The CHAIRMAN, in thanking Mr. Hurter for coming from Liverpool to attend the meeting, said that he would not then presume to say whether the statement and ratio of gradation could not be altered by development was correct or not. He admired immensely the work that Messrs. Hurter & Driffield had done, and he hoped to come to a complete agreement with them as to the instrument they used for measuring the opacity of negatives. Further discussion on the subject would be continued at the next technical meeting of the Society, which would be held on the fourth Tuesday in June, when some of the members would bring up the results of further experiments in the direction indicated.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 21,—Mr. A. Mackie in the chair.

On inquiry being made for photographic results of the Whit Monday outing, it was found that the weather had been too adverse for the enthusiasm of the members to struggle against.

The HON. SECRETARY showed some bromide prints on which there were powerful blue stains, and asked for suggestions as to the probable cause and remedy. The prints had been developed with ferrous oxalate, and the stains had appeared during the washing. The only difference in the manipulation from those he generally adopted was that sulphuric acid had been used instead of citric for marking out the iron. He had tried various agents for removing the stain, but had not succeeded.

It was suggested that the stain was Prussian blue, and Mr. W. E. DEBENHAM thought it probable that by some accident a little ferrocyanide of potassium had found its way into one of the dishes. As for removing the stain, he had found the insoluble form of Prussian blue to be formed when iron was in excess, but that it had been converted into the soluble form by the addition of ferrocyanide. He therefore suggested the application of a dilute solution of this agent to the prints, after which the stain might wash out. Ultimately he and Mr. J. T. Taylor took away portions of two of the prints for experiment, the remaining portions being left in the charge of the Curator.

A question was read, "Is there such a recognised calling as photographic specialist? An advertisement appears in praise of certain paper with the words in question under the signature."

Mr. F. A. BRIDGE noted that one of the statements of the writer of the testimonial was that the paper was easy to manipulate. He had found it extremely difficult, from the paper rolling itself up like a ruler in the toning solution, and he could not persuade it to lie flat.

The CHAIRMAN referred to the toning process for bromide prints recommended by Mr. Weir Brown. He found that a dilute solution of ammonia discharged the colour at once.

Another question from the box was read: "Is there any rule for calculating the adjustment after focussing necessary when using uncorrected lenses?"

Mr. A. HADDON said that the lens, if of crown glass, as usual, would have to be turned in about one-fortieth of its distance from the ground glass.

Mr. J. TRAILL TAYLOR said that for crown glass single lenses the distance to be turned in was about one-thirtieth, but, if two single lenses were mounted in rectilinear fashion, the distance would be less.

The CHAIRMAN said that for detective camera work, where the focus was fixed, there was no reason for employing other than single lenses, as they could be set at once to the proper distance.

Mr. DEBENHAM said that the use of a flint in combination with a crown not only served to correct chromatic aberration, but spherical aberration also, and therefore gave better definition.

Mr. TAYLOR agreed with this, and added that flatness of field was also gained by the use of the second element in the lens.

Mr. DEBENHAM noticed a statement in one of the photographic papers that an entirely new method of producing coloured photographic impressions had been produced. The paragraph then went on to describe the very old device of printing a faint photograph on plain paper, then colouring it, and then albumenising, sensitising, and printing again over the colour. This "invention" had been published at intervals many years since, and in one case was used as the means of bringing out a so-called colour photographic concern.

Mr. A. COWAN believed it was the process patented by Major Hallett.

Mr. TAYLOR said, with regard to photographs having effects of colour, there was just now a collection at the rooms of the Photographic Society of Great Britain that were well worth a visit. He had some years since published a couple of articles in the *Popular Science Review*, in which were described the methods now in use of employing coloured screens through which to take a series of negatives of an object, that serve as *clichés* for making coloured films or printing surfaces, which, combined, should realise the tints of the original.

Mr. HADDON said that at a former meeting he had suggested that a mixture having caramel as its base, as recommended by Mr. Debenham for backing plates, should prove successful as a backing for a reflector when photographing clouds. Mr. Atkins had subsequently stated that he could not succeed with caramel, but showed a plate backed with a mixture of pitch and Canada balsam, which he recommended. He (Mr. Haddon) had therefore coated part of one face of a prism with this mixture, and the remaining part with a mixture of caramel and gelatine, no colouring matter being added. This prism, which was handed round, would show the absorption to be much more perfect with caramel than with the pitch mixture, and he therefore concluded that Mr. Debenham's was the mixture to be used by any one desirous of analysing light in the way suggested for coloured photography.

CAMERA CLUB.

MAY 21,—Mr. R. Inwards in the chair.

Dr. J. J. ACWORTH read a paper on *The Flashlight*. At the outset he dwelt upon the use made of the flashlight on the Continent for the production of artistic photographs, and exhibited a large number of examples of single figure and group studies. He described the appliances in use, and illustrated his remarks by showing specimens of lamps employed in Germany. [The working of these was practically demonstrated, and some exposures were made by Mr. Chang.] Dr. Acworth then discussed the qualities of the light given by the magnesium flash, and the application of it to orthochromatic work, illustrating his remarks by diagrams.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

AT the meeting held on Tuesday, May 19, the President (Mr. J. Traill Taylor) in the chair, Mr. WEIR BROWN explained his method of obtaining warm tones in bromide prints by uranium toning. To obtain the best results he gave a fairly long exposure and obtained, by slow development, a muddy brown-coloured image. After fixing and washing, the print was immersed in a bath consisting of—

Nitrate of uranium	4 grains.
Ferridcyanide of potassium	4 ,,
Acetic acid	90 minims.
Water	8 ounces.

The prints required to be slightly over-toned, as the subsequent washing tended to bring back the original colour. In fact, if continued long enough, the whole of the effect of the toning bath would be removed. Mr. Weir Brown passed round a number of specimen prints in illustration of his remarks.

Mr. A. S. NEWMAN read a paper on *High-speed Shutters*, in which he pointed out the difficulties to be overcome in the construction of a shutter designed to work at a speed of over one-hundredth of a second, and explained how he had overcome these difficulties in the shutter which he exhibited. He also, by

means of diagrams on the blackboard, showed a graphic method of calculating the effective exposure given by various types of shutters.

Several questions relative to the subject were asked by members and replied to, and the proceedings terminated by the passing of votes of thanks to Mr. Newman and to Mr. Weir Brown.

The next meeting will be held on Tuesday, June 2, when Mr. J. Traill Taylor will lecture on *Stereoscopic Cameras and Applianees.*

HOLBORN CAMERA CLUB.

MAY 22.—A large number of excellent lantern slides were shown. These were by Messrs. Arthur, Lionel Gowing, Herbert Thompson, R. Plumbridge, and S. T. Chang.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MAY 23.—A field-day was organized for this date to Hale End and district, when a fair number of members attended.

MAY 25,—Mr. F. Cherry in the chair.

Mr. F. W. COX gave a demonstration on *Kallitype.* He said he had chosen his subject not because he was an advocate for this particular class of paper, but because he believed it would be new to a majority of the members. The paper was coated presumably with a solution of ferric oxalate; this, on exposure to light, is changed to ferrous oxalate, which reduces the silver salt in the developer, and an image in metallic silver is the result. The paper is at least three times as sensitive as silver paper, and, therefore, all developing operations during daytime must be conducted in weak light. A good negative (not necessarily a hard one) will give best results in this as in other processes, and exposure should be stopped when there is a very faint indication of the densest parts of the negative having printed on the paper. Under-exposed prints will develop very slowly, and over-exposed ones come up mealy and muddy in appearance, and are liable to show stains and markings. In developing, the prints are floated face downwards upon the developer for a few seconds, and then placed for a short time upon a piece of clean glass to gain density. Should bubbles appear, a touch with a camel-hair brush charged with the solution will stop any trouble in that direction. The prints are next immersed in clearing baths, and a final wash in water completes them prior to drying. The finished prints range from a bluish black to a purple black in colour, and I see no reason why they should not be toned with uranium to a sepia colour, to suit those who prefer a warm effect.

The demonstrator then proceeded to develop the prints he had brought with him, both by floating and by painting with the brush. Local development was resorted to, and those who had not previously seen the process worked expressed themselves much pleased with the results obtained.

On Monday, June 8, Mr. J. Traill Taylor will address the Club. Visitors will be welcome.

BRIXTON AND CLAPHAM CAMERA CLUB.

MAY 21,—Dr. Reynolds in the chair.

Mr. W. H. Powell, having been suffering from the prevailing epidemic, had been unable to prepare his lecture on *Hand Camera Work*, and it was accordingly postponed until June 4.

Messrs. Hayward, Knights, Palmer, and Reeves were elected members.

RICHMOND CAMERA CLUB.

MAY 22.—Mr. Cembrano presided, and a demonstration of printing on alpha paper was given by Mr. Howson.

Mr. Howson developed and toned several prints, producing red, brown, purple, and black tones, according to the length of time the prints were allowed to remain in the toning bath, time not admitting of the still more prolonged toning necessary to produce a blue.

Field-days now take place once a fortnight, but so far have been unfortunately marred by the weather.

MANCHESTER PHOTOGRAPHIC SOCIETY.

RAMBLES FOR 1891.

SATURDAY, May 30, Central Station, at half-past one and half-past two p.m. Place, *Liverpool.* Leader, Mr. W. H. Farrow.

Saturday, June 13, Exchange Station. *Rossett* (*viâ Chester*). Mr. W. M. Thompstone.

Saturday, June 20, Central Station, at twenty-seven minutes past one p.m. *Arley* (*Knutsford*). Mr. T. R. Cobley.

Saturday, June 27, London-road Station, at thirty-three minutes past eight a.m. *Shrewsbury.* Mr. J. Schofield.

Wednesday, July 1, Central Station, at twenty-eight minutes past seven a.m. *Hawarden.* Mr. J. Wood.

Saturday, July 11, Central Station, at twenty-five minutes past eight a.m. *Alport* (*Bakewell*). Mr. T. R. Cobley.

Saturday, July 25, Exchange Station, at twenty minutes past one p.m. *Worsley.* Mr. W. Broughton.

Saturday, August 8, Tram. *The Irwell Valley.* Mr. A. Heywood.

Saturday, August 22, Central Station, at one p.m. *Millers Dale.* Mr. J. Macnamara.

Saturday, September 5, London-road Station, at a quarter past one p.m. *Alderley.* Mr. J. Wood.

The times given above are subject to railway changes, and the list does not preclude other excursions being arranged by members willing to act as leaders.

PHOTOGRAPHIC SOCIETY OF FRANCE.

AT the last meeting of this Society M. Janssen occupied the chair.

M. Monti exhibited a new invention of his own for replacing the ordinary indiarubber ball used for actuating instantaneous shutters by a cylinder, inside which works a metallic piston; underneath the piston is a spring, which is compressed as the piston is forced down, a catch retaining it in that position at the bottom of the cylinder. When the catch is released, the piston flies up to the top of the cylinder, forcing out before it the air which was contained above it, and so releasing the shutter. The obvious advantage of this ingenious little invention is that the amount of air forced out and the pressure at which it rises do not vary in the least, as they often do when hand-pressure, as with the indiarubber ball, has to be relied on directly, so causing unintentional variations in the time of exposure, and consequent failure.

M. Londe then laid before the Society a kind of flashlight cartridge which he had invented. A "blitz-pulver" composed of magnesium, chlorate of potash, &c., is enclosed in papiroxyl, and to the ends of the case so formed are attached two fuses, one of guncotton for rapid ignition, the other of ordinary cotton, in case it should be desired to gain sufficient time for the operator to join the group he wishes to take before the flash occurs. The sudden conclusion of the papiroxyl is communicated instantaneously to the powder, and the result is a very brilliant and rapid flash. If it is desired to keep the shutter closed until immediately before the flash, a little magnesium may be sprinkled upon a certain part of the fuse, the ignition of which serves as a signal to the operator to open the shutter. M. Londe also exhibited a number of interiors which he had taken by this process.

M. Paul Nadar exhibited a very powerful magnesium lamp which he had recently invented, and showed a number of proofs obtained with it, which met with great admiration, especially from the Chairman.

After remarks on the necessity at present of retouching chromo-collotypes, if it be desired to obtain correct chromatic value, the proceedings terminated.

DUNEDIN PHOTOGRAPHIC SOCIETY.

ON the 25th March the above Society held its first annual general meeting in the rooms, Union Chambers. The report and balance-sheet were read and adopted. The former showed that the Society has made considerable progress, and that during the year much work has been done. During the winter months lantern-slide exhibitions were held, and proved interesting to the members, while during the long summer evenings demonstrations of film-stripping, lantern-slide making, and other photographic work took place. Last winter the Society held an exhibition of its work, which was, despite the unfavourable weather, largely attended, about three hundred persons, it is thought, going to see it. The number of exhibits was about three or four hundred, embracing most kinds of photographic work.

An election of office-bearers for the ensuing year resulted in the following gentlemen taking office:—*President:* Mr. W. W. Wyper.—*Committee:* Messrs. F. Monson, F. B. Smith, R. A. Ewing, Crosby Morris, W. Melville, and W. H. Dickson.—*Secretary and Treasurer:* Mr. W. Livingstone, Royal Terrace.

Correspondence.

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

PHOTOGRAPHING IN PARIS.

To the EDITOR.

SIR,—I came over here last week to try the change to this light and bright air—as it usually is this time—but I found it cold, windy, and wet. I wanted to shake off the after-effects of the influenza, of which, to use the current phrase, I was one of the "victims." There is, however, much to be seen under cover in Paris, and we now have two Salons here—the original one in the Palais de l'Industrie in the Champs-Élysées; and the second, the leading one, in one of the buildings of the late great Exhibition, in the Champ-de-Mars.

Both contain a large and varied collection of paintings and sculpture. The original one has much the larger show, particularly in sculpture, that in the Champ-de-Mars being poor in comparison.

Without attempting to criticise, but speaking generally, I have been both on this and former occasions struck with the greater amount of originality and variety exhibited by the painters here to those who exhibit in our Academy, and how much fewer bad pictures are shown. In speaking on this point to a gentleman resident here for some time, he says it is greatly owing to the fact that art students are better taught; the great men here teach, while in London they do not.

I, however, principally devoted my attention to those subjects which might help to guide me in my photographic pursuits, as it is never too late to learn, and I would certainly prefer a lesson from those who have made art the study of their life to many of the writers in photographic journals who speak of nature and art as if they were the masters of both, while on the surface it is evident they are unacquainted with either. And, note the first—in both exhibitions there was not *one* picture out of focus, no indistinct edges, every object clear and distinct, both in foreground and distance. There were many of the works nearly altogether foreground studies, in which flowering plants and other features were treated so distinctly as if they had been sharply focussed, and the distance being generally in one of corners, it also being distinct, but, of course, not so minutely treated as the foreground. In many of the foreground pictures the horizontal line was run up to nearly the top of the painting, leaving a very small portion of distance and sky—this was principally the case in river subjects. If a photographer attempted this, he would be severely handled by many of the photographic critics. And point the second, to which I directed particular attention, was this—the introduction of figures into pure landscape, because I have noticed that the judges in

photographic exhibitions in England do not, as a rule, give awards to landscapes which have no figures.

As it is said that figures are facts, here is a result: out of *seventy-four* of the principal landscapes only *eighteen* had either figures or cattle, and they were not, as a rule, in the foreground, being generally in the middle distance. The same was also the result of my observation in the Salon in the Champs de Mars.

We had a great thunderstorm yesterday, and the torrents of rain rushed through the roof of the Palais de l'Industrie. It was amusing to see the smartly dressed ladies putting up their umbrellas and rushing to some safe cover to save their garments, while, on the other hand, the undraped nymphs in marble were dried with sponges by the Salon attendants.

The storm having cleared off, it occurred to me to try if I could take a snap shot in an interior, and, as I had my Shew hand camera in my pocket, I resolved to try the experiment; but there was the difficulty, as, of course, it is "défendu" to take photographs in the building; they will not, in some cases, even allow them to be taken in the streets.

There was no use in attempting a painting; so I directed my efforts to a piece of statuary, and near me was a statue of Eve. I am, as a rule, tired of Eves, but this was rather a new departure, as she was offering the apple in all-round manner to whoever would take it, so I selected her as the object of my experiment. But there were difficulties to contend with. No. 1, I lost my view meter. No. 2, the number of viewers were considerable, particularly of the masculine gender; the ladies did not linger, as Eve is always a sore subject to womankind; and No. 3, I had to encounter the vigilance of the police and Salon attendants, whose numbers were many. I therefore had to throw out skirmishers from the optical department of my cranium; but all difficulties were overcome, and the shot was taken. Whether it will be a success or not must remain unknown until my return to Guildford, as I have given up the messing development of an hotel bedroom.—I am, yours, &c.,

Hôtel du Palais, Paris, May 22, 1891. T. W. Brownrigg.

POISONING BY HYDROQUINONE.

To the Editor.

Sir,—Some weeks ago, in April, you kindly inserted a letter of mine in your Journal relative to a case of poisoning by hydroquinone, and at the same time expressed a wish to know the particulars, which are as follows:—

Some hydroquinone got into a small scratch on my forefinger while developing a plate. Two days afterwards the fore and middle fingers swelled considerably, became very inflamed, while the joints stiffened so that I could not bend or use the fingers at all. This lasted for about a week, when, by dint of poulticing and soaking in hot water, the inflammation subsided, and the swelling went down for a time; but, whenever I have had occasion to use my hand much for drawing or writing since, the fingers have again swelled and become inflamed, though not to the same extent as at first. At present, I have a large sort of lump on the forefinger, close to the second joint; it is inflamed and hot; but there are no signs of any coming to a head or discharging matter. I need hardly say that, if any of your correspondents could recommend a remedy, I shall be only too glad to try it.—I am, yours, &c.,

Staff College, Camberley, Surrey, May 24, 1891. E. M. Woodward.

WARM TONES ON BROMIDE PAPER.

To the Editor.

Sir,—The pith of my last letter lay in the last paragraph, "Exposure to daylight spoils the picture." This Mr. Weir Brown appears to have overlooked. If you, Sir, will kindly refer to the samples I sent you, it will be seen at once that the results are not permanent. The piece exposed to daylight for ten days is all discoloured.—I am, yours, &c.,

Ilford, London, E., May 22, 1891. John Howson.

CARDIFF PHOTOGRAPHIC SOCIETY.

To the Editor.

Sir,—If we may trespass upon your valuable space, we should like to explain the *raison-d'être* of Class XV. at the forthcoming Cardiff Exhibition. Our object in offering an optical lantern for the best fifty slides of a town or district is merely an incentive to societies to form such collections; and, although we stipulate that the winning slides shall become our property, they are intended to form a loan collection to circulate amongst the British and American societies.

Of course, with the present high standard of lantern slides, the whole of the work sent in should form most interesting collections, and by arrangement with the competing societies a valuable slide interchange should result; and here we think the utility of the scheme comes in. We trust, therefore, it will receive the cordial support of societies generally.—We are, yours, &c., G. H. Bedford, T. H. Faulks, *Hon. Secs.*

Cardiff, May 21, 1891.

P.S.—We have the pleasure to announce that we have made an arrangement with the Committee of the Glasgow Exhibition by which exhibitors desirous of competing at both exhibitions may have their pictures sent from Cardiff to Glasgow by through truck, carriage paid, to arrive at Glasgow in time for the judging on August 31.

EMIGRATION TO CANADA.

To the Editor.

Sir,—To gratify the morbid curiosity of some of your correspondents, I beg to inform you that I broke up my Canadian home solely on account of the death of my father, which rendered my immediate return to England absolutely imperative. Since my residence here, I have undertaken photographic printing for amateurs and the trade, and, although I have found the business fairly remunerative, my experience has convinced me that Western Canada is the better field, hence my willingness to return.

One of your correspondents is apparently hurt because I class Toronto as a city in the lower districts: any one used to a life in the West would know that, nowadays, *all* places situated below the great lakes are classed as in the *lower* districts—much as their inhabitants may dislike it.

Ten years ago, when Mr. Oakley was twelve years old (at which age that youthful prodigy noted the much higher rate of photographers' wages) the situation of Toronto *was* known as "Canada, West," but that time has past.

As the bulk of the voluminous correspondence in the current issue consists of slang and innuendos, I trust you will excuse me if I decline to waste your space by bandying words with the writers.—I am, yours, &c.,

May 25th, 1891. W. Ethelbert Henry.

To the Editor.

Sir,—Much irrelevant observation has been made in connexion with this discussion. I did not compare Mr. Oakley to the man who came home from America after a stay of ten days. I only wished it to be understood that such men do pose as authorities. Mr. Oakley is a man of experience, even if his years be few. He appears to like the "old country" in preference to the Dominion. That is fair enough. But, after that, there are many men succeeding in Canada, and who like it in preference to the land of their birth. I am quite content to remain "Amateur." I have no axe to grind. What I know about Canada and the United States was not got altogether from books—I read some sometimes—but it will not help much in this connexion to air my knowledge. I am a much older bird than Mr. Oakley, and knew the other side of the Atlantic soon after he was born. As to "Manager," and the imputation that I "am pretty well up in the scheme," that was a waste of time and ink on his part. It will not hurt me, for all I know about it was contained in the prospectus. I said, and repeat it, that the proposal had the ring of truth in it, and "Ubique," who dates from a place 300 miles from where I live, ventures to hold the same belief. I have no personal interest in the proposal either. Its success lies with the persons who agree to carry it out. If they put as much energy into working it as "Manager" and Mr. Oakley have done in decrying it, they will go a long way toward making it what they could desire. If I had to choose from the utterances of these latter or those of Mr. Henry or "Ubique," backed by my own personal experience, I should choose the last-named as my guides.

Quoting Mr. Oakley, I would say, "'Amateur' gives us no idea of any particular person," but I prefer still to remain known to him as an

Amateur.

To the Editor.

Sir,—Your correspondents who write in the last issue add little that is new to the matter under discussion. Mr. Oakley takes exception to our conclusion that he is a disappointed man who has failed in Canada, and tells us that he is twenty-two years of age, and has had four years' experience, working with "camera and brains." Thus we conclude that his argument amounted to the contention that, although he could commence work at eighteen years of age and be successful, there is no chance whatever for anybody else.

Mr. Oakley has read our prospectus, which says that members of the Federation "must be single men," yet he states that in writing to you he was actuated by a desire to befriend their wives and children!

The correspondence altogether seems based on a series of similar small misconceptions with regard to our plans, and a desire to protect photographers from dangers with which we never threatened them, and to guard against which was the main object of the Federation basis of our scheme.—I am, yours, &c., Percy Lund & Co.

Exchange Column.

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

Wanted, good drying cupboard in exchange for enlarging easel and tramway.—Address, Coles, Photographer, Watford.

Wanted, Dallmeyer's 5×4 rapid rectilinear lens; exchange, Dallmeyer's 1AA wide-angle rectilinear lens, good as new.—Address, J. H. Walker, 87, Union-terrace, York.

Wanted, half-plate camera, with square front (Instan to pattern) and slide, in exchange for watchmaker's tools. List on application.—Address, Charles Bedford, 16, Eastmont-road, York.

Wanted, hand camera complete; exchange, fine old violin, guitar, and Bigelow's *Album of Lighting and Posing*, with Key, all in good preservation.—Address, F. DAWKES, Wells, Somerset.

Wanted, rapid rectilinear, about twenty-five-inch focus, in exchange for Beck's wide-angle rectilinear, new, with iris, thirteen-inch focus (cost 13*l.*), and 12×12 studio camera.—Address, COLES, Photographer, Watford.

Exchange, 12×10 Optimus R.R. for Dallmeyer 3D or 12×10 W.R.R. Grubb C single lens, will cover 12×10, for half-plate R.R. or W.R.R. 10×8 double slide tripod and lantern lens for backgrounds.—Address, W. DAWSON, Huddersfield-road, Brighouse.

Will exchange complete half-plate outfit, including lens, also British-American organette with several tunes, for Swinden & Earp's 5×4 patent prize medal hand camera, or the half-plate outfit alone for the quarter-plate size.—Address, W. O. HARRISON, 54, Regent-street, Blackburn.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—

John Horsburgh, Edinburgh.—*Portrait of Professor Smith.*

T. W. SCHOFIELD.—Unsuited for Exchange column.

F. LUPON.—We are glad you appreciate the article so much.

M. A. G.—The gentleman mentioned has removed. Many, like you, would like to know his present whereabouts.

AMATEUR (Newcastle-on-Tyne).—It is sad to see photographers, such as the one whose handbill you enclose, adopting such cutting prices.

L. P. TAYLOR.—Why not write to Messrs. Wratten & Wainwright? They will supply you with a formula for hydroquinone developer best suited to their quickest plates.

WEEKLY SUBSCRIBER.—The lens must be used in its entirety, but with the back of the combination next the negative. This, of course, applies to portrait lenses of the Petzval type.

A. F. P.—There is little doubt that the air bells adhering to the paper so tenaciously when first put into the fixing solution cause the spots. Try the effect of adding a small proportion of ammonia to the fixing bath.

A. CROSBIE asks: "Which is preferable for preparing the glass in enamelling, French chalk or beeswax?"—It is very much a matter of taste. The former is easier of application, while the latter is considered, by some, to give a little more glossy surface.

H. M. asks: "What is the address of the firm or firms which supply plaques, fusible pigment, and glaze for ceramic photographs?"—Lechertier Barbe & Co., Regent-street, or Mortlock & Co., Oxford-street, supply all the requisites.

IVY.—The most suitable portrait lens for the whole-plate portraits is one of about thirteen inches focus, and for *cartes* one of about eight inches equivalent focus—six inches back. Obtain the lenses from an optician of good reputation.

S. T.—Patience and judgment are all that are required in obtaining photographs of animals such as those by Major Nott. With a rapid lens and quick plates there ought to be little difficulty in photographing your favourite cat and her kittens in a group.

C. MALS (Plumstead).—Your only remedy is to sue the man who engaged you in the County Court, and this you should lose no time in doing. The I.O.U. will be evidence of the debt. You should also get your apparatus away, if you have not already done so, without delay.

E. W. HARRISON.—The spots and yellowness of the prints are evidently due to imperfect fixation. We do not imagine that the blisters had anything to do with the spots. The mauve tint has been discharged by the exposure to light, and that renders the yellowness the more conspicuous.

PROFESSIONAL.—It is quite impossible for us, or any one else, to give an opinion on the purity or otherwise of photographic mounts simply from their appearance. The only method of judging is by a series of tentative experiments. These, of course, we have not the time to make. Better send the examples of fading, with some of the cards, to an expert in such matters.

BEGINNER.—The fault with all the portraits sent is that in every case too much front light has been used. Your description of the studio and its aspect is so vague that we do not clearly comprehend them. However, try placing the model so that the light, hitherto falling on the front, falls on the side, and send us a few examples, together with a rough sketch of the building and its aspect.

T. HALSEY wants some very fine emery, and says that sold as "flour emery" contains such coarse particles that it is of no use for his purpose. He wishes to know how to obtain it finer.—The best way is to take some of the flour emery of the shops, and stir it up in a large quantity of water and let it rest for two or three minutes; then pour off the upper portion, containing the finer particles in suspension, into another vessel, leaving the coarser ones in the first one. This operation may be repeated several times, allowing different periods for subsidence of the coarser particles, according to the fineness desired.

C. A. FRANCIS asks how to produce carbon pictures on canvas, suitable for painting upon with oil colour.—The best way is to first scrub off the upper surface of the priming of the canvas with soda and water, well rinse and dry. Then coat the canvas with gelatine containing sufficient chrome alum to render it almost insoluble when dry. The picture, which has been developed on a flexible support, is then transferred to the prepared canvas. In the *Autotype Manual* will be found full working details, and the most suitable tissues to use. These, it may be mentioned, should be such as contain a large proportion of pigment to the gelatine.

H. NUGENT BUCKERIDGE says: "I shall be greatly obliged if you will kindly give me details (with formulæ) of a simple method of enlarging upon canvas (for the purpose of painting) through the camera, preferably by sensitising with nitrate of silver, as I believe this method is as simple as any!"—After removing any surface grease with soap and water, coat with gelatino-bromide of silver, and treat in the same manner as bromide paper. Take care that perfect adhesion is secured between the emulsion and the canvas. The carbon process and the powder process are also used for photographs on canvas. Merely preparing the canvas with a chloride, and sensitising with nitrate of silver, has been found to yield fugitive results.

S. C. says he does a good club business, and last year engaged a man as canvasser and collector, paying him a commission on all the orders he obtained. He now finds that he has embezzled a considerable amount of the moneys received, and now defies him, and says he can't give him into custody as he is not guilty of any criminal offence.—If the facts are as he has stated we fear our correspondent has no remedy except in the County Court. In law, we believe, a servant under an engagement as above is looked upon as an agent. If a weekly, or other salary, were paid, however small, the case would be different; he would be a paid servant, and could then be charged under the criminal law.

W. E. HARDY inquires: "1. Can you give me a recipe for a matt varnish for backing negatives (weak negatives), and which is applied and dries without heat, and like ground glass? 2. Also recipe for a first-class retouching medium, to be applied similar to the "autotype," and to be able to work on it at once, and which will not shift when varnished?"—1. On page 753 of the current ALMANAC will be found a recipe for an excellent matt varnish. 2. We are unaware of the formula by which the autotype retouching medium is made. Venice turpentine, diluted with ordinary turpentine, makes a good surface to work upon. As a shilling bottle of medium is said to be sufficient for something like a thousand negatives, it may be more profitable to purchase than make it.

D. MADRETH writes: "Can you not help us busy men in practice by obtaining from some reliable authority a clear article on the merits and demerits of the (1) eikonogen, (2) hydroquinone, (3) pyro methods of development? A comparison of the three, and a note of their respective shortcomings or comparative advantages, would be of immense value. There is a danger of insufficient attention and space being devoted to the elementary and simple truths about such practical matters as this in all our journals. A few tested formulæ for the new developers would help."—Surely sufficient on this subject has appeared in our columns during the past year or two. It is one on which no one could write dogmatically, seeing that each of the developers yields negatives of a different character, which, while pleasing one, might not be liked by another. Again, different plates behave differently with the same developer. The only suggestion we can make to our busy friend is, in his spare time, to try the various developers with the plates he is in the habit of using, and judge which answers his purpose best, and then adhere to it.

THE PHOTO-AUTOCOPYIST.—We understand that the Photo-Autocopyist can now be seen at work at 72, London-wall, E.C., throughout the day, and that the process is very successful indeed.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, June 3, *Platinotype Processes*. June 10, *Combination Printing*. May 30, Saturday outing at Hale End. Train from Liverpool-street at thirty-two minutes past two.

IN the *Notes from Scotland* last week, by an inadvertence, it was stated that the business premises with which Mr. G. G. Mitchell, Secretary of the Photographic Club, is connected, were removing. It is his house address only which has been altered to 139, Dalkeith-road, and to which Club communications should be sent.

HER MAJESTY'S VISIT TO DERBY.—The 21st of May was a busy day for the photographers of Derby, both professional and amateur, scores of cameras, from the hand camera to 18×20 size, being called into requisition. Snap-shots were mostly failures, for the day was dull and the hour was late. Mr. R. Keene had a special stand erected in the Market-place, where he obtained some fairly good pictures with exposures of two or three seconds. The ceremony of the presentation of the casket containing the address by the Mayor took place in front of the Town Hall beneath a huge canopy, which stopped the greater part of the little light there was at half-past six. Before leaving the town the Queen graciously accepted from the Mayoress, on behalf of Mr. R. Keene, a handsome volume of his well-known platinotypes of the *Interiors of Hardwick* with which she was much pleased.

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TEMPERATURE AND GELATINE PLATES.

The sudden change of a few days ago from the almost wintry weather of the greater part of May to the temperature of the later summer, has no doubt already brought its trouble in very many laboratories, both amateur and professional, for such unexpected alterations of the conditions of working too often take the ordinary operator by surprise, if they do not find him altogether unprepared.

The first and most prevalent complaint will no doubt be that of over-exposure, and in the majority of cases the result will be set down to a sudden improvement in the actinic quality of the light, and measures will be taken accordingly. But the remedy of shortening the exposure will usually prove inefficient, for the very simple reason that it is not so much the increased value of the light that is at work, but the rise in temperature, which gives an additional energy to the developing solution—an energy which serves rather to quicken the action of development than to add to its real power. In other words, the developer, which has previously at or below a temperature of 50° brought up the image in leisurely fashion, and gradually allowed the lights to acquire the requisite density before veiling the shadows, will now, with the atmosphere of the developing room perhaps over 70°, "rush up" lights and half-tones almost simultaneously, and render it utterly impossible to get density before the plate is hopelessly veiled.

The remedy in such cases is not to decrease the exposure, but to completely reorganize the developer by reducing the proportion of alkali, augmenting the restrainer, or perhaps both, for much will, of course, depend both upon the nature of the developer as well as of the film. As a matter of fact, there has been little increase in the value of the light for some weeks past, beyond such as naturally follows the state of the atmosphere, and which is readily estimated and allowed for by the practised photographer. If there has been any difficulty, it has been rather that, on some of the apparently dull yellow days of the past month, the real value of the illumination has been considerably greater than appeared to the eye.

It is well known that all the developers in common use have their action materially affected even by slight variations of temperature, and especially so when the variations occur "in the fifties," or between 50° and 60° Fahr.; but, perhaps, pyro is the one that is least affected in this manner. Experiments made in past years by various persons have shown that, though above a certain temperature pyro ceases to give satisfactory results, the lowering of the temperature, even to nearly freezing point, has no greater effect than to considerably retard the action without affecting the quality of the image obtainable with a given exposure. With hydroquinone, on the other hand, it has been stated that the effect of reduction of temperature is to necessitate an increase of exposure, and, *per contra*, raising the temperature has the opposite effect. Whether this be really so or not, we are not prepared to decide, though it is very probable that, looking at the comparatively slow action of hydroquinone at ordinary temperatures, any reduction may so abnormally protract the period necessary for its perfect action that it practically amounts to a partial destruction of its developing power. We may say certainly that, in the course of some trials a few months back with hydroquinone at very low temperatures, our patience did not permit us to continue its application long enough to produce results in any way approaching those obtained with the solutions at normal temperatures.

The lower degree of solubility of hydroquinone, as well as of eikonogen, as compared with pyro, affords a further chance of these two agents being seriously affected in their action by changes of temperature. It has been shown in these columns not very long since how a stock solution of hydroquinone which had been made during comparatively warm weather had become deprived of nearly all its action when the severe winter cold prevailed; and this effect was traced partly to the reduction of temperature, but more directly to the fact that a very large portion of the hydroquinone had crystallised out of the solution. It is not probable when the conditions are reversed, *i.e.*, when mild or warm weather succeeds upon cold, that any precipitated crystals would be re-taken into solution immediately, or even in some days, unless this were purposely brought about; but if a fresh stock solution be made up after the advent of warm weather, and on the same lines as that in use previously, there is pretty certain to be an upsetting of calculations.

While any sudden change of temperature is sure to produce more or less alteration in the behaviour of the plates or films under development, unless, of course, the operator is awake to the danger, the trouble is likely to be far greater in the case of solutions approaching, or nearly so, the saturation point, and in no instance will the fact be more marked than when ferrous oxalate is in question, mixed, as it usually is, at the time of use from saturated solutions of ferrous sulphate and potassic oxalate. Though this developer is little used in this country for negative work, it still continues to be the favourite for positives and enlargements, and it is perhaps not going beyond the mark to say that variations in the active strength of the solution will produce greater uncertainty and want of uniformity when thus applied than would be likely to occur with pyro, hydroquinone, or eikonogen, as employed for negatives. It will be borne in mind that it is not only the energy of the developer that is affected by variations in the strength

of the solutions of iron and of oxalate, but with its energy the tone, character, and general quality of the positive image are seriously modified.

We have over and over again pointed out the absolute necessity for special care in the matter of temperature when the popular method of compounding the ferrous oxalate developer from saturated solutions is adopted, and, no doubt, in large establishments where much enlarging is done, this care is properly exercised; otherwise the system would not continue to prevail, or, in the alternative, no uniformity of result could be guaranteed. But for the amateur or small worker it is folly to attempt to work with any degree of certainty in that manner, and we can only repeat what has often previously been said as to the wisdom of employing solutions of a definite strength sufficiently removed from the saturation point to render them at least not liable to variations in their actual contents. If this be attended to, and a developer of uniform strength be maintained, there still remains the element of temperature to cope with, and the variations thus produced must be met in the same manner as with the negative developer by regulating the proportions of bromide and of acid.

The great improvements made during the past ten years, as well in the manufacture of gelatine for photographic purposes as of the sensitive films themselves, have gone far to remove the faults once so prevalent in hot weather, such as "frilling" and blistering, or the films altogether leaving the plates. Still, even these, as the results of gross carelessness, may crop up on occasions of sudden weather changes, but all that can be said of such visitations is that the operator has only himself to blame.

This is not altogether so, however, if we turn to another form of hot-weather trouble that is likely to make itself severely felt under such circumstances as we have alluded to. Many photographers make a practice of leaving negatives, and especially developed prints, to soak for a considerable time in water after fixing and roughly washing, in order to thoroughly eliminate the hypo and its accompaniments. The practice is not a bad one if carried out in an intelligent manner and not over done; but to leave gelatine films of any sort for many hours together in water, the temperature of which may be seriously raised by atmospheric change, is in itself a very unwise proceeding. Even negative films that have been duly alumed and hardened after fixing, as well, perhaps, as in the process of manufacture, will often succumb to such treatment; when the conditions are favourable, softening and dissolving in patches as if the gelatine had rotted and lost its cohesiveness. But some of the softer positive films are utterly incapable of bearing the prolonged action of soaking, unless the water be carefully and intentionally kept below a certain temperature, which should not exceed 50 Fahr. But in anything like summer weather, and especially when the atmosphere shows signs of being charged with electricity, the better plan by far is to wash thoroughly in repeated changes of water extending over as short a time as possible. To leave prints soaking "all night," which may mean fourteen or sixteen hours, is tantamount to courting their destruction.

Some of the softer gelatines are most difficult to treat in hot weather, however carefully and quickly the washing may be performed, owing to the setting up of apparently an incipient decomposition. In such cases the employment of an antiseptic is frequently of the greatest use, and we have found nothing better or more convenient than "Sanitas" Disinfecting Fluid, which is at once cheap, effective, and easily obtainable at any grocer's or oil-shop. The "Sanitas Oil," from which the fluid is prepared, is said to be obtained by the atmospheric oxidation of turpentine, and contains, besides other matters, rhymol, camphoric acid, and a peculiar soluble camphor of its own, and owes its antiseptic and oxidising action, as alleged by its discoverer, Professor Kingzett, to the fact that it constantly gives off, on exposure to the atmosphere, peroxide of hydrogen, or hydroxyl.

If a little of the fluid be added to the water in which negatives, or especially prints, are left to soak, the chances of decomposition are materially decreased, and we have found experimentally that prints placed side by side in plain water and diluted "Sanitas" respectively, have behaved quite differently, the latter films being still apparently firm and uninjured when the others have almost disappeared by solution.

Arguing from the alleged presence of peroxide of hydrogen, "Sanitas" might be supposed to be a bleaching agent, and such is, in fact, claimed for it; but, so far as the photographic image is concerned, even when applied in the undiluted form, we have been unable to discover any such action. In the extremely dilute condition in which it is advisable to use it there need therefore be no fear, the strength we have used being an ounce to a quart of water. Similarly any effect it might be supposed to have as a "hypo-eliminator" is practically inappreciable, though we should scarcely advocate its use upon prints or negatives taken direct from the fixing bath. If a small quantity of it be added to a clear solution of hypo that has been used for fixing purposes, the mixture will, in a few minutes, become cloudy, and eventually deposit a black sediment, showing that "Sanitas" actually does decompose the hypo and precipitate the silver. Hence it is advisable to wash the films well before applying it.

PHOTOGRAPHIC INVENTORS, PAST AND PRESENT.

It is frequently remarked by many of the older photographers, those of the earliest days, that inventors of the present time are, in their ideas, widely different from those of the past with regard to the disposal of their inventions, or discoveries. It may be mentioned that the major portions of the discoveries and improvements in connexion with photography, including the most valuable ones, were made by amateurs, and were freely given to the public. We are now alluding to times long past. This remark refers alike to processes and apparatus. In those days, inventors were content with being credited with their discoveries, through papers read or exhibitions before Societies, or by the publicity given them in the photographic press.

As a matter of fact, almost all the most important and valuable processes of photography were so disposed of, while some of them, had they been patented, would have yielded fortunes to their inventors. The wet collodion, the albumen, the collodio-bromide, the collodio-chloride, and the present gelatino-bromide and chloride processes may be taken for examples, for none of these were the subject of patents by their inventors; neither were many of the most useful things in connexion with the different forms of apparatus and optical appliances now in daily use. Many of the inventions of the late Mr. Thomas Sutton, the Goddards, and others, including several by apparatus manufacturers themselves, were not patented by the inventors, though, with slight modifications, they have formed the subject of modern patents.

Any one glancing through the volumes of the Photographic Press, of, say, thirty or more years ago, will be somewhat surprised to see the number of dodges and ingenious contrivances there described which have, within the past few years, been claimed as modern inventions and patented. It almost seems that at the present time any one, be he professional or amateur, making the slightest improvement, or imaginary improvement, immediately rushes to the Patent Office with his invention, and lodges an application for a patent, without for a moment considering if it has any commercial value, or even if it be original. This is fully borne out by the number of patents directly, or indirectly, connected with photography, which are now applied for annually as compared with the number applied for, say twenty years back. In 1870 only fifteen patents for photographic inventions had been applied for; whereas in 1890, although we have not the actual returns before us, the applications were upwards of three hundred. Out of this number, of course, a large proportion will not be carried beyond the initial stage—provisional protection. But this was the same with the fifteen applications in 1870, as then six out of the number were not completed.

Comparing the present with the past, it would seem that inventors of to-day are more mercenary than those of old, for when they make an improvement it is immediately protected by a patent. Particularly is this the case with photographic apparatus. Take cameras, especially detective and hand cameras, for example. The number of patents applied for in connexion with these is legion. As a consequence, some of them are so much like others that, in their most important points, they are practically identical. This remark applies equally well to shutters. Many of the things patented are by no means improvements on what has gone before, but are mere alterations, or different modes of accomplishing the same end, often by a roundabout way, made with a view to avoid the infringement of some previous patent for similar apparatus. The way the changes have been rung in some instances is really surprising.

Photographic patentees are by no means confined to professional photographers and apparatus makers, for a very large proportion of them are amateurs who appear to have not the slightest objection to turning their ideas to a profitable account, some even with a title to their names figuring as patentees; indeed, just now there appears to be almost a craze in taking out patents in connexion with photography. But it should be borne in mind that the mere securing of a patent does not make it a valid one. There is no question that a very large proportion of modern patents relating to photography would be invalidated if contested in the Law Courts.

It must be clearly understood that we by no means discourage the idea that an inventor should receive the reward of his labours when the invention is an original one. But many patentees, if they were made acquainted with what was accomplished long, possibly, before they knew anything whatever of photography, or maybe even before they were born, would perhaps be inclined to re-echo the words of a certain Hibernian, when he exclaimed, "Bother them ancients, they have stolen all my new ideas!"

Most of our readers are familiar enough with spectrum photographs, and to many, no doubt, an opportunity has occurred for indulging in a quiet smile of superiority in hearing outsiders mistakenly speak of "spectre" photographs when the former expression should have been chosen. But a time has arrived when veritable spectre photographs may be spoken of with perfect propriety. The story of the Brocken spectre is to be found in nearly all works on natural phenomena, but we are not aware of the apparition having been photographed. Mr. Arthur W. Clayden, however, during the dense fog of February last, interested himself in raising his own spectre, and then made a photograph of it. His *modus operandi*, as revealed at a recent meeting of the Royal Meteorological Society, was to place a steady limelight a few feet behind his head, whereupon his shadow was projected into the fog. He then made careful measurements of the size and distance of his ghost, and afterwards "took its picture."

This narration of a strictly scientific experiment is interesting, and necessarily to be depended upon. Not so another alleged case of photographic evidence which was brought forward some time ago. Commonly found among travellers' tales is an account of the marvellous feats performed by Indian jugglers, some of which are absolutely incredible to untravelled Europeans, and the most recent explanation, to save the reputation for veracity of the narrators, is that the juggler hypnotises the spectators, who subsequently are made to imagine they see all these wonders. A paragraph has been going the rounds of the Indian papers that a photographer determined to prove this theory. He and an artist friend attended a saénce; the latter was to draw on paper what he thought he saw, and the photographer at the same time was making photographs of the events. Result: The artist's sketch contained a variety of articles used for the feats, which made no appearance whatever in the negative. It appears that this story first came out in the *Detroit Free Press*, and was written with such improbable statements as to carry their own refutation with them; but, instead of this, the whole thing was taken *au sérieux*, the editor was overwhelmed with letters, and ultimately confessed the artist and the photographer existed only upon paper!

The question as to the practical possibility of using batteries for the production of electric light is one of great interest to photographers. A well-known authority on electric lighting said: "As a source of electricity for permanent electric lighting, the voltaic battery is, in our opinion, practically useless." Another equally high authority said: "It is impossible commercially to supply the electric light by means of any form of galvanic battery at present known to us." All the same, inventors and patentees have not been deterred from trying to bring forward some kind of battery which should, after all, fairly economically produce an available light. In the *English Mechanic* for the 22nd inst., with the above quotations for a text, an article is devoted to a consideration of the question, and a description of the leading forms recommended by their inventors. For those interested in the subject this is an excellent abstract; it leaves its readers to decide whether primary battery power is or is not practicable.

The method of destroying the "pin-holey" character of a wet-plate silver bath, by adding nitrate of baryta, is well known to experts. Some years ago in these columns it was pointed out that the large quantity of that salt recommended by Mr. Henderson, the inventor of the remedy, was not needed, a few grains only sufficing. The explanation of the action offered—that the bath contained a sulphate probably introduced by the collodion, and that the precipitate produced was sulphate of baryta—was objected to on the ground that slight precipitates of that salt would take a far longer time to deposit than was the case with the bath precipitate. This, the strongest objection, may now be shown untenable in the light of a paper by Mr. F. W. Marr, published in the *American Journal of Science*, in the "Contributions from the Kent Chemical Laboratory of Yale College." Briefly, these are to the effect that the result of a large number of experiments (described in detail) showed that this slowness of deposition was not a necessary consequence, but that it was governed to a great extent by the nature of the associated chemicals.

At the last meeting of the Chemical Society the remarkable thiocarbamide experiments of Colonel Waterhouse, in which, as has been described by us, he obtains a complete reversal of the image by so

small a quantity as the one-hundredth of a grain per ounce of developer, were under discussion. Mr. Groves drew attention to the fact that the silver deposit, which, in the early stage of the development, apparently behaved like that forming an ordinary negative image, in the latter state became soluble.

FILM-CLOUD NEGATIVES.

THE present season is just the time to secure cloud negatives, and it will well repay any amateur who wishes to be independent of the commercial supply, and avoid finding himself using the same skies in common with half-a-dozen in the same exhibition, to spend a day or two in securing a few *original* ones. There is no great trouble involved; all that is required is to pitch the camera on some preferably elevated spot facing a tolerably straight horizon-line, to use a slow, clean plate, a small stop, and a short, but not too short, exposure. Hydroquinone, in my experience, picks out the detail better than pyro, and gives better contrast—I do not mean harsh contrast and density, but a well-graduated and comparatively thin, quick printing negative, such as gives the best result.

The original or "master" negatives I prefer to take upon glass plates, but it is a nuisance to have to fit the cloud negative separately to each print it is required to apply it to; so I make a practice of providing each landscape negative with its own mask and cloud negative, the latter being reproduced in film form from the most suitable original. There are several ways of doing this, but the best in my opinion, because it saves the trouble of an intermediate transparency, is with collodion emulsion in the following manner.

Prepare a *bromide* emulsion by any of the formulæ published—there have been many in recent volumes of the JOURNAL and ALMANAC—but preferably let it be a slow, clean one. Clean the glass with nitric acid, polish thoroughly, finishing off with powdered talc, coat with emulsion, wash and convert into a dry plate, preferably using a preservative that will give a hard-surfaced film when dry, and so prevent injury when placed in contact with the original negative in printing. Next make a contact print by artificial light, and develop much further than if the result were required as a positive, or, indeed, until it appears veiled. Wash well, but do not fix. Instead, immerse the plate in a sixty-grain solution of iron-alum until the whole of the reduced silver is dissolved out, leaving a negative impression in *bromide of silver;* wash again thoroughly, and after a brief exposure to light re-apply the developer to reduce the silver bromide; in fact, make a reversed negative by the single operation.

After a final wash, and when the plate has become surface dry, place it on a levelling stand, and pour on to it a sufficient quantity of a thick solution of French gelatine, say about a hundred grains to the ounce, previously filtered through flannel. It will be needful to warm the glass before applying the gelatine, or the latter will set before the plate can be properly covered. The safest plan is to dip the plate into very hot water just before applying the gelatine, and to get rid of as much as possible of the adherent moisture by swinging it through the air at arm's length, and lay it on the level and apply the gelatine to the depth of an eighth of an inch or so.

When "set," stow it away in a dry, airy place, free from dust, until quite dry, which will require, perhaps, a day or two; but, as a number may be prepared at once, the loss of time need not be felt. When quite dry, cut round the edges with a sharp penknife, and strip in the ordinary way.

Another method that gives good results, though it requires a transparency to be made first, is one that was published some years ago. It consists in treating ordinary gelatino-chloride paper in the same manner as carbon tissue, and then reducing the silver salt. Select a *soluble* gelatine paper by trying a piece of it before exposure with warm water; if the gelatine dissolves perfectly it is suitable, not otherwise. Many of the chloride papers and most of the bromide are insoluble, or partially so, and unsuitable.

Sensitise in a bath of twenty grains each of bichromate and bromide of potassium to the ounce of water by floating for three minutes, then hang up to dry in a dark cupboard. Expose under the transparency until the image is clearly visible in brown upon the yellow ground, using a safe edge as in ordinary carbon printing. The clear margin caused by the rebate of the dark slide will be reproduced in the transparency as a dark band, and will supply what is needful. Develop by softening in cold water for a minute or two and squeegeeing in the usual way on to collodionised glass, and wash off in tolerably hot water, as the gelatine generally employed for these papers is harder than that used for carbon tissue. A final immersion in hydroquinone and soda will complete the negative, which, if properly made, will be beautifully clear in the shadows and with fine gradation.

If preferred, the film negative may be made to combine sky and mask for the terrestrial portion of the particular landscape it is intended for, but the method adopted can be readily understood without description.

"OLD COLLODION."

IN DEFENCE OF PYRO.

I HAVE read with pleasure, in your pages lately, several papers and society reports upon the subject of development which, notwithstanding the fact of its undoubtedly being "excessively hackneyed," as you, in a recent editorial article express it, is still, I venture to submit, in partial but respectful opposition to your implied opinion, one of perennial interest to the greater number of those who produce pictures by photography; and the pleasure I have felt in the perusal is considerably strengthened by the circumstance that there is a decided tendency on the part of their authors to reject the newer developing substances and combinations for the old servant who did photography such handsome service long before its (pyro's) congeners and rivals were heard of outside the laboratory of the chemist and the seductive announcements of the enterprising tradesman. I predict that it will continue to do so when these compounds have joined the "things that were."

I confidently believe that pyro is shortly destined to enjoy a greater popularity for negative work than it has had during the past two or three years among non-professional workers, and I am persuaded that it will be largely employed for different kinds of positive work. I am aware that the latter speculation is calculated to cause an extensive lifting of the eyebrows, but I utter it deliberately, and not altogether upon inadequate or fanciful grounds. I have in my possession transparencies and lantern slides in gelatine, as well as gelatino-bromide positives, all obtained by a developer the primary agent in which was pyro. Many who have seen these pictures find it difficult to believe that such soft, velvety images, such pure, clear whites, high lights, and margins were produced by a pyro developer; but such is the case. Positive development with pyro is, however, no novelty; for Mr. William England is stated, in the early days of gelatine, to have obtained transparencies having rich, warm, black tones by the aid of alkaline pyro and sulphite, and I have no doubt without stains or marginal discolouration. So why not now?

It is probable that we have not yet fully discovered the capabilities of pyro in the development of positives, and that for negatives there is an inclination to neglect it for imaginary or insufficient reasons. I am strongly fortified in the latter opinion by the knowledge, derived from actual experiment and a study and repetition of the experiments of others, that the claims originally put forth on behalf of hydroquinone and eikonogen have never been substantiated to an extent that would justify the disuse of pyro for this kind of work. The one thing alone that seems to me to have been clearly proved during the last few years is that both hydroquinone and eikonogen have certain distinctive characteristics of their own not possessed by pyro which, however, are not important enough to place one or the other the slightest step in advance of pyro for the development of negatives. I propose to detail in a "popular" form a few of my own experiences in the search of the "perfect" developer, in the hope that they may be a warning to those who are in danger of being seduced from an old allegiance by what I consider to be the delusive encomiums so freely bestowed on hydroquinone and eikonogen.

In pre-sulphite days, and implicitly trusting in the statements of certain high authorities that hydroquinone was a more powerful reducer of the silver haloids than pyro, and that, among other advantages, it admitted of the shortening of the exposure by one-half, besides extracting more detail and, of course, giving greater control over the density of deposit, I was led to subject the new reagent to a series of trials. I think I paid about five shillings an ounce for it. The alkali employed was carbonate of ammonia, and, as it was then largely the custom, development was conducted in separate solutions. I very soon proved to my own satisfaction and disappointment that, as regards hydroquinone permitting of a shorter exposure than pyro, the property was entirely assumed. Not only was this not the case, but it seemed to me to be quite the other way about; in addition to which I could not, by any possible means, get the solutions

to produce me an image upon a fully exposed plate as quickly as I obtained one with pyro and ammonia, and as for the colour of the negatives—and negatives were very highly coloured in those days—it was usually of a deep saffron hue. It is true the pictures were invariably dense enough, but there the "advantages" of hydroquinone began and ended. Using the solutions mixed, the compound turned like black coffee in a very few minutes. Need it be said that I promptly bade adieu to hydroquinone, and for a long time received the statements of high authorities as to the wonderful properties of this, that, or the other thing, not with less respect, but with more caution? Possibly some of my readers may question my having gone the right way to work; but, be that as it may, I cannot recall any published experiences with hydroquinone of a successful nature for years after, so that I may fairly conclude, I hope, that I was not alone in my failure.

Some five or six years ago, however, and chiefly owing to the persistent advocacy of Mr. W. T. Ingall, who championed the claims of hydroquinone so perseveringly, that to him, I consider, belongs whatever credit is due for having brought and kept the matter prominently before us, I was again induced to momentarily desert pyro for its relative, and this time with rather more success than on the first occasion. I am writing this out of reach of my books of reference, hence I cannot give the particular one of the numerous formulæ with which Mr. Ingall favoured us that I employed, but I think that the mixture contained, in addition to the reducing agent, sulphite of soda and carbonate of potash. Carefully tested against some plates developed with a pyro-soda developer, which I had in the mean while adopted in preference to ammonia, and still use, I found that hydroquinone developed slowly, very slowly, gave plenty of density and detail, but not more than pyro-soda, and finally left an image of a peculiarly warm and not disagreeable colour which, however, by no means "assisted the printing" as was claimed it would. After a repetition of these tests, with no better success, I again returned to my old love, for, to put the matter in a nutshell, I entirely failed to discover that hydroquinone, no matter how its proportions as well as those of the other ingredients of the developer were modified, gave me results in any way superior or preferable to those which pyro-soda was giving at the time; for under-exposure it seemed to have no advantage; it was slow in action, and only too often irregular, that is, gave patchy and uneven negatives; and frequently produced a depth of stain which would have done honour to an old pyro-ammonia solution, and which no clearing solution would remove.

More recently, however, as every one is aware, the study of the properties of hydroquinone has made a considerable advance. Probably we have a purer product to deal with, while the use of the caustic alkalies as accelerators has also tended to remove, partly at all events, the old reproach that hydroquinone was a slow developer, although it has not, I regret to say, done so in my own case. Modern hydroquinone solutions undoubtedly do work more cleanly than their predecessors, thus facilitating their employment for the development of positives on paper as well as on glass, but in my own experiences I still fail to discover that for negatives the developer has any advantage over pyro-soda. Do what I may, caustic alkali or no caustic alkali, I can never get it to commence work as quickly as the latter. As to its assigned property of allowing the exposure to be shortened, which seems to be quite an article of faith with many foreign experimenters, I believe this to be erroneous. It has never been proved to be so. I have read numerous collections of tabulated figures in support of the assertion, but I search in vain for evidence that anybody has actually given shorter exposures than would be required for ammonia or soda-pyro, and found a normal hydroquinone developer yield the needful degree of density, detail and gradation of image. Laboratory experiments, and experiments made by exposure and development in the ordinary way, not infrequently lead to conclusions in diametrical opposition to each other. On the whole, a lengthened and varied experience of hydroquinone leaves me in ignorance of its advantages over pyro for negative development; indeed, so far as I have been able to discover, pyro-soda is its superior in several respects. It permits of exposures quite as rapid; it gets to work sooner; it affords quite as much density and detail; in conjunction with sulphite, and provided that development be not protracted, it works quite as cleanly, and as for "the printing value of the negative," as it is vaguely called, who will be so bold as to maintain that hydroquinone gives superior results?

Eikonogen has gone nearer to shaking my faith in pyro than hydroquinone. I call the latest introduction a "pretty" developer, for in addition to the fact, which I have confirmed by experiment, that with soda it is a quick beginner—slightly quicker on an average than pyro-soda, I find—it certainly has the advantage of drawing out the very finer details of a picture which both pyro and hydroquinone are as yet unable to touch, while it is a clean worker and yields a negative that is agreeable to contemplate. The fatal defect of eikonogen in my hands, however, is that I fail to get density with the ease and regularity that I obtain it with pyro-soda, the general character of my eikonogen negatives being a combination of delicacy in detail, thinness of image, and relatively poor gradation, which, however pleasant to the eye, are fatal to the production of vigorous, harmonious prints, devoid of flatness and heaviness in the shadows. As to the claim that eikonogen, like hydroquinone, allows the exposure to be shortened, I beg to meet it with a denial. I have not, do not, and cannot find it so. If one could obtain the pluck and body of a pyro-soda developed negative with eikonogen, I might perhaps be tempted to abandon my old favourite; but at present I am not inclined to make the exchange. Eikonogen is said to be useful in cases of under-exposure; so it is as regards the detail; as for the density I find it inferior to pyro.

I will conclude by mentioning that some trials I have made with the combined hydroquinone and eikonogen developers that are coming into use hardly (to me at least) bear out the theory that the density-giving qualities of the one, and the detail afforded by the other, are thereby assured, since some negatives of mine obtained with such a developer, although excellent of their kind, present no points of superiority to some developed with pyro-soda; and by giving my pet formula, which I picked up in the States during a visit I paid in 1884. My pyro solution consists of 6 grains of pyro, 36 grains of soda sulphite, and 1 minim of sulphuric acid in 1 ounce of water, the alkaline solution consisting of 36 grains of carbonate of soda in 1 ounce of water. The normal solution consists of equal parts, and I use this developer indifferently for negatives, lantern slides, transparencies, gelatino-bromide prints, and opals; but in the case of the last four I clear the picture both before and after fixation, and fix in acid sulphite and hypo. The results I obtain are not inferior to positive work which I have produced by hydroquinone and eikonogen.

R. E. Chesterman, D.Sc.

VIENNA INTERNATIONAL PHOTOGRAPHIC ART EXHIBITION.

It seems as though the extraordinary success achieved on the Continent during the last few years by English painters will be shared in no small measure by the representatives of English photographic art. The Vienna daily papers devote whole columns to the Photographic Exhibition now open there, and are full of the praise of the works of the English exhibitors which they recognise as outshining everything else. German professional photographers are coming to Vienna expressly to study the exhibition; while men of mark in photography, who before shook their heads at the venturesome programme, now express nothing but astonishment and applause; thus the intention of the Exhibition is attained. The Prince Regent of Bavaria examined the Exhibition most particularly, expressing in the most flattering terms his approval of a show like this, containing only standard works.

It is much to be desired that some Englishman of capacity and authority should see what an impression is made on the public by such a small but choice number of pictures which together form an art exhibition of a special kind. We believe that a photographic art exhibition on the same basis in England as that here would satisfy exhibitors and the public in the same measure.

Certainly not all exhibitors can be satisfied, particularly those whose pictures could not be admitted for some reason or other (often owing to an erroneous conception as to the conditions of exhibition). It will be readily admitted that, also, the programme of this Exhibition is capable of several improvements. First, a diminution in the number of pictures sent in would be advisable. Examining 4000 pictures, to select five or six hundred, is no trifle. But probably, after this first exhibition of the kind, the correction will come of its own accord. Further, it would be well for all pictures to be sent in anonymously, as were those of members of the Club and some other persons. Every rejection causes annoyance, which would be borne more easily if nobody knew of it. That the pictures are highly appreciated is shown by the fact that there is already a demand of hundred of copies of photographs exhibited. This will prove a difficulty for the committee, as among the number are some by amateurs who will not sell. It is flattering for the exhibitors that among the candidates for copies are the Imperial Academy of Fine Arts, the Vienna Photographic Society, the Club of Amateur Photographers, &c. The "Gesellschaft für Vervielfältigende Kunst" (Society for Reproducing Works of Art) has offered to publish twenty-four pictures, to be chosen by the jury, if the owners consent. An eminent painter did one exhibitor the honour of offering him a

coloured sketch in exchange for one of his photographs. Almost daily are members of the Court, or other notabilities, at the Exhibition, thus giving the best proof of its value.

All this leads one to suppose that photography is not to be regarded altogether as a mere technical accomplishment or handiwork.

One day towards the end of April the International Photographic Art Exhibition at Vienna was honoured by a visit from the Emperor. This time the number of exhibits is a relatively small one, for which reason he was able to look at every one. Were we to name all those whose pictures attracted his Majesty's attention, it would be necessary to copy the whole catalogue. Concerning many photographs he asked for detailed information, and repeatedly expressed his admiration of the works of the English exhibitors. He laid particular stress on the evident progress made by photography in the last few years. The Emperor, after having expressed to those members of the jury who were present, Director Schaeffer, and Professor Luckhardt, the President, M. Srna, and the Committee, his appreciation of the Exhibition, left after having been there more than an hour.

THEORY OF ORDINARY AND POLARISED LIGHT.

[Abstract of a Communication to the London and Provincial Photographic Association, by Mr. A. Haddon.]

The first part of the lecture was devoted to the history and comparative acceptability of the two theories of light, the corpuscular and the undulatory. The former was put forth as long ago as 460 B.C., by Empedocles, who was followed in the same line by Democritus and others. An expression of Aristotle's, "Whether it be light or air which intervenes between the eye and the visible object, in all cases it is by the movement of this medium that we see," has been taken by some to contain the germ of the undulatory theory. Coming to more modern times, we find Gassendi, about the year 1600, developing the corpuscular theory. He says the "luminous bodies send out particles capable of acting on the eye just as certain odoriferous bodies send out particles capable of acting on the olfactory nerves." Descartes, at about the same time, supposed space to be filled with particles touching one another; the sun and luminous bodies push aside those particles nearest to them, and in this manner the impulse is transmitted in all directions instantaneously. Mallebranche and Grimaldi, fifty years later, held that light was transmitted by a kind of vortex motion, and that different rapidities in the vortices gave rise to the sensations of difference of colour.

Huygens is, however, looked upon as the author of the undulatory theory. He supposed space to be filled with an extremely subtle and elastic medium, which he called luminiferous ether, which also fills the pores of matter. The vibration of this medium set up by the luminous body gives the sensation of light on the nerves at the back of the eye.

Dr. Young and Fresnel have the credit of placing the undulatory theory on its present firm basis. This theory affords the means of explaining phenomena which cannot be explained by any other theory. Moreover, predictions have been made, based on this theory, which subsequent experiments have completely verified. Huygens, though looked on as the father of the undulatory theory, yet put forth ideas as to the character of the vibrations which are not now accepted. He supposed the ether to be affected by the luminous body in a similar way to that in which air is affected by sound; that is, by waves of compression and rarefaction transverse to the direction of propagation. It was left for Young and Fresnel to show that the vibrations of the ether were not longitudinal, but transverse to the front of the wave, and this modification of the theory sufficed to explain what could not be explained either by the Huygensian or the corpuscular theory.

In ordinary light, particles are supposed to move in every possible direction, and not only in straight lines, but in circles and ellipses. The different distances between the vibrating ether particles give rise to difference of colour, and are called wave-lengths, whilst the distance through which the particle moves determines the brilliancy or intensity of the light. When two causes affect a wave, so that at one place the ether would be moving downwards from one of the causes, and upwards due to the other, interference takes place, and darkness results.

The reason given by Newton for accepting the corpuscular rather than the undulatory theory was that light did not travel round corners as sound did. It has been found, however, that light does travel round corners, and if Sir Isaac Newton had been acquainted with more modern experiments, it is certain that he would have accepted the undulatory and abandoned the corpuscular theory, which, nevertheless, has the support of Biot and Sir David Brewster.

The death-blow to the corpuscular theory was dealt when it was shown that in a certain case one thing was required by the undulatory, and just the opposite by the corpuscular theory, and investigation proved that the requirements of the undulatory theory were those that were fulfilled. The case in point was the question whether light travelled more quickly or more slowly through a denser refracting medium. The experiments of Foucault, who ascertained the rate of movement of light both in air and in water, were illustrated by diagrams, and the result, showing that the rapidity was less as the medium was more refractive, was indicated as being of essential importance in establishing the undulatory theory.

The next point dealt with was the case of double refraction, and this was illustrated by diagrams, and by the exhibition in the lantern of crystals possessing this property. The differences between uni-axial and bi-axial crystals, and negative and positive crystals, were explained and illustrated, and then the subject of polarisation was taken up. After discussing the nature of polarisation, as the separation of the vibrations in different directions, it was explained that the angle to the normal made by any ray in order to be polarised when falling upon a reflecting surface depended upon the refractive index of the material. In the case of crown glass, this angle would be 54° 35', and a reflector of this material, backed to present a second reflection with a mixture of caramel and gelatine, was mounted at this angle and used as an analyser with the lantern. The fact that the angle of polarisation depended upon the refractive index of the material was a most important discovery, as it enabled us to ascertain the refractive index of a material in which, owing to its opacity, we could not otherwise succeed in getting it.

The construction of Nicol prisms was then explained, and their use demonstrated by experiment. It was mentioned that double refraction was not an exceptional case with crystalline bodies, but that freedom from double refraction was the exception, although, in most cases, the separation of the ordinary and extraordinary rays was so slight as not to be observed by the unaided eye. Double refraction depended on the material being under some strain, and an ordinary disc or glass was made to exhibit the phenomenon by heating it in the centre and placing it in the lantern in the path of a beam before the heat had become equalised. The value of the method and the examination of glass for strain before grinding it into valuable lenses was pointed out, and illustrated by a striking example.

The lecture was concluded by an explanation of the cause of the beautiful colours produced by thin films of selenite or mica. Whenever light passed through such a substance its vibrations were at once resolved into two sets at right angles to each other. If, therefore, the film were placed so that light passing through the polariser vibrated in directions not those into which the film resolved vibrations, it did not pass. If the plate of selenite were just thick enough to retard one ray three half lengths of the red (corresponding to the Fraunhofer line B, whose wave length is 6867 10^{-8} cm.), this colour would vanish, while the green (b=5165), for the production of which a retardation of two whole wave lengths occurs, attains its greatest brilliancy. A retardation of three half lengths of red equals four half wave lengths of green. Now, if the analyser be turned through 90° those rays which reinforce each other will be quenched, and those which quenched each other will be reinforced—that is, if in the first position the Nicols were crossed and the film appeared green, now that they are parallel the film will appear red, because the vibrations corresponding to the green are destroyed, and those corresponding to the red are superadded.

THE FEDERATION SCHEME.

A Meeting in support of this scheme was held on Monday, May 25, at the rooms of the Photographic Society of Great Britain, 50, Great Russell-street, W.C. There were present ten persons, of whom about one half were delegates of societies authorised to vote. Mr. Barrett occupied the chair.

The proceedings were opened by the reading of the report of the Committee appointed at the meeting held on March 23. In moving the adoption of the report, Mr. L. M. Biden regretted the smallness of the attendance. He mentioned that since the last meeting he had received communications from several societies to the effect that they would prefer to await the announcement of the Photographic Society's scheme before deciding as to their course. The motion having been seconded, attention was called to a letter addressed to the provincial societies, dated May 13, and signed by Mr. Biden, and which had not been read to the meeting. A heated discussion then ensued between the members of the Committee then present and Mr. Biden. The Committee repudiated any knowledge of the letter. Mr. Rumble considered that Mr. Biden had not acted straightforwardly towards the Committee in issuing the letter without their knowledge and sanction. The first notice he had of it was reading it in *Photography*. Other members of the Committee expressed similar views.

Mr. Biden excused his action on the ground that the London societies did not appear to be taking up the movement. He had received a few favourable replies from country societies. The report was then adopted, the majority of those present not voting. Mr. Biden then proposed that

the Committee should form the first Council. Mr. F. Brocas thought it would be against the rules they had just passed to elect the Council at the present meeting. The Federation should elect the Council, and, as a matter of fact, no Federation had yet been formed. A delegate remarked that the Photographic Society had promised a scheme of affiliation, and it appeared to him that directly the Photographic Society moved in this direction all the societies would join it, and the Federation would be without support. Mr. White asked the gentlemen representing the Photographic Society of Great Britain if they could give any definite idea of when their scheme would be completed. Mr. Addenbrooke said that the matter was being pressed forward; additional members had been appointed to the Committee, but it was not considered advisable to act too precipitately.

Mr. Biden said that before the Photographic Society could bring their scheme into operation it was necessary to alter the laws, and this could not be done before the annual meeting in February next. It was pointed out that this statement was not correct, as a special meeting could be called for the purpose at a short notice. Mr. Biden thought they would have to wait a long time for the Photographic Society to decide upon their line of action. He complained that the Society had blocked his scheme, and that it was not until he had brought the matter forward that the Society had thought of affiliation. He had spent much time and money on his project, and intended to have a Federation even if he had to appeal personally to each society individually. Mr. Mackie said that the subject of affiliation had been before the Photographic Society for more than two years. As a proof that the matter was not in abeyance, he read an extract from the Treasurer's last report, in which a scheme of affiliation was clearly foreshadowed. After some desultory discussion, it was finally resolved that no further steps be taken with regard to the Federation, unless the Society's scheme be unsuccessful or be not brought forward.

CAMERA CLUB CONFERENCE.

THE USE OF UNCORRECTED LENSES IN PHOTOGRAPHY.

By Lyonel Clark.

Within the past year or two there has been a fairly universal innovation amongst the more thinking class of photographers in the method of expressing the æsthetic side of photography. It is, perhaps, unfair to call this an innovation; I should rather have said a resuscitation, for as long ago as 1854 Sir James Linton advocated strongly some softening down of the irritating and obtrusive sharpness of the photographic picture when its services were retained for the arts and not the sciences. But photography was then only a new toy, and every one was revelling in the wonderful possibilities of the exquisite detail rendered by a stopped-down and highly corrected lens and a film of structureless collodion, and could not stop to ask whether such minute detail in subservient objects was a necessity. Nearly half a century has gone by since then, and the principle of heredity is beginning to act, and once more the question of sharpness *versus* softness, or, as the mild wits of the other party prefer to call it, "fuzziness," has arisen.

This time, however, the original idea of Sir James Linton has not fallen on barren ground, but has formed a nucleus around which are to be found a fairly large body of representative photographers.

I do not, naturally, propose to discuss here the *pros* and *cons* of the great "focus question," although sorely tempted to enliven the discussion of an otherwise dull paper by so doing. I shall content myself by saying that I personally like a certain amount of softness, and should as soon think of criticising a photograph on the score of want of sharpness as I should of entering a similar protest against a mezzotint. I make, in my own mind, no distinction whatever in the methods used to produce a certain end, and, if that end has been secured, it is of the utmost indifference to me how it was done.

Hitherto one of the favourite methods of producing this softer class of photographs has been the pin-hole, and I must confess that, with a properly adjusted aperture, most beautiful results are obtainable thereby. But the time of exposure is necessarily long, and precludes absolutely the introduction of figures. Another method it that of putting the ordinary corrected photographic lens slightly out of focus. I find myself that, unless the lens be considerably stopped down, the effect of this is to give absolute sharpness on one plane, and considerable diffusion on others. To my mind this is an undesirable effect, for the sharpness of the one accentuates the softness of the other, and *vice versâ*, and both appear equally obtrusive.

With a lens, however (preferably a deep meniscus, say the back combination of a W. A. rectilinear), stopped down to *f*-64, and put considerably out of focus, fairly uniform softness is obtainable; but it struck me that when we come to use a lens under such conditions it is quite unnecessary to buy an expensive tool that has been constructed with care and thought to give good definition with a large aperture, and then purposely introduce a very small stop to get an entirely different effect. It appeared to me that the ordinary uncorrected spectacle lens, obtainable at any optician's shop for a sum varying from twopence to fourpence each, should, under these conditions, fulfil equally my requirements.

Whilst I was thinking over the problem, a leading article by our president, Captain Abney, appeared in *Photography*, No. 100, 1889, alluding to the same subject, and giving some directions for their use deduced from theoretical considerations; but the article in question did not, and, indeed, in the limits of a "leader" could not, go thoroughly into the question, but by the aid of a wholesale order I was, at a very small cost, soon in the possession of enough spectacle lenses to keep me experimenting for some time to come.

The ordinary spectacle lens, or periscopic lens as I should call it if I wanted to sell it, is essentially an uncorrected lens in all respects. The field lens of a telescope is corrected, as far as achromatism goes, that is to say, by the combination of suitable qualities of glass, the colour fringes due to dispersion are nearly, if not completely, done away with. But still such a lens is uncorrected for photographic uses; for the coloured rays that are combined to make white light in the case of achromatism for visual purposes are taken from a different portion of the spectrum than those selected for giving the best combination for chemical effect. In the early days of the Daguerreotype, when ordinary achromatic telescope lenses were used for photography, it was soon found that such lenses possessed what they called a chemical, as well as a visual, focus Mr. Towson was, I believe, the first to publicly draw attention to the fact (*Phil. Mag.*, 1839), but Claudet also made a good many researches on this point, and his focimeter, or instrument for measuring the distance between the two foci, was then well known. Numerous other dodges, some very ingenious, were proposed from time to time; but, as we shall see, they do not concern us, and I need not trouble you with them.

The spectacle lens is, however, not even corrected for visual rays, but forms an image of a point of light surrounded with a red or blue halo as the lens is racked out or in. It will be clear that, if we leave the blue halo round the image, it will imprint itself on the sensitive salt as freely as the image itself, and a blur will result, for the blue rays are intensely actinic. It is necessary, therefore, to rack the lens in till the red halo appears, which will not, of course, impress itself on an ordinary plate. By these means, that is to say, by finding the new chemical focus, sharpness may be obtained by an ordinary spectacle lens; and, were this the only difficulty to be contended against, there would be but little to prevent their universal adoption.

As Captain Abney pointed out, in his article, since depth of focus varies inversely as the size of the stop, we have only to stop down sufficiently to make the distance between the chemical and the visual focus fall within that area of good definition that is known as depth of focus, and the two images will coincide and apparently have the same focus. As a matter of fact, it is not at all necessary to stop down to this extent; the mere fact of introducing a stop at all at once cuts off some of the side pencils of rays that cross the principal axis outside the true focus. The rays of light of different colours being all refracted in different degrees, the image formed at the focus is not a point, but rather a cylinder having outstanding red rays at one end and blue ones at the other, the intermediate space being made up of combinations of these and other colours, and therefore producing white light. With a large aperture spherical aberration causes all the outside rays to fall still further away from the true focus and to still further lengthen out the cylinder of white light. If, therefore, we focus an object in this condition of affairs, we find a certain position giving maximum sharpness. We focus this and introduce a small stop; by doing this we cut off all the outside rays, and thus shorten the length of our cylinder of mixed light; in other words, we have altered the position of the focus and shortened it.

In practice it will be found that if we focus, say, with *f*-8 and then stop down to *f*-16 or *f*-20, this shortening will make the apparent visual focus fall practically on the chemical focus.

Mr. Traill Taylor has shown this very clearly in many of his writings, and some considerable correspondence took place in The British Journal of Photography for the past year on this subject.

But, besides the error due to want of achromatism, we have the errors due to curvature of the field and to spherical aberration and its kindred astigmatism and coma. In an ordinary photographic lens these three main faults (chromatic and spherical aberration and curvature of field) are corrected in two ways, both by the use of a diaphragm at a suitable position, and by making each combination of two or more glasses selected so as to mutually correct each other.

With spectacle lenses, however, no corrections by means of combining different glasses are possible; we are entirely confined to those corrections that can be made by the insertion of a diaphragm. Chromatic aberration,

however, can be entirely cured without using either of these methods, if one combines two lenses of similar glass and form together. Their distance apart, however, must be half their focal length to obtain perfect achromaticity; although, practically, achromaticity is sufficiently obtained without any such onerous conditions. As a type of such a perfect correction there is the Huygenian eyepiece, and approaching thereto the Ramsden. This principle has also been taken advantage of in photographic lenses, and Zentmayer, in America, achromatised his well-known doublet, where each combination is of the same kind of glass but of different focal lengths, on the above assumption.

Theoretically, this lens was not achromatic, but practically, unless we refuse to accept the evidence of many well-known photographers, it was sufficiently so.

Zentmayer was not, I believe, the inventor of this type of lens, and Steinheil sold also a similar kind, a modern form of which is represented by the lenses of the smallest type of the Kodak cameras. They are described and classed generally under the name of "periscopic." But the periscopic lenses of Steinheil, Zentmayer, and the Kodak differ from the ordinary spectacle meniscus lens in having much deeper curves, and, allowing that a true globe lens should nearest approach perfection, it follows that the deeper curves of the Zentmayer approximate more nearly to good results than the flatter curves of ordinary spectacle lenses.

However, even with these lenses, very fair results are obtainable in the small sizes with moderately large aperture, but when one comes to lenses of larger focal length the amount of stopping down required is rather excessive. The effect of stopping a lens down is to make the rays that come from different portions of the picture fall on different portions of the lens. For instance, the central pencil comes straight through the central portion of the lens, whereas a side pencil falls obliquely on the stop, and goes through the side of the lens only. The side of the lens being thinner than the centre, and receiving the rays at a different angle, the refraction is different, and the side pencils are lengthened out, and tend to fall more nearly on the plane of the principal focus and to give a flat field, whilst, at the same time, spherical aberration is cured by cutting off (by means of the stop) all the outside rays.

In a lens of short focal length the diameter of the lens is for a given angular aperture large as compared with the diameter of the stop. But as the focal length of the lens increases so does the diameter of the stop if it is to have the same angular aperture, and it will very soon be found that even a relatively small stoop is as large in actual measurement as the whole lens. A spectacle lens may be taken at 1½ in. diameter; therefore, with a 36-in. lens, a stop of *f*-24 represents the whole area of the lens, whereas with a 6-inch lens an *f*-24 stop would only represent a circle of ¼-in. diameter, or only a small portion of the area of the lens. If the lens is the same size as the stop, it follows that it is quite impossible to differentiate the rays over different portions of it, and it can make no difference whether the stop is placed close up to the lens or away from it. That this must be so is evident, and the possible angle of definition included by spectacle lenses gets smaller as their focal length increases.

In examining into the possibility of spectacle lenses, it seemed to me that the Zentmayer or Harrison globe lens, that is to say the doublet form, should be most likely to give the best results. This form with a stop, say, of *f*-16 to *f*-22 should cure chromatic aberration, especially if the view were first focussed with a larger stop. I find that practice bears this out, and I may say that the correction for achromatism of spectacle lenses, when combined in the doublet form, is practically perfect, even with relatively large stops, and I was much surprised at the sharpness obtainable. This, be it remembered without any attempts at correcting for the visual focus in all cases, as the focus was set sharply by racking the lens in and out till it was midway between the two planes of apparent fuzziness.

But the obtention of good covering power is a much more difficult matter, at least with lenses of long focal length.

I have already pointed out the reason of this, and until spectacle lenses are made of large diameter it will be incurable. As it is, one must stop down as much as possible and remove the stop as far from the lens as possible. The position of the stop is, however, necessarily governed by the field of view, or the area of illumination that the lens is to give. The nearer the stop is to the lens, the greater the angle of illumination (as apart from definition) permitted, and therefore we can only place our stop at such a distance away as will allow a circle of light large enough to contain a given view to pass through it on to the lens.

In my experiments, therefore, I took this fact into account. I might point out here that the circle of light or illumination must be considerably larger than the picture itself; as a rule, one may assume it a circle truck with a radius equal to half the diagonal of the square whose side (A) is represented by the longest dimensions of the plate to be used For instance, assuming a 10 × 7 plate, the maximum square of this is 10 × 10. The diagonal of this (D) is found by the equation,

$$D^2 = 2A^2$$

$$D = 14 \text{ in. (about)}.$$

Therefore, although a 10-in. plate with an 18-in. lens only subtends an angle of 31 deg., still the circle of illumination would have to be at least 43 deg. to cover the plate to the edge, if, as is always the case, the lens were raised above the centre.

It is, of course, an extremely easy matter to see roughly in what position the stop may be placed, either graphically or by calculation, if the diagonal or diameter of the circle of illumination, the focal length of the lens, and its diameter be known; for the maximum distance the stop can be placed away from the lens is to the diameter of the lens as the distance of the plate from the stop (that is the focal length of the lens) is to the diameter of the circle of illumination. In other words, they are both the tangents of half the angle of illumination. The following table gives the diameters of the bases of the cones of light produced by lenses of different focal lengths. For example, if with a lens of 18-in. focal length it is required to give a circle of illumination having a diameter of 15 in., the angle included will be 45 deg.; or *vice versâ*, an angle of 45 deg. with a 12-in. lens gives a circle of illumination of a diameter of 10 in.

I will now proceed to the practical portion of this paper, and record some of the actual tests I have made with these lenses.

The method that I adopted was to fix the lens to be tested on to a swinging front attached to the camera, then to focus the lens sharply on any clearly defined central object, then swing it (the lens) round on its centre until the object in question lost its structure. The same was done in the opposite direction, and the angle read off the attached protractor gave that of good definition. By the same means the circle of illumination was found, the lens being swung in this case till the object on the ground glass began to disappear.

I have experimented with three combinations of spectacle lenses, using in all cases the ordinary meniscus lens of commerce.

1st Combination.—A single lens, with its concave side to view and stop in front. (:

2nd Combination.—A symmetrical doublet of two similar lenses of equal foci.

TABLE No. I.

GIVING THE ANGLE SUBTENDED BY ANY LENS ON THE ORDINARY SIZE OF PLATE.

SIZES OF PLATES IN INCHES.

Focus of Lens in inches.	4	5	6½	7½	8	8½	9	10	12	15
	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.
3	74	79	97							
4	58	64	78	86						
5	48	53	62	74	77	81	84			
6	41	45	53	64	68	70	73	79		
7	36	39	50	56	59	62	65	71	81	
8	31	35	44	50	53	56	59	64	74	84
9	28	31	40	45	48	51	53	58	67	80
10	24	28	38	41	44	46	49	53	62	74
11	22	26	33	38	40	42	44	49	57	69
12	20	24	30	35	37	39	41	45	53	64
13	19	22	28	32	34	36	38	42	50	59
14		20	26	30	32	34	36	39	46	56
15		19	24	28	30	32	33	37	44	53
16			22	26	28	30	31	35	41	50
17			20	25	26	28	30	33	39	48
18			19	23	25	26	28	31	37	45
19			18	22	24	25	27	29	35	43
20				21	23	24	25	28	33	41
21				20	22	23	24	27	32	39
22				19	21	22	23	26	30	38
23					20	21	22	25	29	36
24					19	20	21	24	28	35
25						19	20	23	27	33
26							23	22	26	32
27							19	21	25	31
28								20	24	30
29								19	23	29
30								19	22	28

Rule half the base divided by focus of lens = tan half subtended angle.

3rd Combination.—An unsymmetrical doublet of two lenses of unequal foci.

The lenses were mounted temporarily with cork rings in a sliding tube, fitted into an ordinary mount, having an iris diaphragm, so that any angular aperture could be obtained or measured. The lenses were mounted sometimes with their concave surfaces together ( ), and sometimes with convex surfaces together) (. But, as I found the first form preferable, I soon dropped the alternate one.

The distance of the lenses from the diaphragm was also varied in different experiments, as also the size of aperture of this diaphragm.

From the following table, giving the results of experiments made with two 36-in. lenses combined, it will at once be seen how illumination falls off and how definition improves as the lenses are separated. With this lens, equivalent about to an 18-in. doublet, the two coincide at 30 deg., where the lenses are separated 3 in., and an *f*-16 stop used, the actual angle covered and defined being 33 deg.—or, again, with an angle of 40 deg., where the separation is 1¼ in. and the stop *f*-32.

It is not necessary, however, to have the circle of definition as large as the circle of illumination, at least in landscape work. In the present trials no allowance was made for roundness of field, whereas in most views the nearest objects being at the side of the picture come sharply into focus from that cause. The negative herewith, taken with two 24-in. lenses, 3 in. apart, and an *f*-10 stop, shows clearly this fact. When we come to examine a lens of longer focal length, say a doublet composed of two 36-in. lenses, a stop of *f*-64 will be required to get good definition; but [with *f*-64 and 2½ in. separation, a remarkably flat view is obtained, better, indeed, than is wanted in practice (as the enclosed negative of a side of a house taken under such conditions shows).

With smaller lenses, on the contrary, the definition improves, and it is

TABLE No. II.

GIVING ANGLES OF DEFINITION (D) AND ILLUMINATION (I) GIVEN BY DIFFERENT COMBINATIONS OF TWO 24-IN. SPECTACLE LENSES.

		deg. D.	deg. I.	deg. D.	deg. I.	deg. D.	deg. I.	*f*-64 deg. D.	*f*-64 deg. I.
1.	) (lenses as close as possible.	13	70						
2.	¾×¾ „ 1⅓ in. apart—stop central.	13	40						
3.	1½×1½ „ 3 in. „ „ „	13	30						
4.	( ) „ as close as possible.	17	70						
5.	¾×¾ „ 1½ in. apart—stop central.	17	40	20	40	21	52	54	54
6.	1½×1½ „ 3 in. „ „ „	33	37	33	33				
7.	1½×1½ „ 2¾ in. „ stop not central.	33	37	33	37				
8.	1¼×1 „ 2¼ in. „ „ „	22	47						
9.	1×1 „ 2 in. apart—stop central.	22	40			27	42	45	45
10.	1¼×1¼ „ 2 in. „ „ „	22	47			40	40		

possible to almost cover a quarter-plate at *f*-8 with two 12-in. lenses set about 1½ in. apart.

These measurements were, of course, all made visually, but, in order to find out the actinic effects, I took a series of negatives with different combinations of spectacle lenses, the focus being in all cases sharply set at the point of best visual definition. The results entirely confirm the former deductions, the coincidence of the chemical and visual foci being very marked. In no single case was there any apparent difference between them. It must be remembered that they were first focussed with a large stop and then the small one inserted. My apparatus for this was very simple. The cut-out in the reversing back of my camera was provided with sliding strips of wood, in number one less than required to fill up the opening. By sliding these strips any portion of the plate could be exposed, and by raising and lowering the lens the same strip of view was thrown on each successive strip, and no allowance for decentralisation was required.

To roughly sum up some of these results, the negatives of which I hand round, it is unpractical with a 12-in. doublet on a 10×8 plate to separate the lenses more than 1¾ in. to 2 in., or the circle of illumination fails, and, with this separation, a stop of *f*-32 is required to give definition over the whole field. With an 18-in. doublet the separation can be increased, of course, but a stop of about *f*-45 is required. Coming down to 9-in. and 6-in. doublets, we get, on the contrary, much better results. With the 6-in. good work could be done on a quarter-plate at *f*-8, as the present plate shows. The covering power with these relatively large angular apertures is somewhat improved by not focussing the centre of the picture, but a spot half-way between that and the edge of the view. This is equivalent to slightly racking in the lens or shortening the focus, but, on the contrary, all definition ceases if the lens be racked further out.

In order to put these experiments into actual practice, I exposed some half-dozen plates last Sunday, on actual landscape. The results I hand round. There are a series of four I would draw particular attention to. They were taken with a 12-in. single lens, a 12-in. symmetrical doublet, and an unsymmetrical doublet of about 10 in. In all cases the small branch in the water, in the centre of the picture, was sharply focussed at *f*-16. An *f*-32 stop was then inserted. The absolute coincidence of the chemical and visual foci, in the case of the single lens, is surprising. It will be noticed, too, that in the case of the unsymmetrical doublet, (worked at *f*-10 by accident), although all side definition is gone, still the foci at the centre coincide.

I presume I shall not be expected to conclude this paper without summing up the pros and cons of spectacle lenses, and giving my opinion as to their possibilities in photography.

I will say at once that they are no more likely to replace ordinary lenses generally than the still cheaper pin-hole is. As an aid to landscape work, they may be useful if used intelligently, but probably only for work not exceeding 10 in. by 8 in., or 12 in. by 10 in., unless an extremely narrow angle and much stopping down be allowable. For this class of work I have been much struck by the capabilities of the single lens. I was so firmly of the opinion that the want of coincidence of the foci in the single lens would render it unsuitable, that I have not given it the careful trial it merited. I really think that where soft results are required it may be found useful.

Coming now to the small sizes, say the 6-in. doublet, the results obtained are, I must confess, immeasurably better than anything I had expected. The subject, a flat wall, is a fairly trying test, and these lenses, say at *f*-10, should give excellent results for quarter-plate work, and I shall take an early opportunity of fitting up a hand camera with such lenses. Generally, I may say that the results obtained are better than I expected, but from them to the perfectly corrected and accurate lens of our best makers there is a wide gulf, and I do not think that any of our opticians will find it necessary to put up their shutters on account of this paper.

A CAMERA CAMPAIGN ON THE WILD WELSH COAST.

"HUMID, but healthy," was the almost epigrammatic sentence by which the manual of geography in use at the school of my boyhood described our English climate. It is the only bit of information in that book which the elapsed years have failed to efface, and it is due more to the consistent humidity of our weather and the neatness of Mr. Cornwall's sentence than to any virtue of memory that the fact has remained so undimmed after the eighteen years in which most of the other information acquired under Dr. Betula Glutinosa has been forgotten. There is a downright earnest endeavour on the part of Welsh meteorology to carry out Mr. Cornwall's phrase that is apt to pall on the landscape photographer. The weather charts that illustrate our dailies know and provide for this little peculiarity, for whenever I have consulted the forecast for North Wales it has usually read, "S.W. to N. E'ly winds, moderate to fresh or strong; local showers." They always throw in local showers; it is a quaint way they have of describing a phenomenon that for the last three days has blotted out the landscape to within a quarter of a mile of my sitting-room window. It will be noticed that there is a sort of indefiniteness, not to say comprehensiveness, about this forecast, as though the writer didn't want to commit himself too fully to any one particular line of weather. A short residence in Wales will make one appreciate the modesty and forethought betrayed in these and similar reports, however, if it does not indeed suggest the idea that the comprehensiveness might have been extended a good bit without the paper rendering itself actionable for libel. No! "Humid" may be the exact term for the weather in England, where one can reasonably look forward to three fine days a week, but it becomes a grisly joke when coupled with Welsh weather, and is very misleading too. Yet the object of the present paper is to advance a particular section of the wild Welsh coast as a holiday resort and photographic haunt! A holiday, as I take it, is the opportunity to lounge around doing nothing, and five days out of the seven the weather in North Wales aids and abets such a proceeding with an ability unknown elsewhere. The photographic haunts are hereabouts also in tropical profusion; it is the opportunity to photograph in them about which there is some uncertainty.

Portmadoc, as a town and seaport, has little whereby to attract the attention of picture-seeing eyes. It is a wholly modern place, created during the past ninety years for the disembarkation of the slate produce of Ffestiniog. The broad estuary of Traeth Mawr has been reclaimed from the sea, and, where a hundred years ago fishing-boats sailed, cattle now graze and railway embankments stand. But, though Portmadoc lacks æsthetical qualities, its utilitarian value as a coaching and railway centre, from which prolific hunting grounds may be reached, are undeniable. The Narrow-gauge Railway, which has one of its termini at Portmadoc, is a feature of this district that few leave without becoming acquainted with. Not only is it the "open sesame" to lovely scenery, but travelling upon it is an experience in one's life—something to recall, to talk about, to *lie* about for years after. The man of rabid veracity leaves home for a holiday in these parts, hears of this unique line and its vagaries, visits it with scepticism in his heart and a determination to speak of his experiences afterwards in his usual measured and truthful terms. It is the "little rift within the lute;" the exaggerative traits that have lain dormant so long find congenial soil and grow luxuriantly. He returns home and becomes a psychological study for wondering friends. The very sight of the little train as it stands at the Portmadoc terminus, basking in the sunlight, and looking as though some child had just brought it out of the nursery, is enough to start even a forewarned man of virtue on the downward path. And by the time that train has got round its first curve the man of virtue will be as fertile in fiction as Ananias. It is the habitual liar's great opportunity. He transcends himself, and becomes an object of envy to those around him. The total length of line from terminus to terminus is thirteen miles, the height of one terminus above the other 700 feet, yet am I not afraid to affirm that in this short distance there are more opportunities afforded for real artistic lying than upon all the other systems of the world lumped together. The very by-laws of the Company have a simplicity and freshness that is not of this world, at least not of the railway world. The tickets are issued subject to the condition that "if there is no room the money will be returned," and the would-be passenger left at liberty to exercise his ingenuity in getting home. The full beauty of this law does not strike one when there is a later train and it is fine weather; but should the tired pedestrian, some miles from home and wet through, have his money returned because there is "no room," the aphelion of his orbit with the vulgar tongue is reached far too soon for the proper display of his excited sentiments.

The calendar that a wise and beneficent editor gives us in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC has never before proved such a blessing and mainstay as in the July of last year. For days and days we should not have known that the sun rose and set had it not been for the affirmation of this calendar, but through all those days of doubt the unvarying serenity of this page kept our faith alive, until one day, about the middle of the month, we awoke to find that the sun really had risen, and was gradually rolling up the cloud effect drop-scene that for many days had hidden the mountains and surrounding country from view. People were blinking and trying to accustom their eyes to the unusual brilliancy of light as the Oracle and myself walked along to the station of the Ffestiniog Railway, arguing between ourselves that there ought to be nothing unusual in having a July day suitable for landscape photography.

"Think it will last?" I inquired of the Oracle.

"Well, you see, the weather has been so thoroughly unsettled of late, that it is not unlikely to come on wet; on the other hand, after the continuous rain of the last few days, we may have it fine to-day by way of a change." This seemed pretty conclusive, and I felt sufficiently light-hearted to indulge in a few jokes at the expense of the little engine that was waiting to pull the attached carriages and a long string of slate trucks up fourteen miles of mountain side. Opening a carriage door I made a dive inside with hands encumbered by photographic apparatus, when the light of day suddenly disappeared and stars shone around me, and by the time I had assured myself that I was still a frail human being, living in a wicked world, the Oracle was completing some impertinent speech about "people who expected to find doorways as roomy as those of St. Paul's in the carriages on the Toy Railway."

During the first part of our ride along the embankment that affords such magnificent views of the Snowdon ranges, I was occupied in a vain endeavour to restore one of Christy's latest shapes to its original curves.

"Do you know," commenced the Oracle, "my impression is, that in the pre-glacial epoch this estuary——Will you stop fidgeting with that old hat and pay some attention to the landscape? I saw a hatter's in Portmadoc, so you can easily replace your tile to-night."

By this time we had commenced our ascent to Minffordd Junction, and once past that the scenery commenced to look rugged and rich of colour. On an eminence to the south, beyond the estuary of the Dwyryd, was the historical castle of Harlech; either side were mountain uplands, purple with heather and speckled with lank sheep, while white cottages and swollen cascades relieved the whole from the monotony it would otherwise have possessed.

Some distance pass Penrhyn the little railway climbs round a sharp curve into the beautiful timber about Tan-y-bwlch, and it was round this curve that the Oracle came to grief. In his enthusiasm to see more of the tail end of the train, he went for the window with his head, heedless or forgetful of the two iron bars with which thoughtful officials block up the opening; there was a crash as the Oracle's hat came down over his ears, and a remark afterwards to the effect that "some persons seemed to expect windows of Toy Railway carriages were as capacious as those of St. Paul's."

No part of the journey is more pleasant than this zigzagging up through the wooded slopes about Tan-y-bwlch, with its occasional lovely peeps of the Dwyryd Valley. Both of us grew enthusiastic, double slides and vasculum were to be well filled that day; already the Oracle had noticed giant specimens of *Trollius Europæus*, and was forecasting learnedly by Watson's zones what might be encountered around Ffestiniog. But here we are at Tan-y-bwlch Station, 400 feet above our starting point, and a little onward we look down from our eyrie on the side of Moelwyn into the lovely Vale of Ffestiniog, with its winding river and whitewashed homesteads. The Oracle's gratification was supreme; he overflowed as usual. "With the woman one loves," commenced he, and would have finished the inane remark of a noble lord had I not warned him that his life was in danger by so doing. I had read it in *Baddeley's Guide* the night before, and in *The Gossiping Guide* on Sunday. Black had not been able to resist it, neither had the self-sufficient Barrow in his *Wild Wales*, but they had all borrowed it from Thomas Roscoe, who wrote his *Wanderings* fifty or sixty years ago; and, if he had died before immortalising this very commonplace expression, guide-book-reading posterity would have been happier and better men.

At Blaenau Ffestiniog we left the little engine with its driving wheels of two feet in the terminus among mountains of solid slate, whose sides to within a few feet of their summits have been laid bare by the quarrying operations of man; it is a desolate region now in spite of the dense population, and there is no inducement for any one to linger here unless his one mission on earth is slate, so we betook ourselves to the commodious carriages of the Great Western Railway for the short journey to Ffestiniog proper.

Several ominous clouds that periodically obscured the sun on our upward journey, engendering fits of taciturnity, were subdivided and dissolving in the blue ether as we strolled along the undulating little street of Ffestiniog, and the Oracle began to get more definite in his prognostications when these signs were pointed out. From the village to the Cynfael Glen is but a short distance, and giving the Oracle to understand that I should be able to photograph without any of his multifarious, irrelevant, and often obnoxious, suggestions, he spread himself about the glen verifying the accuracy of Watson's zone theory. It is a short but very beautiful glen, this of the Cynfael, and the various falls and masses of fern-clad rocks make pleasing subjects. Hugh Lloyd's pulpit is a singular detached mass of rock rising from the bed of the Cynfael River, and the legend runs that Mr. Hugh Lloyd (a distinguished Welsh preacher of the last century) was wont to hold forth from its summit to his auditors on the banks around, but the reflection that no human voice could be heard among the roaring of the waters weighs heavily on one, and confirms the idea that, in the inspired language of the Oracle, "that legend's all tommy-rot."

Crossing the stream by a rustic bridge about the middle of the glen, a short distance along its southern bank brings one to the Goat's Bridge, where the river runs through a narrow rift bridged by a single slab of sloping rock, certainly a wild enough place to satisfy the acrobatic proclivities of the most exacting Welsh goat. Close at hand is the upper Cynfael Fall at the head of the glen; and, sitting motionless, feasting his eyes on a huge wall of rock literally draped with beech fern, was the Oracle. The roar of falling water precluded conversation, and I was thankful, for there was a look in his face that told of strong excitement, and when the Oracle becomes excited he is apt to be a weariness to the flesh.

This short walk up the Cynfael Glen had been remunerative alike to botanist and photographer, so we stretched ourselves under the "pennatifid shade" (*vide* the Oracle) of a mountain ash, and in a cloud of tobacco smoke discussed the direction of our post-meridian wanderings. The botanist's Mecca was a point among the mountains some two or three miles away, where he would find the insectivorous Drosera, and he held out the barren glories of a highland cataract as a sufficient inducement to ensure my company; but, while apparently considering this shaping of our course, my own desires were all for the Cymera Falls and a subsequent walk down the Vale of Ffestiniog to Tan-y-bwlch Station; so, with a diplomacy that Machiavelli might have envied, I sketched the glories of the Cymera Glen, and was lavish in dark hints of so many rare plants that a less unsuspecting being than the botanist would have known me for the fraud I was. That fly-eating Drosera nearly proved the overthrow of my Machiavellism, however; in vain I planted fictitious rarities until that Cymera Glen became a resort of the rarer flora of the British Isles; there was one plant essential to the Oracle's happiness, and it grew on the boggy uplands miles away. At last I had recourse to an expedient that has proved of great value in my hands—I *invented;* told how I had overheard one clergyman telling another that during a ramble down this glen he had stumbled across a specimen of *Meconopsis Cambrica*. The Oracle arose, knocked out the ashes from his pipe, put his right hand to the botanist's vasculum, and his left to one of my cases, that we might lose no time in getting back to the village of Ffestiniog, where he tried so hard to curtail our repast of cold beef and beer that I came near cursing my inventive powers and confessing to the mythology of the *Meconopsis*.

From the village to the Cymera Falls it is down hill, a topographical feature that had been present in my mind when pleading for this excursion, and the rugged sides of Moelwyn rising in front over 3000 feet make an imposing background for the views on the Cymera River. When the sun shines on the Cymera Falls they glow with such transcendent beauty that the sensible photographer rests content with the vision impressed on his mind, and does not court subsequent disappointment by attempting monochromatic treatment of them. The colours of the lichen-stained rocks, the delicate green and brown of the *Sphagnums* and *Hypnaceæ* that drape the spray-drenched banks, with the varying purples of the heather and ling, are not translatable by the photography of the present day, and had best be left to the painter, as the falls depend entirely on these for their beauty. Not so, however, an old bridge some distance below the falls, whose title to the Roman origin ascribed to it one fortunately forgets to be critical about when photographing there. In North Wales "Roman" and "temperance" are two words as much used as they are little understood. If a structure whose origin passeth all understanding lacks a name it is called Roman, a name known to be respectable and traditionary; but do not be rash enough to contest the legitimacy of such a claim with Welsh guides, their logic is peculiar, and like their meteorology not often of the clearest. "It is a very old bridge, yes, indeed! and was built by the Romans whateffer!" Of the word "temperance" the observing tourist is likely to have a surfeit; it appears to be used as a charm against evil spirits, and its location on the house-front is determined by the taste of the inmate. Sometimes a piece of cardboard, yanked from its private life as the bottom of a baking-powder box, dangles from the front door bell-pull (unless it is tied to the knocker) and proclaims to passers-by that that house is a "Temperance House." Usually these fugacious tablets beget a desire on the part of the occupant for greater permanency, and eventually the window over the door, or the garden gate, is inscribed by the village painter with the legend "Temperance" in yellow letters; "only this and nothing more." Very rarely indeed do Welsh villages produce beings of such daring and genius as the individual in Ffestiniog, who, scorning the cardboard-box bottoms and front-gate legends of his humble companions, uses a large sign on which is inscribed in orthography as daring as himself, "Temprance and Eting House."

From the Cymera Glen the road drops abruptly into the Vale of Ffestiniog, and the path to Maentwrog along the right-hand bank of the Dwyryd River is a kaleidoscope whose every turn presents some beautiful arrangement of scenery to the appreciative eye. As we descend leisurely into the strath of the valley, we pause to admire perhaps one of the finest landscapes of its kind in Wales. The watershed of the surrounding mountains unites at our feet to form the broad Dwyryd, which, like a silver snake, uncoils itself down a valley that forms the footstool of the tree-clad mountain ranges on either side. Beyond the broad estuary, where its waters mingle with those of Tremadoc Bay, the dim outline of the Lleyn promontory points like a huge finger to sacred Bardsey, the traditional mausoleum of 20,000 saints; at least a monument has been erected in the island of late years asking visitors to "respect the memory of the 20,000 saints buried near this spot;" but it wants a lot of faith in human nature to believe that saints in those days were "as thick as leaves in Vallombrosa. Possibly the standard of examination was somewhat low then.

The photographic work to be done in the Vale of Ffestiniog is very plentiful and diversified; river scenes, mountain scenes, wooded glens, and tumbling waterfalls are to be had in a walk of seven or eight miles, but not *easy* miles. There is still a charming unconventionality and state of nature about the by-roads in North Wales that is not conducive to graceful pedestrianism, especially when both hands are encumbered by photographic apparatus. But to get a genuine, healthy, and soul-absorbing interest in the rolling stones, abyssmal ruts, gradients of one in sixty, and other amenities that Cymri by-roads are made of, it is necessary to ride a tricycle with some forty or fifty pounds of luggage on it. I said "*ride*" a tricycle, but as a matter of fact the wanderer in the by-roads of "wild Wales" finds, after having had to carry the machine a few yards and lift it over sundry fallen trees and bottomless pits, that pushing it perambulator fashion is a luxurious and a speedy mode of transit.

GEORGE T. HARRIS.

EASTMAN PHOTOGRAPHIC MATERIALS COMPANY.

THE CAPITAL TO BE INCREASED.

THE growth of the business of the Eastman Photographic Materials Company, Limited, is altogether of an exceptional character. But perhaps this is not surprising. Every one nowadays, from paterfamilias down to the schoolboy, is either a photographer or wants to become one. Indeed, the photographic fever is almost like the whooping-cough or measles—one is bound to have it at some time of his or her existence. Of course, a good number, after the first enthusiasm has abated, give up the hobby, but a large proportion continue it, and find endless amusement and instruction. But, whether you take up photography partially or wholly, you must have apparatus and materials, and in any case the manufacturers benefit. The success of the Eastman Photographic Materials Company, Limited, is a case in point, as the business has increased to such an extent that a further issue of shares to provide the capital necessary to execute the orders which have flowed in upon it has become imperative. In this respect the history of the parent Company has been repeated, and in connexion with this point we may quote the following from the circular convening the meeting held on Tuesday at Winchester House:—"In recommending this issue of capital the directors would refer to the experience of the parent Company, which, starting in the year 1884 with a capital of $300,000, is now, after reconstruction, working with a capital of $1,000,000, represented by 10,000 shares of $100 each, which are now readily saleable at $275—*i.e.*, a premium of $175 per share."

Colonel Griffin, the Chairman of the Company, presided, and the notice convening the meeting having been read,

The Chairman said: It is not my intention to detain you for any considerable time. I may, however, say that it is exceedingly gratifying for me to stand here to-day to assure you that the business has altogether outgrown the present means for carrying it on. This growth has been in many respects far beyond the expectations of its most sanguine friends. When at our last meeting—the annual meeting—some one asked the question when the balance of the unpaid capital was to be called up, the answer was: "Not until it is required." At that moment the Company had sufficient capital to carry on the work, but since then the volume of business has increased so enormously that we find our capital largely locked up in outstanding accounts. In addition to that, our buildings at Harrow are now completed, and are being occupied by the operatives, and within a few weeks we shall be in a position to manufacture the larger part of our own goods. This being so, we find our capital not now sufficient for trading purposes. We come, therefore, to you to-day to ask you to authorise us to increase the capital from 150,000*l.* to 200,000*l.* We do not require the whole of this 50,000*l.* at the present moment. It may be a year or two before the whole of this sum will be wanted; just now 10,000*l.* or 15,000*l.* of additional capital will be all that is needed. The parent Company, showing their confidence in the business being transacted in Europe, have expressed their willingness to subscribe for 1000 shares, or 10,000*l.* Whether we allot that number or not will be for the directors to decide. We owe an indebtedness to the parent Company, to enable us to carry on our business, amounting to about 8000*l.* for goods received from them and not yet paid for. By the arrangement, we are obliged to pay them interest; and, if the parent Company takes its payment in shares, we shall relieve ourselves of our obligations, so far as purchasing goods are concerned, and shall therefore be our own masters. In saying this I would also add that the parent Company has always been most kind to us, and only too ready to assist us in every possible way. I do not know that I need further enlarge upon the resolution which will be moved, but if any shareholder wishes to ask any questions they will be readily responded to. I can only hope for the hearty co-operation of the shareholders in this matter, so as to enable us to extend the business. I may say that the volume of business has increased fifty per cent. during the past three months, whilst orders are coming in with such rapidity that it is impossible to duly execute them. We are also going to open a branch in Paris, and suitable premises have been secured, from which we hope to have a largely extended business there. It also may be necessary to open up business in Berlin; and all this outlay will require our additional capital, as it will be necessary to keep up our stock at these depots, in order that our business may be kept going smoothly.

Mr. T. Spiller moved the following resolution:—"That the capital of the Company be increased to 200,000*l.* by the creation of 5000 new ordinary shares of 10*l.* each," and went on to say: I think from the statement which you, Mr. Chairman, have given us, it appears manifest that the capital must be increased, if for no other reason than being able to pay in shares the amount we owe to the Eastman parent Company. I should like to ask the directors if they contemplate, in regard to this issue of the 10,000*l.* of capital to the Eastman Company, whether this issue is to take precedence? One would think it would be desirable that the shareholders should have the preference. It must be remembered that we are preferential shareholders entitled to ten per cent. The present issue will, I apprehend, represent ordinary shares in the Company, and that will be a new feature. I think your statement is sufficient to show us that the increase of capital is warranted by the increase of the business.

Mr. E. H. Jupp seconded the resolution.

Mr. Ashburner: At what price will these shares be issued? It is stated in the circular that the Eastman shares are at a very high premium.

The Chairman: The shares will be issued at par. You must not confound the shares of the parent Company with those of the English Company. It is quite true that the shares of the parent Company are selling at a very heavy premium, and we hope to do equally well. It is not proposed that we should necessarily accept this offer of the parent Company. We propose to offer the shares first to our shareholders on this side, and, if they are not all applied for, the balance will be allotted to the American Company. We wish rather for the shareholders to have the benefit; at the same time the parent Company is quite prepared to take shares to the amount of 10,000*l.*

Mr. Walker (General Manager): I hope the reference to the parent Company is quite understood. The value of the American shares was mentioned to indicate that as this Company was nothing more nor less

than an offshoot of the parent Company, taking up the business where they left it in this country, and as they are very large shareholders in this Company, with good interest and management the probability is that the shares of this Company will be in time as valuable as those of the parent Company.

Mr. J. Spiller: Have we a clear authority and arrangement with the parent Company to work on the Continent?

Mr. Walker: We have authority to work everywhere except in North and South America.

Mr. Spiller: I see in the foreign journals that the Kodak camera is advertised for sale in Paris by such establishments as those of Nadar. If we could supply foreign customers direct, it should be a source of great profit.

The resolution was then carried unanimously.

Colonel Noel Allix moved, and Mr. E. H. Jupp seconded, the following resolution:—"That such new shares shall be issued at such times, in such manner, upon such terms and conditions, as the directors shall from time to time determine," which was carried unanimously.

A vote of thanks to the Chairman terminated the proceedings.

—*Financial World.*

Foreign Notes and News.

The recent Imperial Festival at Düsseldorf was the occasion of a triumph in flashlight photography. A huge group of 400 persons collected in the concert-hall were "taken" with all possible success by means of "blitz-pulver." Gaedicke "blitz-pulver" was employed, and was fired off at eight different points, by means of electricity, while electric arc lamps were made use of as auxiliaries.

M. Max Jaffé recommends the following method of stripping gelatine plates for collotyping with safety. The negative should not be collodionated, but covered with a solution of fifteen parts of gum-arabic in 100 parts of water. Thereupon a sheet of gelatine, which has been "swelled" in water, is pressed on to it, and allowed to dry, whereupon the stripping may take place without danger.

The following recipes are given in *La Photographie* for giving a brown tone to bromide prints by means of an iron oxalate and chloride of potash developer.

Solution A.

Water	1000 parts.
Oxalate of potash	330 ,,

Solution B.

Water	1000 parts.
Chloride of potassium	130 ,,

Solution C.

Water	500 parts.
Sulphate of iron	24 ,,
Citric acid	2 ,,
Bromide of potassium	2 ,,

The print is very fully exposed, then softened in water, and developed in a bath composed of—

Solution A	20 parts.
Solution B	5 ,,
Solution C	5 ,,

The more of solution B that is employed, the browner are the tones produced.

NOTES FROM NEWCASTLE.

Our oldest amateur has made a bold plunge, and developed into a professional, the *locale* being 54, Collingwood-street. I refer to Mr. Thomas Galloway, whose experience of photography dates from the days of the Daguerreotype. No. 54 has been a photo studio for many years, and various men have courted for time there with variable success. The situation, however, is good, and Mr. Galloway has, by means of excellent upholstering, furnishing, and electric lighting, put, so to speak, a new face on the establishment altogether. The studio has been remodelled, and is now in the hands of Mr. Fergus, the capable manager, well known, particularly in the neighbourhood of Greenock and elsewhere, as an excellent artist, adapted for every kind of lighting; in fact, the work turned out so far is quite first-rate. Mr. Galloway has an interesting collection of apparatus, ranging from a complete Daguerreotype outfit, a sliding-body camera and lens (said to be the first ever brought to Newcastle, and still usable), to a handsome modern studio camera of large dimensions, and all the latest improvements.

Mr. Galloway has an arrangement for flashlight photography, the peculiar feature about it being a double ball attachment (the continuous spray of the perfumery trade), an idea worked out by Mr. Galloway and the writer last November. This arrangement must be very similar to that of M. Nadar, described recently by Captain Abney before the Photographic Society of Great Britain.

I note the advertisement of still another dealer in photographic material, viz., Mr. Clark, surgical instrument maker, of Mosley-street. Newcastle district is very well supplied now surely; but, apart from the large increase in popularity hereabouts, the number of persons using photographic goods must be immense. By the way, considering that two of the new dealers are unqualified to sell poisons, it would be interesting to know how they manage with regard to the sale of some of the necessary chemicals. To my certain knowledge the Pharmaceutical Society people have been making some explorations in this part of the country. D. D.

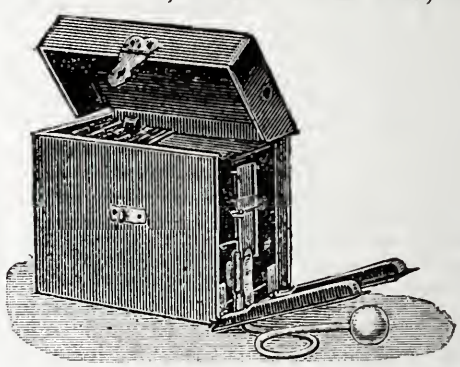
Our Editorial Table.

The Guinea Detective Camera.

Walter Griffiths & Co., Birmingham.

Unless we had been well assured to the contrary, we could scarcely have believed that the camera above mentioned could have been sold at a guinea. Of the various low-priced hand cameras we have yet seen specially adapted for presenting to a youth or well-behaved schoolboy, or for those who cannot afford a greater outlay, this camera is entitled to the greatest consideration, for it is not a mere makeshift, but a veritable good working instrument, having an achromatic lens that defines well, three double dark slides, a shutter which "flips" off a view in the twinkling of an eye, and a finder. Its covering, if not leather, looks sufficiently like it to pass muster at a little distance. Let us now look at it a little closer.

The greatest external measurement of the camera is $9 \times 5 \times 7$. The finder is placed on the top, and is one of the usual form with a lens, a reflecting mirror, and ground glass. When the lid of the camera case is raised it discloses to view the camera proper, which is formed of wood, as shown in the cut, and three double slides, one of which is



in situ, the other two occupying a recess behind. The lens is about four and a quarter inches focus, and over the stop, which is flush with the inner front board, a shutter slides in vertical guides. The normal position of this shutter is such as to keep the lens capped, but on pressing a trigger at the bottom it flies upwards, propelled by a rubber spring, only to be as quickly turned back by another spring. The slides are light-tight, and have thin metal shutters which draw out entirely. As we have hinted, the Guinea Detective is not a toy, but a veritable working instrument.

Shenston's Focussing-cloth Clip.

Messrs. George Houghton & Son, 89, High Holborn, have sent us a sample of this clip, for which they are sole wholesale agents. It consists of a double strip of brass, arranged to draw out to twice its length. At each end is hinged a folding arm, the whole being kept in a folded condition by means of a spring. These arms, being inserted into a wide hem in the focussing cloth, are then sprung over the body of the camera, to which the cloth is thus immediately attached. It will prove a boon to those who employ a camera out of doors.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8834.—"A Process for Producing Photographs." F. Sternberg.—*Dated May* 25, 1891.

No. 8934.—"An Appliance for Attaching Tubes or Cylinders to Flat Surfaces, primarily applicable for Attaching Photographic Lens Tubes to Cameras." H. G. M. Conybeare.—*Dated May* 26, 1891.

No. 8950.—"Improvements in Photo-Etching." B. C. Le Moussu.—*Dated May* 26, 1891.

No. 9015.—"Improvements in Photographic Cameras." W. Heath.—*Dated May* 27, 1891.

No. 9042.—"An Improved Photographic Shutter." E. H. Micklewood.—*Dated May* 28, 1891.

No. 9129.—"The Revolving Reservoir Hand Camera." F. O. Bynoe.—*Dated May* 29, 1891.

PATENTS COMPLETED.

Improvements in Photographic Baths for Developing and like Purposes.

No. 9413. John Boultbee Brooks, Great Charles-street, Birmingham, Warwickshire.—*May* 2, 1891.

The object of my invention is to prevent the overflow of the fluid during the process of carrying or rocking the bath whilst developing photographs.

In order to do this I make my bath or well of any desired shape, but the sides and ends are constructed as follows: After raising the sides and ends to the required depth, I form a hollow beading all round, with the top edge well turned in towards the interior, my object being that, whereas with an ordinary straight-sided bath immediately the fluid, on being disturbed, reaches the top of the sides, it comes over, and is spilled; but in the one that I construct as aforesaid the fluid, on being disturbed, runs into the hollow beading at the top of the sides, and returns back into the bath.

To overcome also the difficulty of pouring the fluid out of the bath, I make two ear-like projections near the spout to prevent overflow, or I construct either a fixed or loose spout cover, which, if loose, is made to slide on to the corner at right angles, and fixed by means of springs or otherwise, so as to bind on the base and face of the sides of the bath.

I can construct the bath on this principle either of china, vulcanite, wood, metal, papier mâché, or any other known or desirable material.

Improvements in the Construction and Arrangement of the Adjustable Parts of Photographic, Easel, Music, Reading, and other similar Stands, and in the Means of Securing the same.

No. 9497. Frederick Arthur Walton, 54, Hylton-street, Birmingham, Warwickshire.—*April* 25, 1891.

I will first briefly describe this my invention, as applied to a photographic stand, having an adjustable stay or prop, by which variation in the angle of the stand may be effected, and also having an adjustable grip by which pictures, glass, &c., of various widths may be held.

I cut or stamp out a pillar, of a strip form, from sheet metal, having a suitable foot to receive the picture, glass, &c. At a suitable height upon this pillar, say at about half its height, I provide a joint to receive the one end of a stay or prop. This stay consists of a strip form, having at its upper end pivots or bearings, taking into the aforesaid joints upon the pillar, and thence extends for a length equal to, or a little more, than to the bottom of the said pillar. Upon the outer side of this stay, and at a suitable distance from its upper end, a second joint is provided similar to that upon the pillar, to which is connected the one (lower) end of a strut, the upper end of this said strut being in its turn connected to a sliding piece, which latter is made to slide upon the aforesaid pillar. This sliding piece is further provided (generally) with outstanding arms to form a support for the picture, &c., resting thereon. Upon this sliding piece I further provide a joint, which is to receive a gripping lever. This gripping lever may be cut from stamped metal, and is furnished near its one end with two pivots, taking into the aforesaid joints upon the sliding piece. The other end of the lever forms its handle or manipulating end, whilst its short end is bent at about right angles thereto, and is so made that when the lever is raised to its vertical position, and lies back against the pillar, the sliding piece and the pillar are firmly locked to each other. Thus, by raising or lowering the sliding piece, the strut is raised or lowered, and in so doing the lower end of the stay or prop is extended from the base of the pillar, and by manipulating the locking lever as before described the said stay may be secured in any given position.

At the upper part of the pillar I provide an extensible top-grip, consisting of a strip of metal the same width as the pillar itself, and having a suitable upper part (bent over or otherwise) to lay hold of the picture, &c., or otherwise to carry an ornament, &c. This extensible grip is passed into and through the aforesaid sliding piece, so that when securing or locking the sliding piece to the pillar the extensible grip is secured also. By reason of this extensible grip being capable of sliding within, or through the aforesaid sliding piece, it may be adjusted to suit pictures, &c., of various sizes, and then locked in such position.

If desired, a separate locking lever may be employed for securing the extensible grip, or in some instances the said grip may be disposed of altogether.

Also, instead of applying the locking lever to the upper part of the strut, the said upper part may be a fixed point, and the sliding piece and the lever applied at its junction with the stay. Or the said sliding piece and the lever may be applied to the upper end of the stay, and each end of the strut in such a case would be fixed joints. Further, instead of putting the strut above the stay, it may be varied by putting it below, with the same variations as to the position and application of the sliding piece and lever, as before described.

In some cases, instead of the pillar consisting of a strip form, it may consist of a frame or a plate, in which latter the strip upon which the sliding piece is to travel may be formed upon the said plate by cutting therein two long vertical slots, the portion lying between such slots forming the strip.

Photographic Exhibition at Leeds.—A National Photographic Exhibition on a large scale is to take place at Leeds towards the end of the year, promoted by the Fine Art Gallery Committee of the Leeds Corporation and the Leeds Photographic Society. The probable date of opening will be towards the end of November, and the Exhibition will remain open until the middle of January. The official prospectus will shortly appear. In the meantime any information may be obtained from Mr. George Birkett, curator, Fine Art Gallery, Leeds.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 8	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 9	Great Britain	50, Great Russell-st., Bloomsbury.
,, 9	Derby	Society's Rooms, Derwent-bldings.
,, 9	Bradford	50, Godwin-street.
,, 9	Manchester Amateur	Manchester Athenæum.
,, 9	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 10	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 11	Birkenhead	Association Rooms, Price-street.
,, 11	Manchester Photo. Society	36, George-street, Manchester.
,, 11	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 28,—Mr. W. E. Debenham in the chair.

The Chairman produced the portion of a blue-stained bromide print which had been brought to the previous meeting for explanation. It was then suggested that the stain was due to some form of Prussian blue, caused by accidental admixture of ferrocyanide of potassium with the washing solution before the oxalate developer had been entirely removed. This was doubtless the case, the stain having now been cleared away by treatment with caustic potash followed by citric acid.

A question from the box was read: "If one thickness of tissue paper stops twenty per cent. of the light passing through it, what percentage is stopped by two thicknesses?"

The Chairman said for homogeneous light, or for a medium which stopped all rays equally, each additional thickness would represent an arithmetical power, higher by one, of the number representing the stopping force of the medium; or, as Messrs. Hurter & Driffield put it, the stopping power would answer to a logarithmic series. Unfortunately, the mere use of the word logarithm was sufficient to deter many from examining propositions in which it was used.

Mr. J. Traill Taylor said that the progression was geometrical; twenty per cent. of the remaining light would be stopped by the second thickness, and so on.

Mr. T. Bolas observed that where the light was originally of mixed character, and the medium let through certain rays only, it was conceivable that a second thickness would not stop any additional light at all.

Mr. A. Cowan said that, in a recent number of The British Journal of Photography, it was stated that chloride of ammonium—which under the name of sal-ammoniac could be obtained almost anywhere—might be used instead of sulphite of soda to prevent the green colouration otherwise given by the carbonate of soda and pyro developer. He had tried the formula, and now showed a series of negatives produced under like conditions of exposure and time of development. The plate developed with the chloride of ammonium admixture was quite as free from green as that with which sulphite had been employed, and was rather brighter and fuller in character. The plate to which neither addition was made was, although greenish, decidedly in advance of the sulphite plate as regards apparent amount of exposure.

Mr. W. Coles had noted that a yellow colour was characteristic of certain makes of plate.

Mr. A. Haddon then gave a lecture on *Ordinary and Polarised Light* [see page 358], accompanied by diagrams and demonstrations with the lantern.

At the conclusion of the lecture, which was much applauded, the Chairman, in thanking the lecturer for the great labour he had undertaken, not only in delivering the evening's discourse but much more in preparing so large a piece of work, said that at that late hour he would only add one remark, which was to the effect that not only, as had been pointed out, was the assumption on which Newton based his objection to the undulating theory, that light did not travel round corners, found to be incorrect, but the converse proposition, that sound did travel round corners was found to require limitation. Experiments had shown that there was such a thing as sound shadow. The enormous disproportion between the size of sound waves, which were measured by feet, and light waves, which were measured by millionths of a millimeter, as well as the different character of the movement, would account for the difference of power of turning corners between light and sound: the difference was one of degree rather than of kind.

Mr. Haddon, in thanking the audience for the warmth of their reception of the lecture, said that he hoped other members might be stimulated to take up some subject with which, maybe, they were imperfectly acquainted, master it, and give the Society the benefit of their labours.

CAMERA CLUB.

On Thursday, May 28, a paper communicated by M. Léon Vidal was translated and read by Mr. Lyonel Clark. The subject was *A Method of Mechanical Colouring for Carbon Transparencies, Stereoscopic Views, and Lantern Slides.* Mr. Andrew Pringle occupied the chair.

M. Vidal's paper was followed by the reading of one sent by Professor W. K. Burton upon *A New Emulsion for Printing-out Paper.* The communication was illustrated by some good examples on Whatman paper sent by Mr. Burton. The process consists in preparing the salting and sensitising solutions in one emulsion, on which the paper can be floated or the solution can be brushed on. The process was fully described, and the formulæ given for thin, medium, and strong negatives respectively.

Some discussion followed, in which Messrs. Warnerke, Clark, and the Chairman spoke.

During the same evening Mr. Woodward demonstrated Schoppen's method of viewing lantern pictures stereoscopically by means of coloured glasses. Considerable interest was taken in the exhibition.

HOLBORN CAMERA CLUB.

ANYBODY strolling into the Holborn Camera Club-room last Friday night would have been taken aback to see the large number of hand cameras pointing at him as he entered the room. But the "dreaded click" did not take place, and, gaining confidence again, he doubtless would go in and examine the instruments. Owing to the bad weather on Friday, the show, however, was not so good as had been expected. Many manufacturers did not show their hand cameras. Messrs. Adams & Co. sent a representative, who explained in a most satisfactory manner the nature of the working of the Ideal. Mr. Benest showed Roberts' hand camera, and Mr. Chang the Eclipse and Diamond hand cameras. The novelty of the evening was, however, a stereoscopic hand camera, shown by Mr. Raphael, which, by a sliding arrangement of the front, could be used as a quarter-plate, as well as a stereoscopic hand camera.

Mr. Arthur R. Gowing was elected a member of the Club.

BRIXTON AND CLAPHAM CAMERA CLUB.

ON Saturday, May 23, the members of the Club visited Bexley by invitation of the President (Mr. A. R. Dresser). After several photographs had been taken, a group of the party was obtained, after which all sat down to a substantial tea, which had kindly been provided by the President. A total of 170 plates was exposed.

HACKNEY PHOTOGRAPHIC SOCIETY.

MAY 28.—The following excursions were arranged for the next two months :—June 13th, to Dorking; 27th, Waltham Cross; July 11th, up the Thames; and 25th, to Hampton Court.

Mr. BECKETT then read a paper on *Elementary Work*, and gave as his preference a quarter-plate camera, single lens, one-and-a-half or twice the length of the plate, half-plate tripod for quarter-plate camera, to ensure greater rigidity, and the slowest plate that could be obtained. For development he preferred pyro and gave as an excellent formula :—

A. Pyro, one ounce; sulphite of soda, three ounces; citric acid, sixteen grains; water to sixteen ounces.

B. Saturated solution :—Carbonate of soda, with sal-ammoniac, or roughly, for saturation, six ounces of sulphite to one of sal-ammoniac.

For use :—

A	10 minims.
B	1 drachm.
Water	1 ounce.

He had found a mixture of eikonogen and hydroquinone work well, and very nearly equal to pyro. For exposure the best method was by making notes of those plates which had been exposed and comparing.

Dr. ROLAND SMITH said he had found a good way of bringing out under-exposed plates was by first using pyro and then following with quinone.

CROYDON CAMERA CLUB.

THE following excursions have been arranged :—June 6, Merstham to Godstone; trains from East Croydon fifty-nine minutes past one, thirty-nine minutes past two, forty-seven minutes past two p.m. June 13, Leatherhead; train from West Croydon forty-eight minutes past two p.m. June 20, Kingston to Hampton; train from West Croydon thirty minutes past two p.m. June 27, Betchworth to Dorking; trains from East Croydon fifty-nine minutes past one, thirty-nine minutes past two, forty-seven minutes past two p.m. July 4, Oxted to Godstone; trains from East Croydon three minutes past two and three p.m.

Members wishing to arrange excursions are requested to send particulars of time and place to the Hon Secretary.

Excursions will be arranged for July and August, due notice of which will be given.

RICHMOND CAMERA CLUB.

MAY 29,—Mr. Ford presided.

Mr. KIDD showed and explained the "Adams" hand camera (Adams and Newman's patent).

The subject for discussion was *Finishing and Mounting Prints*, which was pretty thoroughly thrashed out.

Programme of Meetings :—June 5, Demonstration on the Use of Celerotype Paper. June 12, Development of Plates with Unknown Exposures. June 19, Tourist Kits. June 26, Result of Development Competition. July 3, Result of Outing Competition. July 10, Hand Camera Work. July 17, Cloud Photography. July 24, Dark Rooms. July 31, Report of Delegates to Photographic Convention. August 7, Photographing Interiors. August 14, Home Portraiture. August 21, Lenses. August 28, Shutters.

Field Days :—June 13, Shepperton; seventeen minutes past two train from Waterloo, and forty-four minutes past two from Richmond. June 27, Brentford and Isleworth; meet on Middlesex side of Kew Bridge at three o'clock. July 11, Windsor; five minutes past two train from Waterloo, and half-past two from Richmond. July 25, Burnham Beeches; twenty minutes past two train from Paddington. August 3 (Bank Holiday), Guildford; fifty-two minutes past eight train from Richmond. August 22, Cobham; thirty-two minutes past two train from Waterloo.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 28,—Mr. Paul Lange presided.

The following were elected members, viz. :—Messrs. Thomas Rome, Anthony Dod, John Wells, and F. E. Patchett.

The CHAIRMAN reported on the excursion to Chirk, which took place on Saturday, 9th May. Twenty-one members went, and, although the day was dull, some good photographs were taken, and a very enjoyable time was spent at the castle and neighbourhood.

The Hon. Secretary exhibited the London Rubber Company's new waterproof focussing cloth.

Mr. B. Boothroyd showed Chadwick's new hand camera, fitted with Swift's special lens, working at F 4 (four-and-a-half inch focus).

Dr. MANTON, President of the Sheffield and District Optical Lantern Society, then read a paper on *The Carbon Process*, with a demonstration.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 26,—Mr. Thomas W. Dewar (Vice-President) occupied the chair.

Among the novelties exhibited were the process of rubber-type printing for placing the title of the picture on the negative (the process has already been described in the pages of this JOURNAL), and the newly introduced waterproof focussing cloth of the London Rubber Company.

The forthcoming Glasgow International Exhibition in September, and its conditions, were also brought before the meeting.

A paper on *Copying* was read by Mr. W. M. SMITH, in which he described generally the methods adopted by several of the professional men who made a speciality of this class of work, and he enlarged upon the various ways by which the same thing could be done by amateurs with easily fitted-up arrangements for the purpose. He insisted specially upon the proper lighting of the subject to be copied, in order to avoid the grain of the paper and other matters relating thereto. For this purpose he preferred using slow plates and giving a full exposure with the lens well stopped down; there should be no forcing of the development, so that the full quality of the object copied could be got by the first intention. He did not like intensification of this class of negative.

GLENALMOND PHOTOGRAPHIC CLUB.

MAY 30,—The President in the chair.

THE President remarked that the Club had to decide upon the subject for a photograph, for which a prize would be given by one of the masters of the College.

After some discussion it was settled that the prize should be given for the best set of three photographs of river or burn scenery within walking distance. It was left to the committee to bring up further details.

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

MAY 13,—Mr. John G. Bullock (President) in the chair.

The PRESIDENT announced the appointment of a special Committee to take into consideration the feasibility of starting a movement looking to a uniform method of marking the sensitiveness of dry plates.

Mr. JOHN CARBUTT exhibited a Watkins' exposure meter, which he had brought for examination as promised at the last meeting. He had tested the meter that morning, and it seemed to agree with the one he had previously used, which had been brought over by a gentleman living in the west, who desired him to rate his plates to work with it, if possible. The maker of the instrument had attempted to give some scale by which American plates could be used; but, as far as it related to his (Mr. Carbutt's) plates, it was very far from being correct. Various negatives were shown to the members by Mr. Carbutt, illustrating his trials of the instrument, the conditions under which they were exposed being fully described. His opinion was that the meter was practically correct provided the sensitiveness of the plates used was known, and this would have to be ascertained by the operator, as there was no correct guide given. A man would have to use judgment in its use.

The CHAIRMAN inquired if one would not have to use as much judgment in its use as was required in exposure by the ordinary method?

Mr. CARBUTT said that the instrument did what was claimed for it. It saved the wasting of plates. In regard to the pendulum attachment, for his part he would prefer not to use it, because with our strong sunlight it would puzzle a great many to watch both the pendulum and the sensitive paper at the same time. The instrument had this value, that it would enable them to estimate the quality of the light better than the eye could, especially at this season, when the light is so changeable.

Mr. HAND had examined one of these instruments, and found that the indexing was badly done.

Mr. CHEYNEY said there was an article in *Anthony's Bulletin* on the subject of exposure meters which seemed to him more rational than any of them. The inventor of the meter referred to coats the bottom of a brass tube with luminous paint, which he exposes to the light the picture is to be taken with. Then a cap is placed on the tube, and through a small peep-hole the time it takes the luminous paint to fade is noted. This luminous paint is affected entirely by the blue rays, and a very close approximation can be made as to the proper exposure to be made.

The CHAIRMAN said he did not think it could be depended on. The same batch of paint might be constant, but no two batches would be alike.

Mr. IVES remarked that the time in which this paint lost its luminosity depended upon the temperature. If it was warm, it lost it quicker; if cold, it held it for a long time.

Mr. STIRLING thought in that case one would require a series of comparative tables. When the thermometer was 32°, so much; when 70°, so much.

Mr. TAYLOR suggested that it was something like Captain Cuttle's watch.

Prints made on the Omega sensitised paper were next shown and toned by Mr. HOPKINS. The paper is coated with a gelatine emulsion, and printed in sunlight, requiring about one-third less time than ordinary albumenised paper. A combined toning and fixing solution is sold for use with the paper, or a formula for preparing the same is furnished with each package. Unlike most

ready-sensitised albumen papers, a satisfactory black tone can easily be obtained when desired, or by stopping the toning at an earlier point warmer tones are obtained. The print should be made considerably darker than the finished tone desired, and immersed in the toning solution without first washing, being left therein until the desired tone is obtained, and then well washed in several changes of water. They may be mounted directly after washing, or can be hung up to dry or laid face up on blotting-paper, care being taken not to place anything on top of the prints till thoroughly dry, as they would adhere to the gelatine surface. The prints can be glacéd by squeegeeing them face down on a tin-type plate. It was claimed that the paper was more permanent than albumen paper, and would not fade if properly used.

Mr. BELL took exception to the toning and fixing in one solution; the prints so treated were going to fade. In the olden time they were taught to tone separately and fix separately if they desired to get permanent prints, and the mixture of the gold and hypo together looked as if they were going back to the old fading time.

Mr. HOPKINS had not found this to be the case. The prints in the sample book shown them had been made for over a year, and they were just as good now as when they were first made.

Correspondence.

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

"PHOTOGRAPHING IN PARIS."

To the EDITOR.

SIR,—On reading my letter to you of the 22nd May in print, I noticed that I call the exhibition of paintings in the Champ de Mars "the leading one." I intended to say that the original, in the Palais de l'Industrie was the principal; that, however, in the Champ de Mars contains many notable works.

As regards my experiment of taking a snap-shot photograph in an interior, it turned out, making allowance for all the difficulties I had to contend with, rather successful. This you can judge for yourself, as I forward a lantern slide made from the negative.

I notice that I must write my signature very indistinctly, as the initials of my Christian names are T. M.; in Vienna they read them as F. M.

As the pen is in my hand, I may mention that at the late Exhibition of the Guildford Art Association I obtained the silver medal, the jury being artists.—I am, yours, &c., T. M. BROWNRIGG.

[The elegant statue "captured" by our esteemed correspondent warranted his encountering even greater difficulties in securing it. By the way, what a handsome woman our common mother must have been!—ED.]

POISONING BY HYDROQUINONE.

To the EDITOR.

SIR,—If Mr. E. M. Woodward will try the following, I think his finger will soon get all right:—Solution subacetate of lead, two drachms; tincture of opium, four drachms; distilled water, eight ounces. Mix and keep constantly applied to finger on a piece of lint, and cover with oiled silk. Epsom salts, one drachm. Dissolve in a *tumblerful* of water and take each morning for a week. This dose of salts will act as a diluent, and poison will be eliminated by the kidneys.—I am, yours, &c.,

Liverpool, June 1, 1891. WOOD'S WASHER.

To the EDITOR.

SIR,—For years past I have been a daily user of hydroquinone, and for a considerable time suffered very much from its poisoning effects. At that time I used shallow dishes for developing. The last two years I have used deep trays for that purpose, thus preventing the solution getting to the fingers. Since I made this change, I have had no bad effects. Thus far for prevention, now for cure. Put a teaspoonful of sugar into the mouth and moisten well, scrape from a piece of common soap about the same bulk as the sugar, work the two together with a knife into a paste. Apply this to the part affected, which, if kept clean, will heal up in a day or two. I do not know if this will apply to Mr. Woodward's case, seeing his is whole skin. He may try and see.

I would have replied to Mr. Woodward's letter in April, but waited to see if any one else had a similar experience.—I am, yours, &c.,

51*a*, *Perth-road, Dundee.* J. ROBERTSON.

POLYCHROMATIC PHOTOGRAPHY.

To the EDITOR.

SIR,—I see by your report of M. Vidal's paper on *Polychromatic Impressions by Photography* that he "protests against the claims put forward by some that they had been able to reproduce the effect of nature by the selective character of the negatives only," and asserted that "a correction must be made by hand." Now, it has been shown by purely theoretical considerations, based upon the now universally accepted theory of colour vision, why it is that this criticism must apply to the methods of Duhauron, Albert, and others: three pictures that do not represent the effect of the object photographed upon the three primary colour sensations, naturally will not combine to reproduce the effects of nature. But, if the modern colour theory be true, the proper combination of three pictures which do represent the effect of an object on the primary colour sensations, cannot be open to criticism. It is easy for M. Vidal to make an assertion, but I challenge him, or anybody else to show that my own patented method does not fulfil theoretical requirements as perfectly as the ordinary photographic process fulfils theoretical requirements for reproduction in monochrome.

I can excuse anybody for doubting the practicability of this method until they have seen the results, and the means by which I now produce them; but it is not fair to discredit the principles involved without offering any reasons for doing so.

I did not accept an invitation to send specimens by my process for exhibition with those collected by M. Vidal, because, although I know that I have obtained far better results than any that have been exhibited elsewhere. I prefer to wait a few months, when I shall be prepared to give a demonstration that will completely disarm my critics, and secure a just recognition of the process.—I am, yours, &c., FRED. E. IVES.

Philadelphia, June 1, 1891.

Exchange Column.

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

Beeston Humber tricycle, worth 7*l.* 10*s.*, in exchange for 12×10 camera.—Address, BLYTH, Photographer, Ilfracombe.

Will exchange portable studio in sections, wood and glass, about twenty-four feet by twelve feet, for good rapid rectilinear or group lens.—Address, W. S. KEDDIE, The Royal Studio, Warminster.

Wanted to exchange, enlarging apparatus, with seven-inch pair condensing lenses, lamp and everything complete, by Marion, for a 10×8 or 12×10 camera.—Address, W. K., 104, Terminus-road, Eastbourne.

Exchange, international half-plate camera, three double slides, rapid rectilinear Iris lens, Kershaw shutter, tripod, and waterproof case for whole-plate rapid rectilinear lens and cash balance. Also wanted a whole-plate field camera.—Address, SPENCE, Winterfield, Higher Broughton.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

J. Horsburgh, Edinburgh.—*Photograph of Professor Smith. Two photographs of Rev. Dr. MacGregor.*

NEMO.—Employ rain or distilled water.

A VICTIM.—We shall make inquiry as to the cause of the delay.

JNO. CALOE.—We quite agree with you, and hope that all will adopt your course, and keep their "fifty thick uns" in their pockets.

CHARLES JOHNSON.—We never interfere with subscribers who effect exchanges through the medium of our columns. They are usually arranged by mutual agreement.

J. HARRIS.—We cannot tell the cause of the stains unless you send the formula by which you prepare your opal plates, and tell us the developer you employ.

H. T. YOUNG writes: "Will you kindly inform me to whom I must apply in order to obtain permission to photograph in Hyde Park?"—To H.M. Office of Works, Whitehall, addressed to H. W. Primrose, Esq.

S. W. PHIPP.—Gelatine in its dry state will keep for years; not so if it be exposed to moisture, as then it rapidly becomes mildewed. Carbon tissue which is covered with mould, although it may be wiped off, should be discarded.

AFRICA.—We presume you are over-exposing, in which case the addition of a bromide is necessary. Try the effect of less exposure, and if you do not get on well then go back to pyrogallic acid. When trying a new developing solution bear in mind that its peculiarities have to be learnt.

R. M. DAY.—1. We are sorry to be unable to give the address of the gentleman named. Better write to the Secretary of the French Photographic Society. 2. Presumably ordinary celluloid films will act as a support for gelatine in photo-mechanical printing. 3. See the claim in the specification. 4. The proportions depend upon the effect desired. A few experiments will quickly determine this point.

W. A.—Xylonite is more or less analogous to celluloid in its composition, which is a compound of camphor and xyloidine—a low nitro-cellulose compound. The xyloidine used for xylonite would not be suitable for making collodion. Pyroxyline as made for collodion, on the other hand, would not be adapted for xylonite or celluloid. Besides nitro-cellulose and camphor, other substances are added according to the material required.

SIDNEY AUSTIN.—We do not see why you should discontinue photography under the circumstances if you are able to work at it. It is quite as healthy as any other occupation, unless you were confining yourself to the dark room all day. We should say that emigration to a semi-tropical country would best suit your case. But as pneumonia runs its course rapidly, one way or the other, you had better delay taking any steps at present.

C. WENBORNE.—The lens in question, when working at *f*-6, although it covers but a comparatively small area sharply, may, nevertheless, be a very good instrument. With such an aperture no lens must be supposed to define over a large field. If the lens be stopped down to *f*-8 or *f*-11, we should judge, from the picture enclosed, it is a very fair photographic tool, and that is really what is required in practice. Of course, for the price paid the acme of perfection must not be expected.

JOHN BEAN asks: "Where can I buy bisulphite of ammonium (in fluid form) as recommended as a substitute for soda sulphite? I cannot get it at the chemists here. How could I make it without much outlay?"—Bisulphite of ammonium in solution is supplied by Messrs. Hopkin & Williams, Cross-street, Hatton Garden, and, we surmise, by all operative chemists. We cannot here spare the space to describe its manufacture. By the way, we do not find the article referred to in our ALMANAC for the current year.

MACK asks: "1. What is the best thing to throw down the silver washing? I have used salt and hydrochloric acid, and it still has the milky appearance. I am using ready sensitised paper. 2. What is the best for throwing down the gold in old toning bath?"—1. If with salt or hydrochloric acid the silver does not subside quickly, add a little nitric acid, and stir vigorously for a few minutes and the end will be attained, particularly if the washing be exposed to full light. 2. Sulphate of iron acidified with a little sulphuric acid.

WEXFORD writes: "Some short time ago a gentleman brought me a portrait of his father to copy. The deceased was a very popular man, and the son gave me leave to publish the portrait if I liked. I did so, and now the photographer who took the original portrait is threatening with an action at law for infringement of his copyright. Surely he cannot do this, as the son and heir gave me his permission. Your advice will oblige."—If the copyright is vested in the photographer who took the portrait, it is his property, and the son of the deceased has no more right to dispose of it than he has of any one else's property.

FRANCIS BRYANT writes: "Will you please inform me the best method by which I can use my copying lens for enlarging any small photograph without the grain of the paper affecting the negative, as it does in my case; my lens being a powerful one, the grain of the paper shows to a great extent."—Our correspondent's "powerful lens" has nothing to do with the grain of the paper showing conspicuously. All copies from paper prints, when enlarged, show the grain of the paper to a certain extent, according as the original is illuminated. Illuminate the picture to be copied so that the granularity is reduced to a minimum. We have no publication on the other subject inquired about.

W. B. puts the following queries: 1. "Which furnace, in your opinion, would be the best for firing enamels—Fletcher's Gas Muffle, or Lacroix's Automatic Kiln for Fuel? 2. Can you say which is the weakest kind of gelatine made, and how is carbon tissue coated?"—1. In our experience the first-named answers best. 2. As a rule the lowest priced. The price is generally regulated by the strength. Carbon tissue is coated by making the paper pass over the surface of a solution of gelatine containing the pigment, so as just to "lick up" an even coating. Of course, this is done by a suitable machine, several of which have been patented.

C. V. B. asks: "Will you kindly inform me on the following points: 1. I am in the habit of mounting with good glue, and keep the same in a carpenter's glue-pot. I find after a few days it goes mouldy, no doubt owing to its being very dilute. Can you tell me of any preservative which would prevent this? 2. Can you account for the following? I was developing a snap shot yesterday, and was surprised to find that the result was a positive instead of a negative. The developer used was hydroquinone, which had been standing ready mixed for about eight hours."—1. A trace of thymol or carbolic acid will prevent the glue from becoming mouldy; but better still is the method of making it fresh as required. 2. In all probability light got to the plate during the development, and so set up the reversing action of light. Or is it possible, though scarcely probable, that the plate was much over-exposed?

NEMO writes as follows: 1. "I should be glad if you would give information as to chief cause of want of evenness in shadows of prints after silvering. Bath is full strength, new, and a blue litmus paper remains unchanged in testing, yet a slight marbleness always remains, though I have every reason to believe albumenised paper is excellent in quality and above suspicion. Kindly give cause and remedy. 2. Is any substitute for citric acid thought as good for preserving? 3. Through some cause or other upon floating the first sheet, the citric bath becomes very milky. This has occurred just recently, and though I have changed both baths, it is still the same, and I cannot get at the cause. Full information would meet with my sincere thanks."—In reply: 1. We cannot assist our correspondent, inasmuch as he does not say how the paper is albumenised, and the proportion of chloride it contains. He says the bath is "full strength," but, of course, that depends upon the amount of chloride in the albumen, and further, he does not say anything with regard to the time of floating. 2. Tartaric acid is preferred by some. Professional preparers of ready-sensitised paper do not publish their formulæ. 3. From the meagre data we can give no authoritative opinion.

H.R.H. THE DUKE OF EDINBURGH honoured Mr. Shapoor N. Bhedwar with a sitting for a photographic portrait at Clarence House on Saturday, the 23rd ult.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, June 11, *Hand Cameras*. Members are requested to bring as many as possible for examination. June 18, *Lantern Microscope*, T. E. Freshwater.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, June 10, *Combination Printing*. June 17, *Photographing Animals*. Outing next Saturday (June 6) to Eltham. Train from Cannon-street at fifteen minutes past two.

THE NEW PORTABLE LAMP.—In our last issue we described the ingenious portable lamp just introduced by Messrs. Benham & Froud as "The Traveller." Since that was written this firm has decided upon changing the name to the "Holiday" lamp, by which designation it will hereafter be known.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—June 9, at eight p.m., adjourned discussion on M. Vidal's paper. Mr. L. Warnerke on *A New Sensitometer*. Capt. Abney on *Dark Room Illumination*. June 23, subject for discussion, *Orthochromatic Photography*. The exhibition of chromo work will remain open till end of this month.

DARK ROOM.—A regular charge should be made for the use of dark rooms. We see no reason why this accommodation should be given free any more than the dozen other things we want when on tour. We never found the owner offer to lend us his bathing machine gratis. Why should the owner of the dark room do otherwise? A reasonable tariff might be as follows:—Changing plates, 3*d.*; developing, half-hour, 6*d.*; weekly ticket, 3*s.* 6*d.* Of course, dealers in many cases offer the use of their dark room *to customers* free, and quite rightly so, but non-purchasers should pay for the privilege.—*Scraps.*

THE LATE CORELLI BERE.

ON Sunday last passed away one of the oldest photographers in the person of Corelli Bere, who, though probably little known among the present generation of photographers, owing to ill health having for some time prevented him mixing much in active life, was a living encyclopædia of photographic lore. His experience lasting from the Daguerrian practice, he was a worker to the last; no new process found him unprepared for experiment, and his work in all forms was of great excellence. He was imbued with keen artistic abilities, and his studies always formed the most beautiful type of pictures.

His kind-heartedness and sympathetic manner were a passport wherever he went, and he was never more delighted than when he could induce any youthful friend to take up photography as a pursuit. His many kind acts are well known to his circle of intimate friends, but he always made light of the many opportunities he took of assisting struggling talent. Many professionals owe much to his kindly help with advice and means.

In the course of his long photographic career he collected a very extensive assortment of apparatus of every kind, which was always freely placed at the service of his friends. He was always delighted to get a fellow-student to have a quiet gossip with him over a pipe, and when well started would discourse by the hour in the happiest vein of old times, old men, and old processes; hardly any photographic subject could be mentioned in his house but he would be able to find a note in his commonplace book, or a specimen of work illustrating it, and he would spare no trouble in searching among his very large collection of objects and papers to please or assist his companion.

In later years his associations have been restricted to a very small circle, and those who have had the great advantage of his intimate friendship will long miss his gentle friendliness and ever regret one who inspired much affection and esteem. H. E. DAVIS.

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THE BRITISH

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PHOTOGRAPHIC NOMENCLATURE.

We observe that a recent number of the *Journal and Transactions of the Photographic Society of Great Britain* contains the report of the Committee appointed last year to consider the question of lens standards, and to report on the advisability of introducing other standards for use in photography. First of all, certain additions to the existing sizes of flanges for lens screws are recommended, while other suggestions in connexion with the subject are also made. Then, the Committee recommend the adoption of standard sizes for plates, the existing half-plate being taken as unit, smaller or larger sizes being produced by doubling or halving one dimension. A second series, with a unit of $5\frac{1}{2} \times 4$ is at the same time noticed. Finally, the Committee make a recommendation anent the expression of photographic formulæ in parts per thousand of the total volume, using parts by volume of liquids and parts by weight of solids, the respective units being either grammes and c.c. per litre, or grain weights and grain volumes per 1000 grain measures.

The publication of this report is an opportune reminder that the useful work begun by the Society in attempting to set up certain badly needed photographic standards some ten years ago is not, as might have been supposed by those who have no opportunity of posting themselves up in the affairs of the Society as the principal, if not the representative, mouthpiece of native photographic practice, in any danger of being discontinued, although we must confess to a strong feeling that much valuable time has been wasted in this decade of inactivity, and that there is considerable leeway to be made up. Be that as it may, we are sure that it will give satisfaction to know that the Committee is practically a permanent one, and that, besides the three questions above touched upon, it recognises that there are "others which may require future careful consideration," among these being uniform nomenclature of photographic processes, unit of light, actinic intensity of light, and so forth.

It is undoubtedly wise of the Council, while publishing this report, to refrain from suggesting its adoption by the Society, inasmuch as "the question of standards will shortly be discussed at the Congress in Brussels." Under these circumstances, moreover, the Committee's recommendations are exempt from independent criticism, and we shall therefore now content ourselves by simply drawing attention to them, in the hope that those of our readers who are interested in the subject of photographic standards (and which of them is not?) may have an opportunity of knowing what is afoot. In contradistinction to the purely local and practically abortive Congress which assembled in Paris during the Exhibition year, the Brussels Congress is, we believe, really of an international composition, and we may therefore feel every confidence that its resolutions will come to us stamped with an authority that did not belong to the French gatherings. For the present we shall confine our remarks to one of the many subjects which await settlement at authoritative hands—we allude to that mentioned at the head of this article, and which is also treated of in some of its aspects by a contributor in another part of the present number of the Journal.

The attempt of the Paris Congress to reform and codify the hap-hazard and confusing names applied to photographic processes was, on the whole, happier and more rational than its efforts in other respects, and we do not think there would be much to complain of as regards lucidity and simplicity if the recommendations then made came into general use. It will be remembered, for example, that in photo-mechanical process work the term photo-collography was suggested for employment when referring to collotype printing and its numerous modifications, and photoplastography for Woodburytypes; "phototype positives" and "phototype negatives" were to stand for developed positives and negatives respectively, "photo-copy positives" for printed-out pictures. It is only upon some such lines as these that we can ever hope to arrive at a uniform system of speaking and writing of the many processes now in vogue. In the department of photo-mechanical printing a common agreement is badly needed. The various names by which collotypic pictures are called must be extremely puzzling and misleading to the lay mind, and their mere enumeration here would occupy a considerable portion of this column.

It would be affectation to ignore the fact that it is to commercial process workers that we are chiefly indebted for the multiplication of these fanciful and misleading titles. The dictum of the bard notwithstanding, there is a great deal in a name; for, see, it is just as easy to write photo-mezzotint for collotype, and platino-gravure for platinotype; and then think of the art-glamour that is thereby cast over the pictures! They are surely something more than impressions in litho ink and sepia-toned platinum respectively! And so this perverse ingenuity of nomenclature has spread from one to another until, at the present moment, it baffles a great many to disentangle the meanings of some of the queer names often given to the "common," or "garden," collotype.

We are quite alive to the difficulties in the way of simplifying photographic nomenclature, not merely in regard to photo-mechanical process work, but to several other departments of photography. Commercial men are not, as a rule, too willing to be influenced in such matters by Standard Committees, Congresses, or anybody else. It pays them to "wrap up" their wares in mystifying or high-sounding names, which do not tell anything of their real nature to the public. It is

only upon this assumption that we can account for three recently introduced printing processes being called respectively Kallitype, Celerotype, and Agathos. If the design of the sponsors of these processes, all of which we know from personal experience of them to yield most charming silver prints, was to disguise their exact nature from the outside public, we can congratulate them on their success in doing so.

The Paris Congress tried, if we remember aright, to hunt the words "pyro" and "hypo" out of the photographers' formulary. They failed, of course, and nobody is sorry. It is, we hope, unnecessary to warn the Brussels Congress, or any other body bent upon a reforming mission, that, in tampering with such expressions as these, which have, so to speak, become indelibly impressed upon photographic literature, and, furthermore, carry a clear, definite, unmistakable meaning to every one who employs them, they are simply wasting time. It is too late. The majority of us refer to pyro *as* pyro, and not as pyrogallol, and to hypo *as* hypo, and not as sodium thio-sulphate, despite innumerable rebukes for so doing, and doubtless we shall continue to do so. Why not, if, as we have just said, their meaning is clear? The reformers of photographic nomenclature have not, so far, been happy in their efforts, chiefly, we venture to remark, because those efforts have not been well directed. Take the case of hydroquinone. Some little while ago, at one of the society meetings, a *plébiscite* of those present was taken, when it was decided for the future to call this reagent "quinol," in the belief, we suppose, that such a lead would be universally followed, which has not by any means been the case. Here, we think, it would have been better to leave well alone.

Of late years we regret to notice, beside the introduction of so many confusing synonyms for the various processes, a great tendency towards looseness, obscurity, and downright error in expressing many photographic operations by name. Thus we heard speak the other day of "the toning of an iron image" (*àpropos* of platinum printing). We do not "tone" ferrous images, any more than we "develope" them, using either of these latter terms according to its ordinary meaning.

Again, why "bromide print" and not "bromide negative?" The first of these terms is one of those catchy phrases which we suppose will never die out, although it is a singularly ill-chosen one. Since there is no "bromide" in the finished picture, its peculiar designation is just about as sensible as the title "iron print" would be for a platinum picture. We could very largely multiply such instances; but we will conclude by appealing to photographers to assist in bringing about a uniform system of photographic nomenclature by rejecting all hap-hazard, meaningless, or confusing terms from their formularies.

A PROBLEM FOR THE "PLATE-MAKERS."

The beginning of the now almost universal employment of gelatino-bromide plates may be said to date back not more than a dozen years, and probably a large majority of those now expert in their use knew nothing about photography half a dozen years ago, while, as to the working of wet plates, comparatively few now connected with the art ever saw a wet collodion negative produced. It is a necessary result that among them a first-rate gelatine negative is the only known standard to work up to, or, if possible, excel. How wonderfully that standard has from year to year been raised, those with only three or four years' experience can say; and others, who have seen dry plates arrive from what they were a dozen years ago to the high state of excellence they now exhibit, can judge still better. Rapidity, freedom from mechanical defects, such as frilling, &c., and, most important point of all, uniformity, have all increased. But does any one believe perfection is arrived at, even in the best plates on the market? It may be safely said they do not. There are problems still to solve. Let us go back to the wet-plate work. When was halation, as it is now termed, in any way a trouble? A wet-plate worker, provided his bath was in order, and his slides clean, was never troubled in his mind when he had whitewashed walls to photograph, or a church interior, with a brightly illuminated window immediately opposite his lens—never, that is to say, if he had confidence in his plate standing the necessary protracted exposure without drying and showing drying marks. But where is the dry-plate worker who, under such conditions and without adopting special precautions, would be as confident? The window would scarcely be discernible from the dark space that surrounded it, while, if a whitewashed wall formed the larger part of a view, he would be a clean worker who could count upon obtaining a negative that would not be slightly veiled in its deeper shadows. And it is certainly true that in taking, for instance, a landscape with a bright sky behind a foreground of trees, there are few, if any, plates in the market that would not show signs of the sky apparently impinging upon the dark foliage of the trees. There is no need now either to explain that this is caused by the illuminated portion of the film being reflected from the back of the plate on to places where no light should be, and so, in a sense, fogging them, or to show that such reflection is minimised by backing the plate in a suitable manner. But it is not generally recognised that another effect, that of general fog, is excessively liable to be produced when a large portion of the image is from objects light in colour and brilliantly illuminated. Those who are familiar with the properties of lenses are aware that this fog must be produced by the image on the plate during exposure being reflected from the lens itself back again to the plate upon the lights and shadows impartially.

We can now bring our remarks to a focus. These reflections from the back of the plate to the back of the film, and from the lens to the front of the film, either did not take place or were virtually inoperative in wet-plate work. Why? Further, could not this quality of the film, whatever it was, be imparted to a dry plate? The answers are: wet-plate films were so thick that they allowed little light to pass through, and that little of but slightly actinic value; while the light reflected from the face of the film to the lens and back again was also far less actinic in colour than that which would be operative with a gelatino-bromide film.

The problem for the dry-plate makers is to produce a film which shall permit few actinic rays to pass through, and also which shall be of such a colour that when the image of bright objects is thrown upon it the reflections from the lens back to the film shall be innocuous. Our views as to how this desideratum is to be realised may be briefly stated. We say, "Stain the film," or, in other words, add a dye to it, so that when the plate is made it is distinctly coloured, and so would keep back the greater part of the light from passing through, and also render harmless the lens-reflected illumination of the front of the film. It may be answered that, if such effects were produced, their advantages would be nullified by loss of rapidity, entailed by the light being obstructed through this dyeing operation. We reply that we have every reason to

believe that this objection is untenable, and we express a strong opinion that the first plate-maker who will carry out our suggestion will produce a plate possessing such marked advantages over all others that he would practically "sweep the board."

VARIETY OF RESULT WITH GELATINO-CHLORIDE PAPER.

An opinion has been expressed to the effect that for every class of pictorial subject there is a style of printing which renders a more artistic effect than others; that silver and platinum respectively each has its special applications, while the choice of the "matt" or "enamel," the rough or the smooth surface, should be made judiciously and in accordance with the character of the subject. Without going to the extent of agreeing that this or that class of picture demands platinum printing, or gelatino-bromide, or carbon, in preference to the tone and finish of a silver print, we are quite willing to agree that instances arise, by no means infrequently, in which some departure may with advantage be made from the ordinary or beaten track.

Unfortunately, few, amongst amateur photographers at least, are equipped with the necessary requirements, or possessed of the practical knowledge and skill, to change at a moment's notice from one printing method to another. Most, if not all, who practise the art at the present day are familiar with silver printing and toning, and not a few add to this knowledge that of platinotype, of gelatino-bromide, or chloride; but it is seldom, except in rare instances, that each and all those methods are worked with equal success. If albumenised paper be the material generally employed, the familiarity gained in its manipulation will give it a proportionate advantage over any other process that may be pitted against it, and a better result will be obtained by the method in which the operator is *au fait* than by another to which he is a comparative stranger, or which he only occasionally uses. Similarly, those who have accustomed themselves to the general use of platinotype or any of the newer styles of printing soon find, on reverting to silvered paper for any special purpose, that they have a difficulty in attaining the class of result they were formerly accustomed to when the whole attention was devoted to that particular process.

For those of our readers whose artistic aspirations lead them so far as to study the particular printing method most suitable for each individual negative, there is, however, one process which offers to them a very considerable range of result—if, indeed, it cannot be said that by suitable modifications in the manipulation any character of print that may be desired can be obtained. The process alluded to is gelatino-chloride—the "printing-out," not the development form—with which, even with any of the regular commercial samples, a very great variety both in tone and finish can be produced with very little alteration in the method of treatment. The different development processes are capable of rendering very fine results in careful hands, but it can scarcely be claimed, whether chloride or bromide of silver be the basis of the sensitive layer, that the same range of colour, or anything approaching it, can be secured as is offered by albumenised paper or its nearest substitute, gelatino-chloride printed out. As a matter of fact, too, though not of necessity, the latter form of printing paper as issued commercially is so manufactured as to permit of a greater diversity in the style of finish than is afforded by the development papers; it may, for instance, be "finished" with equal ease with the bright gloss or enamel surface so prized by many, or perfectly "matt" as more closely befits the modern fashion. This is only possible to a limited extent with most of the development papers with which we are familiar, owing to the difference in the proportions and quality of the gelatine employed in forming the respective films.

But, in order to secure the utmost variety of result, it is necessary for the operator to prepare the emulsion himself, and it is our desire to show how this can be done with the least possible trouble, and how, starting from one stock or "standard" preparation, any variety may be made to suit special purposes. The preparation of printing-out gelatino-chloride emulsion, we may commence by premising, will be found a very much simpler process than is the case with a bromide emulsion for negative purposes. In the first place, its lower degree of rapidity renders unnecessary the strict precautions as to light that must prevail in the other case, for the emulsion may be made and applied to its support by gas or candle light, or even by the daylight of an ordinary room. It is well, however, in the latter case, to allow it to be exposed to white light for as brief a period as possible.

Again, in connexion with the sensitising, or preparation of the emulsion, there is no need for digestion or "cooking," as it is called, beyond the simple retention of the gelatine in the liquid state for ten minutes or a quarter of an hour after the addition of the silver, which is easily managed by merely immersing the bottle in another vessel of hot water. There is, moreover, no necessity for washing the solidified emulsion to remove the soluble salt, as must be done with a quick bromide emulsion; in fact, to bring about the removal of the excess of silver nitrate and other matter would rob the emulsion of its chief feature, namely, its power of giving a red image, capable of being toned with gold in precisely the same manner as albumenised paper.

Of course, it will be understood that the presence of these soluble matters—but especially the silver nitrate—tends to the spontaneous discolouration of both the emulsion and the film after coating and drying; but our readers need not be deterred by any fear of that sort from using the process. Emulsion will keep for a long time without any change whatever; but even when it has acquired a decidedly yellow tint, which is, of course, imparted to the film on paper, this disappears entirely in the operation of toning and fixing, leaving the whites of the prints perfectly pure and free from the slightest degradation. It is only when the yellowing is due to very great age, or to a faulty emulsion to start with, that the colour becomes permanent.

As a matter of fact, the keeping qualities of the emulsion are provided for by the addition of citric acid, and in some cases of a salt of citric acid, the presence of either of which, in conjunction with free nitrate of silver, exerts also a considerable influence on the colour of the print as it comes from the printing frame, or before toning. Other acids may be employed, or their salts, such as tartaric, oxalic, or the tartrates and oxalates, but citric is the most generally convenient. Its only fault lies in the fact that the citrates are mostly very deliquescent, a property which renders them undesirable adjuncts to a sensitive film, on account of the tendency to attract moisture. An emulsion containing any considerable quantity of an alkaline citrate would, if spread upon glass, produce a film which, after a short exposure to a moderately moist atmosphere, would become covered with a

dewy film, caused by the hygroscopic attraction of the citrate, and such a film would be practically useless, unless newly coated and well protected from outside influences. When paper is the support, however, the case is different; the film remains apparently dry, every moisture absorbed by the citrate being quickly abstracted or partially so by the paper support, with the result that, though the tissue may become limp, it retains its apparent dryness.

The proportionate excess of silver nitrate and of citric acid or citrates must be regulated in accordance with the tone and character of the image required, and by the length of time the preparation is expected to keep. The larger the excess of silver, the more sensitive will be the preparation, and the redder the colour of the untoned image, but the shorter will be the time the emulsion or dried film will keep. But the want of keeping may be neutralised by the use of citric acid, which, in addition to its preservative action, conduces to the formation of a strong and vigorous image, and, unless used in too large proportion, it also increases the sensitiveness. But its use must be kept within certain limits, on account not only of the hygroscopic qualities of itself and its compounds, but also because in time it causes the emulsion to clot and become insoluble, and also tends greatly to neutralise the toning action of the gold, especially if the emulsion or film have been long prepared.

In order to avoid the insolubilising influence of a large excess of citric or other acid, the corresponding alkaline salts are sometimes used to partially replace the free acid, while still securing the benefits of the organic reaction, which tends, as mentioned above, to the production of a strong and vigorous image. The retarding action upon the toning is greatly reduced when the salts are used instead of free acid; but the keeping qualities of the former are far less than the latter, which should be taken into account in connexion with the keeping of the paper. The alkaline citrates, moreover, render the emulsion more hygroscopic than is the case when citric acid alone is used, and it is chiefly owing to this inconvenient feature that other acids and their salts have been used in preference to citric. Tartaric and oxalic acids and their salts confer none of the undesirable attraction for moisture upon the emulsion, and, when very warm images are not required, produce very good results; but the tones obtainable in both cases are inferior in their range, as well, perhaps, as in their character, to those given with citric acid, and the variety of gradation obtainable by modifying the proportions is again less than with that acid.

There is one serious drawback to the use of oxalic acid or the oxalates, namely, the reducing action that those substances exercise on the chloride of gold of the toning bath. Not only does this cause a slow and unsatisfactory toning, but it brings about the precipitation of the unused gold in the solution in the form of a black powder, that attaches itself either to the prints or to the toning dish. Of course the obvious way out of the difficulty is to wash the prints sufficiently well, before placing them in the toning bath, to remove all the soluble adhering matter; but unfortunately it is not so easy to altogether get rid of the oxalic acid in this manner. In whatever form used, it enters more or less into combination with the silver in sensitising, forming oxalate of silver in the emulsion; and this, being practically insoluble, is not removed by washing, but remains to exert its baneful influence on the toning bath. The difficulty, once recognised, is easily met; it is only necessary, after removing at least the bulk of the soluble matter, to immerse the prints in a not too strong solution of common salt for five or ten minutes, by which means any unaltered oxalate of silver is converted into chloride, with formation of soluble oxalate of sodium, and this is removable by further washing. The treatment with salt slightly alters the colour of the prints both before and after fixing, but not to a very great extent; it is, however, desirable to use the salt bath as weak as possible, and to insure complete conversion of the oxalate by a sufficiently prolonged immersion.

Turning from the chemical to the physical characteristics of gelatino-chloride films, very much depends upon the thickness of the film as well as on the proportions in which the gelatine and the chloride of silver are mixed. In the first place, the gradations of the print—that is, the power of securing a complete range of tints, from the most delicate high lights to the deep shadows, without heaviness and want of transparency in the latter—depends upon the layer of silver chloride being sufficiently attenuated to retain its translucency for a considerable time during the process of reduction, and thus allow the light reflected from the white paper support to reach the eye after penetrating the deepest shadows, while at the same time it must possess sufficient of the organic element to cause it to present "body" combined with the transparency. This can only be secured by using a large proportion of gelatine to a very small proportion of the properly adjusted organic chloride compound of silver. If the silver be present in too large proportion, so intense is the colouration produced by light, that long before the high lights, or perhaps even half-tones, of an ordinary negative have been penetrated, the shadows will have become a black, opaque mass, void of all detail or transparency. The great difficulty is to persuade beginners in this class of work to use an emulsion of a sufficient degree of attenuation. The film which will give a bright and vigorous picture on paper or opal will be scarcely visible before exposure if spread upon clear glass, and will present an almost indiscernible picture if viewed by transmitted light after exposure—though laid upon a sheet of white paper it will present the necessary vigour and contrast.

By varying *slightly* the proportions of gelatine and silver, as well as by varying the proportion of organic salt present in the sensitive compound, the paper can be made to suit thin, medium, or dense negatives, as may be desired. This is frequently of great assistance in getting the best quality of print from a slightly defective negative, as no doubt many of our readers have discovered when using some kinds of gelatino-chloride paper. We have, for instance, in the earlier days of that preparation secured prints from negatives too hopelessly thin to give any result at all with albumen paper; but more recently the tendency seems to be to make the paper suit rather dense images.

As regards the question of "matt" or enamel surface, so far as the preparation of the emulsion is concerned this depends entirely upon the thickness of the gelatine, the glossy enamel surface requiring from sixty to a hundred grains to the ounce, while for "matt" purposes it may be reduced to eighteen grains or less. The result may also be modified by special treatment after printing.

In another article we shall give formulæ and working instructions for the preparation of a chloride emulsion, which, with slight modifications, will be found of universal application.

It is with regret that we learn that trade with photographers, so far as portraiture is concerned, has not improved to the extent they had hoped it would with the advent of finer weather. During the five or six months of winter the depression of business was attributed to this cause, and it was fully expected that at its termination there would

be a rapid influx of trade. Unfortunately, however, this expectation has not been realised. It is frequently said that photographers as a body, like farmers, are always complaining. We fear, however, it is not without good reason at the present time. On inquiring amongst the wholesale houses and manufacturers, we learn that they are tolerably busy, though they say the chief of the trade is with amateurs and those who supply them with material. All express the opinion that the business in portraiture is now very bad, and that several houses have been compelled to reduce their expenses. However, we hope business will now take a favourable turn.

How is this unusual and pretty general depression to be accounted for? One gentleman, when speaking on the subject, suggested that the general public were getting satiated with photographs. He remarked that there were, at the present time, few families that did not have one or more amateurs amongst its members whose work, good, bad, or indifferent, was always before them; hence they became nauseated with photography generally. It is to be hoped that our friend took an exceedingly pessimist view of the situation.

THE question is often mooted as to whether amateurs injure the photographic profession. If the above idea be correct, they do very seriously, though indirectly. But there is litttle question they do so directly when they touch portraiture. It is true that their negatives are usually inferior, but after they have been retouched by professionals, and carefully printed by them, the results are often very passable with this advantage; the expression is frequently more agreeable, and the pictures are generally associated with family surroundings, which is not the case with portraits taken in the studio. When an amateur's work is admired by his friends, he naturally feels a little proud, and often distributes it broadcast. Whether he makes a charge for it or not is quite beside the question, for, if his work takes —as it frequently does—the place of that which would otherwise be done by a professional, the latter must be the sufferer. It is the opinion of many that amateur photography is but a temporary fashionable craze, as many other things have been before which, in a short time, die out, to be supplanted by something else.

WHAT a contrast is there between painters and photographers, past and present. Some thirty or forty years ago the latter obtained their poses from the former, and every photographer was provided with the orthodox pillar and curtain. At the present time painters appear to copy the poses of photographers—as witness the majority of portraits now on view in the Royal Academy. Several of these were actually painted almost entirely from photographs, with only one or two sittings from the originals, though the limners would not like to admit it.

PHOTOGRAPHERS on the look-out for novelties might do worse than give some attention to xylonite. We recently had the opportunity of seeing some excellent pictures on this material by the carbon process. Those who remember the Eburneum portraits by the late Mr. Burgess of Norwich have, no doubt, often wondered why similar pictures have not since been produced, and, if they have been, why they should not have become popular? Mr. Burgess's pictures were really collodion transfers on a compound of gelatine and zinc oxide in imitation of ivory. We say imitation of ivory, but, as a matter of fact, it was very unlike the natural ivory, inasmuch as it was lacking its peculiar grain. Still the pictures were very beautiful. Xylonite, or its analogue celluloid, has been used for positive prints by the bromide process, but by this method the colours are limited. But, as a matter of course, by the carbon process any colour can be obtained. The particular xylonite on which the prints referred to were made was a very close imitation of real ivory, inasmuch as it possessed that characteristic grain of the elephant tusk with which we are all so familiar.

MOST illustrated journals have availed themselves of photography in one way or another, either by utilising photographs to engrave from, or by making photo-engraved blocks from original negatives, as witness the *Illustrated London News*, the *Graphic*, and similar works. One would have surmised that the class of periodicals that would have been the first to adopt photography for their illustrations would be the ladies' fashion journals. Not so, however, as their illustrations are of the hard, crude, inartistic, and ungraceful type that prevailed half a century back in cheap publications. Surely phototypic blocks from living models would be infinitely better for such works than the coarse, lay figure kind of subjects at present in use. Cost of production is possibly a consideration.

FROM time to time the subject of auxiliary or supplementary exposure comes to the fore. If it is of any value, surely it should be made available now in supplementing the exposure of many instantaneous pictures. Possibly, however, full advantage of this is already unwittingly taken by the diffused light existing in the camera, or reflected from its sides when wide angle lenses are used.

THE annual report of the Comptroller-General of Patents has just been issued, and contains many matters of interest. It shows that the number of applications for patents is increasing annually. The number of applications under the provisions of the International Convention for the protection of industrial property amounted to to two hundred and seven. The number of readers at the Patent Office Library during the year was nearly one hundred thousand. Something over six hundred designs were refused registration on account of their similarity to others previously registered. The number of applications for trade marks registration were, however, over a thousand less than last year. Photography has, during the past few years, done much in swelling the number of patents applied for, though very many of them do not pass beyond the provisional protection stage, while many of those completed would, without doubt, be invalidated if contested, unless indeed they were considerably amended.

ON THINGS IN GENERAL.

THERE are few occurrences that hurt one's feelings, and produce a tendency to the employment of "early English" to so great an extent as does the smashing of a negative by other hands than one's own. It is, too, always a specially valued one that goes; hence every one will sympathise with the loss experienced and graphically described by Mr. Martin in the columns of this journal a month ago. But, while my own experience in connexion with postal parcels has by no means been an unchequered one, and I am, in consequence, in no way disposed to hold a brief for the postal authorities, I feel bound, nevertheless, to look at the other side of the question. It has been pointed out in these columns by you, Mr. Editor, some time since, that these authorities have stated that they would not give compensation for damage done to negatives, unless the parcel showed external marks of violence. Mr. Martin must be aware that in the ranks of photographers there are, as in other professions, dishonest men, and no doubt the Post Office has been subjected to many claims which they had every reason to believe dishonest in connexion with such articles as photographic negatives; hence, the rule he quotes. A parcel arrives at its destination, to outward appearance just as it was when dispatched; it is discovered to contain a broken negative. The Office has had claims for broken negatives which it has reason to believe were so broken when packed, and it prefers to treat *all* broken negatives brought under its notice as having been damaged by the sender before or during packing, unless the parcel bears marks of pressure or a blow. Any railway parcel official can give numberless instances of this kind of knavery, and the honest have to suffer for the dishonest. It is very hard, and in some cases a great injustice is done; but, as a matter of fact, when a properly packed negative is broken in transit it is rare that there are no external signs of damage. Moral—When a parcel of negatives is received, examine carefully before opening, and, if it appears to have been improperly treated, take it to the Office, point out the evidence, and have the parcel opened in the presence of the officials.

How does it happen that, with so many papers of sterling merit

read at the Camera Club Conference, Mr. Pennell's remarkable effusion was permitted to be read? It is simply a farrago of nonsense. Let us take one special example. Holding the opinion that "a work of art is the expression of one man's individual impression of an object,' he gets a photograph, has it enlarged, makes a pen-and-ink drawing upon the enlargement, and then has the photograph washed away! This is art, indeed, but not fine art; it is the dodge of a trickster. But that is not all; to make sure, he has produced his "individual impression of the object he has never seen," he takes his precious handiwork down to the cathedral and tears it up, because the photographer had eyes in his stomach (he, the photographer, presumably was a cherub, and could not sit down and photograph from that standpoint). The photograph did not contain certain distant turrets and towers that Mr. Pennell could see with the unaided eye. What is there to find fault with here except the choice of standpoint? The perspective of the lines of a building is mathematics; the application of art in the production of a beautiful drawing of such objects is found not in falsifying these mathematically correct linear outlines, but the *chiaroscuro* and the treatment of the atmospheric perspective.

This question of linear perspective naturally leads the mind to lenses and the old fallacies about the relative "truth" of long and short-focus lenses. It ought not to need, but it does need, and with continued reiteration, stating that from a given standpoint a given object is represented in absolutely identical fashion by any (rectilinear type) lenses, whether narrow or wide angle, short or long focus. Of course the size of the object in the negative would be governed by the focus, but, if all the negatives taken by a multitude of rectilinear lenses of all kinds and foci were copied to a uniform size, every line on one photograph would exactly overlap every corresponding line on each of the rest. At the Stereoscopic Club (at a meeting held early last month) the Chairman, Mr. W. J. Sunliffe, referred to some remarks of Mr. W. J. Chadwick which contained the truisms I have been repeating, and under the impression that, clearly as Mr. Chadwick had stated them, their exact bearing might not be appreciated, had prepared an ingenious arrangement to prove their truth. He "had constructed some apparatus with which to ocularly demonstrate the facts, which consisted in two wooden boxes about twelve inches square by twenty-eight inches long. In one end of each was a small sight-hole and opal glass covering to the posterior ends. A transparency on glass was fixed inside each box. The members, without being informed of the respective sizes or positions of these pictures, were invited to inspect them. The unanimous opinion was that they were of equal size, or, at any rate, it would only be *guessing* to say which was largest or smallest; but, when the posterior opal coverings were removed, and the pictures revealed, one was found to be four inches diameter, fixed at twelve inches from the sight-hole, and the other eight inches diameter, arranged twenty-four inches from the point of sight. Much interest was shown in the manifestations, and the Chairman presented the apparatus to the Club."

A world of talk, of misapprehension, and of severe language would be saved if a duplicate of this apparatus were to be kept by photographic societies generally, to exhibit to the ever-present demonstrator of the falsity of photographic representations.

It is just worthy of note that the fact of the amount of light passing through a number of translucent screens superposed in regularly increasing number, being represented by a logarithmic series, was first stated (ten or fifteen years ago, if my memory serves me) in the columns of this JOURNAL by a gentleman well known in his day—Mr. Johnson, one of the founders of the Autotype Company. By the bye, the theory that the pigment tissue adheres to the support by atmospheric pressure dies hard, for I saw it was brought up again at a recent meeting of a photographic society reported in these columns.

FREE LANCE.

THE OPTICS OF THE LANTERN.

[A Communication to the Camera Club.]

FROM the canal boat to the White House is a transition not any more pronounced than is that of the lantern of half a century ago to that of the present period. *Then* a wonderful magical toy; now a philosophical instrument replete with huge possibilities of education, art, and amusement.

Some time since, Mr. Pringle discoursed before this Club of the lantern: its illuminants, mechanics, and applications. The duty assigned to me to-night is one of much narrower scope—its optics, and to this theme I shall confine myself as strictly as possible. Lantern optics take cognisance of the light, from its genesis at the lime or other radiator, to its ultimate destiny or termination on the screen, these termini constituting the alpha and omega, or, in optical parlance, the conjugates of such optical system as may intervene.

I shall assume the existence of the light which, for the sake of simplicity, may be that emitted from incandescent lime. Now, as its rays radiate in every direction, the first consideration is the collecting as many of these as possible, and causing them to travel in just the direction we desire. If only a few of them, in other words, a narrow angle of illumination, be our requirement, the problem of their forward transmission is one of extreme simplicity; but if, on the other hand, the greatest possible angle of illumination be the desideratum (and of course this is the case), then does the problem become slightly more involved. We cannot here institute a comparison between the methods adopted by lighthouse engineers in utilising all their light and those demanded by the lantern, for in the latter case it is to be employed in the formation of an optical image, whereas in the former it is merely projected into space, and both direct light from the radiant, together with that reflected from either a holophotal or a parabolic reflector, are available. But, while we cannot utilise so much of the light as in the lighthouse, we can use it to much greater advantage for our special purpose.

We now inquire the greatest angle of light possible to be got advantageously through a condensing system, for this lies at the root of the whole matter, and in doing so have to ascertain how near can the light be approximated to the first surface with safety. From innumerable trials with lenses of a thickness not too great and set with such a degree of looseness in the brass work as not to be cell-bound, I find that two inches may be considered as quite safe. When condensers crack it is usually the result of their being too tightly burnished in their cells, brought too suddenly under the influence of the heat of the radiant, or being subjected to currents of cold air. I assume, of course, the perfect annealing of the glass of which they are formed. When this last point is dubious, it may be well to adopt the system employed by the Scotchwomen of a former period, who, when laying in a supply of tumblers intended for whisky toddy, invariably placed them in cold water, which was slowly brought to a boil, and then allowed to cool slowly, by which treatment immunity from subsequent breakage was believed to be insured.

At this stage we proceed to analyse the functions of a lantern condenser, so-called. We find that these are (1st) the collecting, and (2nd) the condensing of the light. Of these the former is much the more important. What we wish done is the collection of so many rays as to form a large angle, and their projection forward in as near an approach to parallelism as possible. Absolute parallelism cannot be obtained unless the flame were a point, instead of being as it is a a disc or patch having sensible dimensions of, say, a quarter of an inch upwards.

Some of the cheap French condensers (of which I would not speak disparagingly, for they render excellent service and are marvels at their price) transmit an angle of light of from 40° to 50°, and a higher class of London-made articles claim, I understand, to embrace 60°. But, by a slightly increased expenditure of optical means, it is possible to increase this angle to 95°, which, I need scarcely observe, somewhat more than doubles the intensity of the illumination. Let us see in what way this is to be accomplished.

Kepler's law, as you all know, is that the focus of a plano-convex lens equals the diameter of the sphere of convexity. This is, of course, for parallel rays, and it is those we are dealing with at present; and we are also dealing with plano-convex lenses, these being the best for condensers, subject perhaps to a slight hollowing of the flat surface, of which I shall soon speak. Well, it is very evident that, if we desire a large angle of light, the single Kepler won't do much for us, unless, indeed, it was made enormously thick—even hemispherical—when we would encounter two evils: first, the enormous spherical aberration consequent upon transmitting light through a bull's-eye; and, secondly, the proximity of the said bull's-eye to the radiant, which not only emits light, but heat—a heat which would quickly cause our bull's-eye to see stars and stripes. How, then, is it to be accomplished? By borrowing the ideas of the microscopist. Did any of you ever hear of a microscopic objective of even the most distant pretensions to wide angle being composed of one lens? Can you conceive of such a thing? Well, no more is it possible in our collecting system, which is analogous. We must have, at least, two lenses for our purpose. One of them—that nearest to the light—must be 4½ inches in diameter in order to catch up the 95° of which I

spoke. But this cannot render the rays parallel; still, it transmits them to its colleague under such circumstances that *it* does so, the two lenses thus doing what no one singly could effect.

[The lecturer here submitted drawings made to scale, and transferred them to the blackboard.]

The first lens of the collecting system is comparatively thin, which, apart from any optical advantage, is useful in this respect, that it has to bear the first impact of the heat; and, as you can readily understand, this lessens the liability to fracture. It is only 16 mm. ($\frac{5}{8}$ inch) thick in the centre, is 8 to 9 inches focus, and is formed by preference of flint glass. The second element is 5 inches in diameter, and, the radius of curvature being rather shorter, this, combined with its greater diameter, causes it to be proportionally thicker, being 28 mm. ($1\frac{1}{16}$ inch) at its centre, and 7 inches focus. This lens, too, should be made of colourless glass. The loss of light from absorption is but little, and I anticipate an objection that might be suggested as to that from oblique incidence. This is really so little as to be unworthy of notice, but it carries with it its compensation; for it occurs most at the thinnest portions of the lens, where there is the least absorption, and thus aids in ensuring uniformity of illumination throughout the entire beam. But it may be reduced by rendering the first surface concave instead of plane, and retaining the balance of power by grinding the back surface on a tool of shorter radius. I at one time was madly in love with the meniscus form of lens for this purpose, but incited thereto by the experience of Dr. H. Morton, and after many trials with lenses both plano and meniscus, and formed of different kinds of glass, from St. Gobain's crown to English flint, I arrived at the conclusion that the plane surface answered every purpose in an effective manner.

If the radiant were infinitesimally small, a parallel beam of a large collected angle could be transmitted with a singular degree of perfection for several yards. With a triple collecting system (that worked out by Dr. Charles Cresson, in which the first lens is a plano-convex $4\frac{1}{2}$ inches radius; the second a meniscus, respectively 30 inches and 6 inches; and the third a crossed lens of 52 inches and $8\frac{3}{4}$ inches radii), I projected across my bedroom a very tiny gaslight on to the dial of a French clock, which was thus illuminated a whole season. But such extreme nicety is not required in the practical working of the optical lantern, as, owing to the magnitude of the flame, two elements answer every purpose. The two that I have described should be mounted together as closely as possible, fixed permanently in the lantern, and must always be used together, and not separate. Until a compound collecting system of this nature is tried, one can form no idea of the capabilities of the lantern for certain scientific purposes, such as polarising.

[Here the speaker showed diagrams illustrating the superiority of the system advocated for the purpose mentioned.]

Let us now direct our attention to the *condensing* element of this optical system. We have seen that the two elements of the collecting portion must be fixed and inseparable. This, on the contrary, should be variable, and selected to suit the special end in view. Its form may be plano-convex, more especially if for use with long-focus objectives; but if the latter is to be short-focus, and the condenser of crown glass, then is the crossed form, in which the curves are as one to six, or two to thirteen, open to be preferred.

But, dealing as we now are with immergent parallel rays, it were folly to imagine that a condenser properly adapted for an objective of 12 inches focus will answer equally well for one of 6 inches. Bearing in mind Kepler's law, which, however, applies only to one kind of glass and must not be held as applicable equally to the flint glasses, especially those of the denser sort procurable at the present day, I would say that for long-projection lenses of 12 to 15-inch focus a plano-convex having a radius of curvature of 7 inches will serve every purpose; for an objective of 8 to 10 inches the radius may be $4\frac{1}{2}$ inches, while, for one of 6 to 8 inches, 4 inches will suffice. But, as I have said, this latter may with advantage be a crossed lens, in which case the radius of the more convex side will be longer.

One word more before dismissing the condensers. Treat them with the most scrupulous care, both in heating and cooling, and avoid allowing a current of cold air to play upon them during the cooling. With this precaution, superadded to having them set loosely in their cells, a fracture will rarely, if ever, occur.

Turn we now to the objective—the image-former. First, its diameter, especially that of its posterior combination, must be sufficiently large to take in not merely the whole of the cone of rays emerging from the condenser, but by preference a little more. This permits of the utilisation of a small portion of light radiated from the substance of the image itself.

A large back lens also permits it to be brought nearer to the picture; and this is advantageous, especially with the condensers of the common order, as it acts in condensing the scattered rays from those of this class, enabling also the light to be approached nearer to the condenser. The lens tube should be longer than in the case of its application to photography, for, unlike this, all it is required to cover is the very limited area comprised in a plate $3\frac{1}{4}$ inches square, minus the portion occupied by the mat. For the highest class of objective, it suffices that it be achromatic in the sense different from actinic, for, so long as the visual image is perfect, it matters not what becomes of the violet or chemical rays, or what relation they have to the luminous ones.

It is in the construction of a lantern objective of short focus that the skill of the optician is taxed, as it has to cover sharply to the margin with its full aperture, and under circumstances in which the slightest inequality in the definition is instantly detected. To a cultivated eye it is extremely unpleasant to see an image quite sharp in the centre of the disc, and falling off rapidly towards the margin, or by racking in securing marginal sharpness at the expense of the centre. Of the various forms of objective to be met with in commerce, at any rate for those of medium short focus, I incline to give preference to that introduced ten or eleven years ago by J. H. Dallmeyer, judging by the performance of one of this class in my possession, made by Newton & Co. In it the elements of the back lens are separated to an extent which would prove hostile to sharpness in the case of one employed in producing a photographic image in the camera. If photographic lenses are to be employed in the lantern, those of the *carte-de-visite* (Petzval form), that is, those corrected for flatness of field, even to the extent of there being slight astigmatism, are advantageous. One of the most satisfactory *short*-focus objectives I ever used had a back lens $2\frac{1}{4}$ inches in diameter, the front lens being $1\frac{3}{4}$ inches. I gave a very great excess of negative spherical aberration to the back lens, and the front was a nearly plano-convex achromatic of short focus. This gave a field which was singularly flat, the definition at the margin quite equalling that in the centre; but, owing to the excess of aberration spoken of, the image did not quite equal in sharpness that obtained by the ordinary *carte-de-visite* lens with rounder field. Still, spectators seated at a distance of 5 yards from the screen were unable readily to appreciate that the definition was imperfect, for, as you know, even the crude brush work of the scene-painter seems sharp when viewed from a distance.

In objectives of long focus there does not appear to be the same tax on the skill of the optician. Poor, indeed, must be the lens of 10, 12, or 14 inches focus that will not cover sharply and uniformly a plate 3 inches in dimensions.

J. Traill Taylor.

Discussion.

Commander Gladstone: Mr. Taylor said that in the ordinary commercial lanterns the whole of the back lens is not used. I found in using the ordinary green glass condensers that even taking the lime three inches away you might cut off half an inch of the condenser all round, so that a four-inch condenser becomes practically a three-inch. I think the principal point in the condenser is the glass of which it is made. We don't quite realise the amount of light which is lost in passing through the green glass condenser in the ordinary lantern; there is also degradation of tone, for the colour of the glass considerably interferes with the colour of the slide, especially if it has anything of a brown or mauve colour. Mr. Taylor says that the condenser he described takes in an angle of ninety-five degrees; if the back lens were four-and-a-half inches and the lime two inches away, that would be so. But I also understood him to say that the front lens was five inches in diameter, and, if so, it seems to me that the effective angle is not ninety-five degrees, because, taking the opening of the slide to be three inches, the whole of the light collected by the back lens does not pass through it, it being in close contact with the condenser. I have no doubt that the system he has described is the proper one; you want first a collecting system to get parallel rays, and then to place in front of it a lens that you can adjust the focus of, and so adjust the cone for whatever lens you want to use.

Mr. Elder: I might just point out one or two things. First, a method used by Professor Boys for saving his condensers from damage by heat. He places a sheet of plain glass against the condenser at a slight angle. Every one knows how sensitive the ear is to the crack of glass under heat. When the lime gets pitted, or anything else goes wrong, this piece of glass cracks, he hears it, attends to the lantern, and so saves the condenser. The disadvantage of the plan is that it gives another reflection, and so wastes light. It can be used, unless very large work is being done, ample light passing through the glass for ordinary purposes. I was very much interested in what Mr. Taylor said about the position of the focus of the cone of rays coming from the condenser. But it seems to me there is a difference in practice in using the lantern and using the microscope; the same laws must apply, and yet there does seem to be difference. My friends who use the microscope habitually say that to get the best effect they find it necessary to focus the radiant with the condenser on the object. One would, therefore, presume that to get the best effect on the screen it would be necessary to focus it on the slide, and not

in the centre of the projecting system. It struck me whether it might not be possible to alter the whole system of projection by using a moderately large radiant brought to a focus on the slide. No doubt, if it were possible, the best system would be to use no condenser at all, but to put a large radiant, in fact, a sheet of light, close to the slide. Light is always lost in using condensers, and it is only because it is impossible to do this that we are compelled to use them. The next best thing seems to me to be to focus the radiant on the slide, thus making the slide the luminous object or origin of light as far as the projecting system is concerned.

Commander Gladstone: I have cracked a good many condensers, and I tried to see if I could not get something to interpose between them and the light. I tried all kinds of glass, but never found a piece that would stand the heat for ten minutes. I was using a blow-through jet, which I turned on till it was hissing, and left it there. If you attend to your jet, and don't let the lime get pitted, there is no danger at all. I tried chemical glass, Bohemian flask bottoms, unsuccessfully. At last I got a Sugg's lamp chimney, sixteen inches long and five inches diameter, used for 500 candle-power light; I had it cut into four, and put one piece over the whole jet, and I have never cracked it yet.

Mr. Elder: Professor Boys told me he found that his plan acted well, though he often cracked the piece of glass.

Mr. Kapteyn: There is a rule that you must not let the sun shine on the lens. Is the principal reason of this because the glass of the lens is affected by the sunlight coming right into it? There are, of course, other reasons why, when taking a photograph, the direct sunlight should not be admitted.

Mr. Traill Taylor: If the three-inch slide is close to a five-inch condenser there is a loss of light, but I have always taught that the slide ought to be movable, so that it can be brought to the point where the cone of rays is of the same diameter as the slide. The slide holder ought to be really the movable part of the lantern in conjunction with the condensing lens, and, if it were so, even the whole power of the light could be made to pass even through a one-inch picture. The degradation of tone by green glass is more than any one has any conception of. But there is another degradation of tone, and that is due to the printing of transparencies upon strongly coloured green glass, and covering them with another piece of the same colour. Most of them are exceedingly offensive in that way. Lay one on white paper and you will see the degradation. Many years ago I had some transparencies made on French crystal glass, the kind which was used for covering Daguerreotypes, and that, even when held edgeways, showed no colour. I was lately talking to Mr. Newton, sen., who pointed out that he had never lost a condenser since he had interposed a piece of slightly curved glass between the light and the condenser. The sun should not be allowed to fall on a photographic lens, because it sets up a variety of reflections which degrade the image, and it also degrades the glass itself. How that applies to the more recently introduced glass I am unable to say. Those who formerly used photographic lenses for solar enlargements complained that after a time they got slower, no doubt from that cause. It could not be from the effect of the light on the Canada balsam, for it bleaches that.

Mr. Little: A member of a photographic firm in Boston told me that they imported in one year 8000*l.* worth of French crystal glass for lantern slides alone. That may be a reason why the American lantern is ahead of the English lanterns.

Mr. Traill Taylor: The American commercial lanterns are bought in this country. What I had in my mind's eye were those made many years ago by Dr. Cresson and Professor Henry Morton, of Philadelphia. There were many exceedingly clever scientists there who devoted much attention to the lantern, men of the Zentmayer type, gentlemen connected with the Franklin Institution. When Professor Tyndall was lecturing over there he was "flabbergasted" by the great excellence of the lantern appliances, and saw mono-chromatic polarised light which he had never seen before. The price of the lenses I have described ought not to be great.

CAMERA CLUB CONFERENCE.

PHOTOGRAPHY AND ILLUSTRATED JOURNALISM.

By Major J. Fortune Nott.

One of the most noticeable characteristics of the past decade has been the constantly increasing demand for illustrations that pictorially record events that have a social or historical importance, a fact exemplified by the increasing number of illustrated newspapers which are thriving in our midst, the increasing frequency of illustrations in papers which formerly did not deem them necessary, and, further, in the profuse way in which our current literature in book or magazine form has to be illustrated to meet popular taste. The extent also to which pictorial art is used for advertising purposes is a sign of the times which, in a minor degree, exhibits a conformity to public requirements upon the part of those whose interest it is to study such matters, and is, therefore, to a certain extent, typical. Undoubtedly, the popular demand of the present age is to have scenes, whereat matters of general interest have been enacted, represented pictorially, with short, explanatory paragraphs, rather than in the unadorned, lengthy descriptive articles such as once ruled supreme in journalism.

It would occupy far too long an encroachment upon your time if I were to attempt to show how public taste has been led in this respect, or to detail certain interesting facts in connexion with this highly important subject. Its importance can easily be understood by remembering that many records of the past ages, to which we are considerably indebted for proofs of certain facts in connexion with the history of the world or the progress of our civilisation, are those that have been represented pictorially, and this at a period when art in any form was in its earliest rudimentary condition. Facts are learnt from the Egyptian carvings, from the rude designs of the primitive Indians, or from the quaint representations woven into the Bayeux tapestry, and other well-known pictorial sources of information which would, otherwise have been lost to the world. It may certainly be contended that these records were created before the era of the printing-press, or that otherwise they would not possess such a unique historical value. This contention, on investigation, can hardly be admitted; and, moreover, with respect to the present age it must be remembered that life is too short to contend with the avalanche of literature with which that same press is now deluging the world; hence facts, that hereafter may develop importance, are apt to be swept away from human view beneath the flood of printed matter in which they soon become submerged. To such a fate pictorial records are not exposed to anything like the same extent, and when they can be made to serve the purpose they are easier to consult.

At any rate, it has to be admitted that the retaining, keeping up to date, and handing on the nation's history, not only in its grander phases, but in its humbler domestic life, are inherent obligations we owe to ourselves and to posterity. Now, the part photography can take in this work will undoubtedly soon be one of its most appreciated powers, and elevate it into a position in the art world, where it can be made to stand without a rival. Hitherto, the work that has been done in this connexion has largely been in the hands of artists who have learnt to use the pencil or the brush in some of the various schools of art. Hence, to a great extent, the work has had but little value when regarded from any other point of view than the artistic. Even the most æsthetic portion of the public, who have a keen appreciation of all artistic work, must, in common with that portion which possesses less keen susceptibilities to æsthetic pleasure, prefer, in work of the class to which we are now referring, accuracy of detail, and exactness to facts rather than "pictures" wherein essential features have been sacrificed in order to conform to certain rules which dominate art. It is evident that a school of artists exists who are so permeated with the idea that art is opposed to accuracy, and that nature should not be faithfully represented, but suggested, as to refuse to believe that the public can ever require the ugliness of truth in place of art with its beauties, and so have refused to supply it, even where it was imperatively demanded. This was especially noticeable in the era before photography had made the rapid advances which it has lately done. The rubbish that has been palmed off by artists as truthful pictorial representations, which have formed the illustrations of many of our books and journals, is appalling when seen by the light shed by accurate knowledge. On this subject, in connexion with the representations of animals, I dare not trust myself to speak, for I could enlarge for hours upon the harm that these so-called artists have wrought by their absurd libels on the animal world, which have engendered narrowness of mind, cruelty, superstition and other evils. It should long ago have been made a crime to pictorially libel dumb animals, whether wild or tame. In such an event some artists of repute would have been great sufferers.

But to return to our subject, which we purposely have confined to illustrated journalism. It must be patent to those who give the matter any attention that the public demand is for truth rather than for work which only shows this or that artist's treatment of the various scenes, highly artistic though they may be. For instance, they do not want to see elephant races where the animals are represented as flying over hurdles in the picturesque manner of horses, which an illustrated paper, some time ago, seriously asked us to believe; neither do they want African scenes with tigers as conspicuous ornaments; nor do they care about having regiments of their highly paid army portrayed as wasting ammunition by firing at long ranges with rifle sights unadjusted; neither can they be brought to understand that now and again the sun rises in the west and sets in the east, although these strange sights were sketched upon the spot by "our special artist." When the inaccuracy of minor details can be detected, a doubt respecting the truth of the whole is unavoidable, consequently accuracy in every particular is essential. A picture then becomes a record that speaks for itself.

With respect to accuracy in every point, the photographer can, if he possesses the requisite skill, make his work excel that of an artist, who

has to rely upon his hasty sketch for outline, and, in situations of short duration, upon his memory for detail. But this class of work demands care, attention, quick perception, clear judgment, technical knowledge, and training—in a word, a concentration of energy upon this branch of photography. No results worthy of the art can result from any haphazard methods. To do it properly it must be made a specialism. It is, however, a field for photographers wherein they can make their art a recognised power, and enhance the value of photography—which, I take it, is an object we all have in view.

You will, therefore, perhaps, pardon me if I now enter more fully into the technical requirements and methods of procedure which are essential to the proper representation of scenes in a manner suitable for the purposes of reproduction in the pages of an illustrated journal, which is the only way in which such work can be given its widest circulation, and be of proportionate public benefit.

The camera *par excellence* for this class of work is, of course, the one now known as the hand camera, but many forms of hand cameras are utterly unsuitable. The great *desideratum* is simplicity of construction. The camera for the purpose should be light in weight, and its working manipulation be confined to two simple operations—setting the shutter before exposure, and removal of the exposed plate or film afterwards. There should not exist any complicated mechanism liable to get out of order at times, or that cannot stand a certain amount of rough usage. To do the work we are now considering it is absolutely necessary for the faculties to be concentrated upon the scenes themselves, and this is hardly possible if the manipulation of the camera at crucial moments calls for any attention, such as would be required in one where a plate-holder had to be inserted, a shutter drawn, focus adjusted, or the camera has to be treated as though it were a naughty girl which requires to be shaken before she will behave, which in one camera I lately possessed was absolutely necessary. The shutter ought to work slowly, and under ordinary circumstances be so used, but possess the means of being readily given increased speed. The character of the lens is all-important. It should be of as long a focus as its use in a hand camera will permit when the considerations regarding definition, focal adjustments, and other questions of like nature have been given the attention their importance demands. The lens should be one that will work at the very largest aperture optically possible. This feature I have come to regard as essential, for it enables photographs to be taken possessing sufficient detail for the purpose we are considering on dark or even foggy days. By using a lens of this character I have procured fairly good views of scenes enacted in a November fog—not, of course, a London particular, but one of the class usually selected by our Lord Mayors for their peripatetic shows. It will also enable the camera to be used in well-lighted interiors, and under many other circumstances utterly impossible if *f*-11 or even *f*-8 is the largest aperture permissible. Only three stops are necessary, and it is well to banish from the mind all those complicated calculations about *f* this or that, and have the stops so made that you can call them dark, bright, and sun. That is to say, one, the largest, which has to be used on very dull days, with the shutter working slowly; the next when the light is fairly bright; and the smallest when the sun is shining on the scene. In the event of a sea view having to be taken, then this last stop can be used with the shutter working at its fastest. In my experience this simple method has saved a lot of anxiety regarding correct exposures, and worked admirably in all other respects.

If plates are used, they should be the best that can be procured, and their speed such as will suit the above arrangement of stops. A roll holder and the rollable film I regard as perfection. In fact, I look upon these appliances as having created the class of photography to which I am referring. The sensitive material is in such a compact and portable form, and is free from nearly all the dangers and drawbacks incidental to the use of glass. By the aid of the roll holder the nuisance of constantly resorting to a dark room is avoided. Of course, plates—two dozen or more—are now stored in hand cameras, and can by simple devices be all used before the gloomy shades of a dark room have to be entered; but another matter in connexion with films has to be considered which at once brings down the beam in their favour.

In journalistic work speed is more often than not a vital requirement. No paper of any repute cares about illustrating events that have become "ancient history." The work the photograph performs is only the initial step towards the "illustration" which has ultimately to be produced; for in all probability it will have to be copied by drawing or photography on to a block and then engraved, or else it will have to be "processed." As work of this description requires time and care, the sooner the original photograph can be produced the better will be the appearance of the finished block. The necessity for speed is, therefore, apparent. Now, films lend themselves to a treatment having this object in view utterly impossible in the case of glass plates. A number of films can be developed a the same time, and with a slight rinse in water on removal from the hypo can be carried away in a sheet of paper, or even loose in one's pocket. Moreover, they can be used for printing purposes while wet. For instance, say an event of importance has taken place some three or four hours' journey away from London. If it occurs in the morning hours, it is quite possible to take the views required, develop them immediately, catch a train back, print one or two of the negatives in the train, and arrive home with all the rest dry and ready for use, so that that same night the engravers can go to work. All this can be done without being in any way burdened with appliances beyond two small printing frames and a packet of pins. I am not speaking theoretically, for when I say this can be done I am speaking from experience. On many occasions the *Graphic* has given illustrations of scenes that have been enacted at a distance the same week of issue. They have often resulted from this method of procedure, and the *Daily Graphic* frequently shows the marvellous things in the way of speed that can be accomplished by the aid of photography. A great deal of this work could not, however, be done if glass plates were used.

(*To be continued.*)

THE SIMPLIFICATION OF PHOTOGRAPHIC TERMS.

Generally speaking, a term is a simplifying and distinguishing method of expressing some thing or action. Speaking, however, from a pessimistic point of view, it would, perhaps, be more correct to put the last sentence in the past tense, as, owing to the enormous elasticity of meanings in the hands of the word artificer, many constructions may be put upon even a simplified expression. A man may strive to express his thoughts, but whether his sentiments be approved does not depend so much upon what he says or writes as upon the way that which he says or writes is understood. He would, therefore, be a bold man who undertook to give an expression with one meaning solely and absolutely. Some may say that it is not the difference of meaning in an expression so much as the difference of application, which is merely a roundabout way of saying the same thing twice, as an expression with *absolutely* but one meaning would naturally have but one application. The reader is probably by this time awaiting the disclosure of the meaning and application of this article to photography. Well, then, the elasticity of a language being taken for granted, it behoves every photographer and well-wisher of the art to simplify *the expression of his art*, if I may use such a phrase. There are some terms which have sprung up in photography of later years the meanings of which retain, at present, only their first application. Such terms, for instance, as "idealism," naturalism," and "impressionism," may be misty in their meaning, vague in their application, and may even have been the foundation of a mystical and inconsistent "school," but as yet have been applied to one purpose, as yet preserved their simplicity, though the simplicity be chaos. There are, on the other hand, terms which have grown old with photography, and the meanings and applications of some of these terms have grown, like the ivy on the oak, and threatened to choke their own origin and support, unless cleared away by re-simplification.

Take a brief glance down the advertisement columns of our papers, and note the constant repetition of that compound expression, "first-class." "Assistants wanted for a *first-class* business." "*First-class* assistants only need apply." "A *first-class* retoucher wants——." "A *first-class* operator requires——." "A *first-class* all-round disengaged," &c., *ad infinitum*. Surely, one would think, this expression needs no simplification. But does it not? A man's business or abilities are first-class by comparison, by opinion, by mental obtuseness, by interest, by anything, in fact, that will stretch this term without breaking it. Employers certainly have the most to complain of in this, but there is something to be said on the other side also. Only a short time back I saw an advertisement from a business man personally known to me, requesting that none but first-class men would apply. How many first-class men travelled down on a fool's errand I have no means of knowing, but their surprise can be imagined when they found themselves in front of only a second-rate three-and-sixpence-a-dozen business. Their interview must have been warm—if they stayed for one—though probably not affectionate.

An employer must naturally feel the elasticity of such a term when he receives in answer to an advertisement for a first-class assistant replies embracing all grades. He feels it in temper and pocket probably when, judging by appearances only, he finds, too late, he has engaged the most glaring example of elasticity. He finds, after a time, that this is no exception; therefore he becomes distrustful, cynical, misanthropical, what you please, and says within himself, "First class is a species of fly-

paper, except that it is non-destructive. I'll try a 'capable' man.' Experience proves this term to be equally elastic, though not quite so fashionable. He thereupon sets down a business axiom, "In employing an assistant, always accept the square root of what he *says* he can do as his actual ability." This axiom, applied generally, becomes unjust to some; but who is to blame? Our world is too business-like to accept the simple honesty of "A man needs employment;" he must be "A gentleman of good appearance and address, used only to high-class work, of engaging manners, and splendidly recommended." How many first-class men would remain if their class depended on examination in theory and practice by a central and representative body? How many would wish for classification at all if that depended not on assertion but proof? "First class" may, in the sense that the "last shall be first," occasionally be correct; but, on the other hand, may be as one's opinion of first class goes. "High class" may be mountainous, but then again may prove hollow, like some kinds of jewelry. "Thoroughly experienced" may apply to time or to intellect, but may occasionally be applied by the absence of either. "Capable" may exhibit ingeniousness, or may merely lack the simple prefix commonly supposed to reverse the meaning. A term that admits a parasitical growth of meaning becomes, after a time, meaningless, unless periodically cleansed. It would therefore seem the better plan, supposing the restoration of the original meaning of these and similar terms to be impossible, to expunge them, as dishonoured and degraded, from the photographic vocabulary.

The foregoing remarks may be said to apply to terms of the personal order. This order may be divided into terms of the first personal order and terms of the second personal order. The former having been dealt with, it merely remains to say that, as the meanings of terms of the latter order are equally precise, and generally unflattering, in all trades and professions, they need not be dealt with here. But there are yet two important orders, viz., the Impressive and the Expressive.

It will be readily granted that, though impression be generally possible, the expression of impression is often difficult, and sometimes impossible. It is not uncommon for a man nursing some great impression that continually eludes his speech to seek refuge and quiet within the walls of our institutions for the unreasonable. It is still less uncommon for a man tried in this way to ascend into cloud-land, and, selecting a substance of the softest and most pliant nature, shape his impression into a term; to lower himself and his dear especial term into the commonplace once more; to call round his friends and neighbours, and say (in effect) "Rejoice with me, for I have fashioned a term. Not for myself have I fashioned it, but that, being cast abroad, it may raise and elevate the human species," and, thus saying, let loose that term. Fashioned of airy, buoyant material, and being attractive by its rarity, it passes from architect to architect, improved upon, ever growing, until it becomes a world-wide colossal reality; and then—oh, well, being found out late one night, and having no collar on—is taken into custody, and finally passed over to some humane word-fancier, who makes it useful while he can, keeps it in a glass-case until it crumbles, and then buries it decently. I am afraid that in defining this order of terms I may have been vague; but, then, that is in keeping with the nature of the term. Simplification is out of the question here. Who can describe the indescribable, or define the indefinable? Born of one impression, and built up by many, its nature, being composite, is reducible to no theory. Wise men shun it as a brain-disordering nightmare, while the disputatious use it as an effective brickbat. Language was surely not given us to disorder the understanding, though, according to some authors, Browning has proved its capability of doing so. Expressions such as I have defined have sprung up considerably within the last few years, expressions that need whole columns, not to define their meaning, but to increase it. When I meet a term such as this, I sympathise with the rural character who, after a lecture on art, exclaimed, "Gimme art, but gimme plain speech."

The last order of terms, the expressive, is met with at all points. Real good terms, most of these coined in a business-like generation, when words were of little avail if meaning were absent, illustrating the compression of sentences into words, not the expansion of words into sentences. And yet, owing to these same terms, how difficult it becomes for a photographer to describe a process to a customer. How he sails ahead, unconscious of the utter bewilderment he is occasioning! Watch Mr. Amateur's face as he carefully pores over his new "hand-book for beginners." How it expands (lengthways), how quickly the look of intelligence fades, and with what heartiness he exclaims, "Thunder!" as the book reaches the most distant wall! Born and bred with us, part and parcel of ourselves, how dear is the photographic vernacular. Some of the terms of this order would be understood even by an outsider. Any man could understand what is meant by a negative being "dense," that is, if he understood what a negative was, and did not partake of its quality; but a thorough photographic education is required to appreciate in its most powerful sense a negative being "plucky" or "vigorous." An outsider would probably offer a plucky and vigorous resistance to such terms, but experience would give the necessary fine appreciation, and render him equally enthusiastic and prolific in term manufacture. Let us have plenty of terms of the expressive order, providing that they tend to the capture and total dissolution of terms of the impressive order. Above all, let the meaning and object of the term be clear, simplifying an expression, not mystifying it, having, in fact, a pointed and decided application, in preference to a general one. Language may be compared to a storm-tossed sea. Who shall wonder, then, if the reader, in following me over a small portion of that treacherous element, is thankful, like the writer, to escape a watery grave and reach that safest of all points, the end?

H. Colebrook.

NOTES ON PERSPECTIVE DRAWING AND VISION.

Some years ago we made some experiments with the object of comparing a monocular perspective drawing with the drawing of an aplanatic photographic lens. We found that under similar conditions they were alike, as was, of course, *a priori*, probable. More than a year ago one of us published a short paper with an experiment, which threw grave doubts upon the truth of perspective drawing * when compared with what the eye really sees.

We now offer a series of provisional propositions, experiments, proofs, and deductions, which, we venture to think, are of fundamental importance to all artists, as well as to physiologists and psychologists. We are working now to still further elucidate the matter; but we decided to publish the following notes, so that specialists might perhaps help us in the matter.

Our experiments and deductions, if correct, will show that for scientific reasons the accepted rules of monocular perspective are likely to mislead the artist, and prove the fallacy of photographic and all mechanical methods of measurement.

Proposition A.—The eye does not constitute a symmetrical lens, the top and bottom † portions being different. That portion of the eye which perceives distance and distant objects (*i.e.*, those above the ground), sees the objects on a larger scale than the portion of the eye which views the foreground or nearer objects, therefore our impression of nature is not what we get with a mathematically correct perspective drawing, or the drawing of an aplanatic photographic lens. That is, a perspective drawing surprises us by making the foreground objects look larger in proportion to the distance. Also, we see a larger arc with the lower half of the eye than with the upper.

Proof 1.—That we do not see the same amount with both halves of the eye (upper and lower) is proved by the observer lying on his back and looking straight up at the sky, when he will find that the field of vision of the upper half is much more limited than the space seen by the lower half of the eye. This holds for either one eye alone or for both when used together.

The proof is completed when we stand with our legs apart, and, standing with our back to the landscape, bend down and look between our legs. Here the fields are inverted, and, consequently, the distance appears small and far off, and gives much more the appearance of a sharp photographic rendering of the scene. This peculiar effect has long been well known, and it has puzzled a good many observers, but hitherto no valid scientific explanation has been offered.

Proposition B.—We think this may be the result of the naturally selective action of the retinal nerves. It has been to our advantage in the struggle for life to see all the objects near to us and close around clearly, and to compass as wide a field as possible. It has also been to our advantage in the struggle for life for certain parts of nerves to try and draw distant objects nearer and to enlarge them, so that special functions may have developed purely by natural selection.

Deduction 1.—That mathematical perspective drawing gives quite a false impression of what we see when using *either one of our eyes or both.*

That such is actually the case we will now endeavour to prove, at the same time still further supporting our contention that the upper and lower portions of the eye see objects in different perspectives.

Proof 1.—Let the observer select a church tower or tall chimney

* When we use the term perspective drawing, we mean a mathematical drawing of various objects in the field of vision (*i.e.*, angular measurements), as received on a glass plate (ordinary perspective drawing) or upon the screen of a camera, for, under like conditions, they are, as is well known, identical.

† We have ignored for the sake of simplicity the optical law of inversion of the image on the retina; when that is considered, the terms "upper" and "lower" must be merely interchanged.

for experiment. If the sides are parallel the object will *appear* to his eye wider at the top than at the bottom when he stands facing it at the distance of the tower itself and looks steadily at its centre. These experiments are best made in the diffused light of evening. The experimenter must not move his eyes up and down the tower from top to bottom, and so *measure or correct* his impressions, but he must look steadily at the centre of the tower and take his pure sensuous impressions. As most towers and chimneys do taper considerably, the result the observer gets when close to them is that they *look parallel* or nearly so. This fact was, no doubt, felt by the architects of the Parthenon, and it has never been known why they built the columns leaning inwards a little out of the perpendicular. That they were built out of plumb has been proved by measurement; that they *look* parallel is well known, and the reason of this we venture to find in our proposition.

Proof 2.—A very simple proof is to look about the middle of a doorway or door; it will be felt that the door or doorway is wider at the top than the bottom. The same holds with books in a bookcase.

Proof 3.—Cut two slips of paper.

(*a*) 8 inches long by 2 inches wide.

(*b*) 8 inches long by 2 inches by $1\frac{7}{8}$ inch wide, so that it tapers $\frac{1}{8}$th of an inch.

If the parallel slip (*a*) be held upright eight inches from the eye (its own length), and looked at straight in the centre—the centre of the paper being opposite to the eye—the paper will appear slightly wider at the top than at the bottom, the same proviso of not correcting the pure impression by measurement (looking up and down it) holding, as we pointed out in the case of the church tower.

If the observer now takes the tapering slip (*b*), and holds it narrow end upwards, looking at it in the same way, it will *appear* parallel; if he hold it wide end upwards, it will appear much wider at the top than at the bottom.

This holds equally true if the experiments are made either with one eye or both—showing that binocular vision has no effect on the impressions.

Proof 4.—Another interesting experiment is to place a penny upright on a table and a halfpenny eighteen inches behind it and a little to the right or left of the penny. The eye must look *over* the penny at the halfpenny, so that the penny is a foreground object and the halfpenny a distant object. If the observer now looks steadily at the halfpenny, at the same time seeing the penny, he will find the impression given is that the halfpenny looks nearly as large as the penny.

Proposition A and proofs deal mainly with what we would describe as *vertical vision*—that is, with the variations in the appearances of objects when placed one over the other, as in a vertical column, or with objects at a distance as compared with objects in the foreground.

But within the radius where binocular vision acts (calculated by Mr. T. R. Dallmeyer to be sixty yards) new and important variations occur. These properties we shall consider under the term of horizontal vision.

Proposition.—Within the limits where binocular vision is effective (say normal vision (eight inches) to 60 yards) objects *appear smaller when they are compared with objects beyond the binocular limit*—that is, they appear smaller as compared with drawings as given by monocular or mathematical perspective.

An experiment to practically bring the effect of the binocular vision variations entering into the matter may be made as follows:—

Take the tapering slip of paper aforesaid (*b*) and place it between the two eyes, the wide end resting upon the bridge of the nose, the slip being inclined at an angle of 30° with the horizon. The result is that the paper vanishes *towards* the eyes—diametrically an opposite result to what perspective would lead us to expect. This phenomenon still holds if the paper be gradually moved away from the eyes and held at arm's length, but in the same plane.

Proof.—Place a book at a distance of six feet from the eyes. Then proceed to measure the width of the book with a pencil (one eye being closed), as a draughtsman draws objects by monocular perspective, and then open the other eye and measure the width of the book with both eyes; the binocular measurement will be found to be smaller than the monocular measurement. If the height of the book be measured in the same way, there will be no difference in the result obtained with one or both eyes.

But more convincing is proof 2. Wafer a square sheet of white paper (say eight inches square) on the wall or on a window, six feet from the observer, and look at it. The impression given will be that it is larger vertically than it is horizontally. This explains the old trick of marking off the height of a tall hat against a wall; as a rule, everybody places the mark too high—the reason is now explained.

Still another proof. Stand a halfpenny and penny on the table, as directed in the previous experiment. Now place the eyes on the same level as the plane of the table and observe. The result will be exactly the reverse to that previously obtained. That is, when looking directly at the halfpenny, at the same time looking (indirectly) at the penny, the penny will appear the larger, and *vice versâ* when looking directly at the penny and indirectly at the halfpenny, the halfpenny will appear nearly as large as the penny.

Another every-day proof. Let a person sit in one end of a long punt with parallel sides, and look at the other end—it will look to him to be wider than where he is, and yet its sides will, by perspective laws, vanish quickly away from him.

These proofs show the effect of binocular vision, which is to increase the appearance of height and to narrow the appearance of breadth, consequently it makes objects appear taller than a perspective drawing would do.

Deduction.—The reason we get a different impression of relative sizes of objects by normal vision from that given by mathematical perspective drawings and photographs is, that the combination of these properties of vertical and horizontal visions gives quite a different result to that of perspective drawings.

Final.—Having shown how we see forms, it only remains to say that a mathematical perspective drawing or the drawing of an aplanatic photographic lens does not give forms as we see them. They are altogether false to the visual impression of the proportion of things, and therefore give a wrong idea of the original scene. On the other hand, a perspective drawing or correct photograph gives the *actual facts* scientifically, *i.e.*, the pillars of the temple as leaning, the paper in experiment as *square*. All such drawings are, therefore, purely scientific diagrams, and artists who wish to render what they see must not rely upon them.

P. H. Emerson & T. F. Goodall.

Foreign Notes and News.

Still another developer, fortunately this time with a somewhat shorter name than before, viz., Ixol. Its discoverer, however, from whose communication to the Association Belge we draw our information, makes up for this deficiency by bearing the fairly lengthy appellation of René Lacoste Deplérier. Crystallised ixol, we are informed, is a chemical novelty. The solutions recommended are—

A.	Crystallised ixol	5 parts.
	Distilled water	100 ,,
B.	Caustic soda	2½ parts.
	Distilled water	100 ,,

For time exposures the negative is dipped for two minutes into solution A (instantaneous exposures remain in it for from 4 to 6 minutes); then, without allowing it to dry, it is immersed in B. The image is said to appear very rapidly. For fixing is recommended—

Fixing soda	25 parts.
Bisulphite of sodium	5 ,,
Water	100 ,,

Professor Eder mentions that he has recently been shown some platinum prints on linen by Fischer, of Graz, with which he seems especially pleased. He states that the linen does not require any preliminary preparation, the platinum mixture being merely thickened with some adhesive substance, and applied directly. For small sizes, which are printed out in the press, Herr Fischer employs Pizzighelli printing-out paper, but he alters the recipe given by decreasing the amount of the platinum salt, which decreases the expense considerably. For enlargements Herr Fischer develops by applying the platinum oxalate with a sponge.

The rate at which some of the plants in America develop their blossoms when once they set about it appears to be, like a great many other things in that country of wonders, quite phenomenal. For, according to a German photographer, Herr Sachse, of Berwyn, Pennsylvania, one is obliged to resort to flashlight and instantaneous exposure in order to succeed in catching them on the job. Herr Sachse has sent some of his results to Vienna.

A recent communication by Dr. Kaempfer to the Brunswick Photographic Society is devoted to the Zeiss objectives. He points out that the principal object of these combinations is the elimination of astigmatism. As it had been carefully calculated that this error could not be corrected

by any combinations of ordinary flint and crown glass, Dr. Rudolph, of Zeiss's firm, attempted combinations of a flint glass of lower and a crown glass of higher index of refraction than the ordinary glasses. The former was employed in double concave and the latter in double convex form. These combinations also showed astigmatism, but in the opposite way to the old combinations. The arrangement of the new and old combinations together consequently enabled perfect anastigmatism to be obtained.

M. Paul Brunel recommends a new platinum toning bath :—

Water	1000 parts.
Potassium platino-chloride	2 ,,
Common salt	2 ,,
Acid tartarate of soda	1 ,,

The acid tartarate of soda serves to make the bath slightly acid, and the toning will only take place in an acid bath. This bath is suitable both for albumen and Aristo paper. Before toning, the prints should, of course, be well washed.

From the last meeting of the Vienna Photographic Society we learn that a new application has been found for that general favourite among metals at the present day—aluminium. It has been employed by Herr Putz as a substitute for magnesium for producing an intense and actinic light. Herr Putz made use of two different plans. One was to mix the aluminium in the form of powder with chlorate of potash and sulphide of antimony. This gave a horrible smoke, but it was found that the antimony might be perfectly well omitted, when the result was equally good and quite smokeless. Another method employed was to insert thin leaves of aluminium between layers of collodion cotton impregnated with chlorate of potash. This produced a very brilliant effect, and was absolutely smokeless.

We take from the *Amateur Photograph* the following recipes for a toning-fixing bath for Aristo paper :—

Solution I.

Water	800 parts.
Hyp. soda	200 ,,
Ammonium sulpho-cyanide	25 ,,
Acetate of soda	15 ,,

Solution II.

Water	50 parts.
Alum	10 ,,

Both solutions are mixed, and one-eighth of a sheet of unfixed Aristo paper immersed in the bath so formed, and allowed to stand in the dark for two days ; the solution is then filtered, and to it is added—

Water	200 parts.
Chloride of gold	1 part.
Chloride of ammonium	1 ,,

This bath will keep for any length of time, does not soil the fingers, and tones very equally and certainly.

Our Editorial Table.

Etude Complète sur le Développement et les Développateurs.

Par L. Mathet. Paris: Société Générale d'Editions.

Opening with a chapter on sensitive surfaces and the action of light upon silver bromide, and after devoting a few remarks to the fittings of the dark room and its lighting, M. Mathet enters upon the different sorts of developers applicable for dry plates, describing the four in the following order:—Pyrogallic acid, ferrous oxalate, hydroquinone, and eikonogen. The various formulæ given for the working of these differ in no essential respect from those already known to our readers.

From Messrs. Taylor, Taylor, & Hobson, of Leicester, we have received their new catalogue of lenses, from which we are greatly pleased to see that this firm make their flange-screw fittings in accordance with the standards of the Photographic Society of Great Britain. This "standardising" of the various lens fittings, which seemingly applies to all the works of this firm, is greatly to be commended. The catalogue contains several useful hints, *inter alia*, on the preservation of lenses: their surfaces should be lightly dusted by an old clean cambric handkerchief, and never rubbed, and they should be kept in a pure, dry atmosphere, away from dust and damp. Among other things in the catalogue we find a very complete series of lenses for stereoscopic use.

The Fry Manufacturing Company, 5, Chandos-street, W.C., have sent us a sample of their Compound Sulphoquinone developer. Without knowing more of its composition than is to be ascertained from the name, we do know, from actual trial, that by judiciously mixing the two solutions—for it is sent out in two bottles—we have in every case succeeded in developing good negatives, having the requisite density and gradation, with freedom from stains or fogging. What more can one desire?

Mr. William Tylar, Birmingham, sends us a Sucker Handle for cutting glasses. It is extremely simple both in construction and application, and consists of a soft rubber sucker the size of a sixpence cemented to the end of a wooden handle, as shown in the cut. The sucker, when damped and pressed against the centre of a small plate of glass, at once takes a firm hold.

Mr. Shapoor N. Bhedwar has submitted to us his results *in re* his photographing H.R.H. the Duke of Edinburgh. There are four really admirable portraits on 15 × 12 plates; and, considering that they are not taken in a regularly constructed studio, but are of the "At Home" class, the lighting, posing, and general execution are most excellent.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9278.—"A New or Improved Method of Photographic Printing Direct from the Negative by Contact, Lantern, or otherwise." W. Stringfield.—*Dated June* 2, 1891.

No. 9372.—"Transpareut Pictures for Magic Lautern Slides and other purposes." J. D. Theobald.—*Dated June* 3, 1891.

No. 9577.—"Improvements in Detective Cameras." A. Dvorak.—*Dated June* 6, 1891.

No. 9591.—"Improvements in Apparatus for Photographing Engineering Drawings and the like." W. Palmer.—*Dated June* 6, 1891.

No. 9598.—"Gauges for Centering Lenses and Making other Optical Instruments." Communicated by A. L. Smith. W. L. Wise.—*Dated June* 6, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 7489.—"Photographic Cameras." Vevers.—Price 8*d*.
No. 7650.—"Photographic Shutters." Gotz.—Price 8*d*.

1891.

No. 2390.—"Photographic Spotting, &c." Beacham.—Price 6*d*.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 16	North London	Wellington Hall, Islington, N.
,, 17	Bury	Temperance Hall.
,, 17	Manchester Camera Club	Victoria Hotel.
,, 17	Edinburgh Photo. Club	5, St. Andrew-square.
,, 17	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 18	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

June 9,—The President (Mr. James Glaisher, F.R.S.) in the chair.

A letter from Mr. Léon Warnerke, who had intended to read a paper on *A New Sensitometer*, was received and communicated to the meeting. It appeared that, on account of an attack of influenza, he was unable to be present, and the President expressed the sympathy of himself and of the members for the writer.

A paper on *An Undiscussed Point in the Illumination of the Dark Room* was read by Captain W. de W. Abney, and illustrated by demonstration. He said that it might be thought that all that could be said on the subject had already been said. Some few years since the subject had been much discussed, and he then expressed the opinion, which he still held, that dark orange was better than ruby light. Then canary medium found supporters, and Mr. Debenham had recommended a combination into which green entered. For bright, natural illumination he still advocated dark orange, but for artificial light canary gave a light which was surprisingly safe compared with the power of illumination to the eye. He had been in a manufactory of dry plates, and been surprised to find a canary light in use, which appeared dangerously white, but it was used with apparent safety. He had recently come experimentally upon some results which greatly explained the cause of the safety of greenish or yellow light when the quantity was low. It appeared that, if starting

with a red and green light that at first appeared of equal strength, the green might be reduced in amount very much more than the red, and still retain illuminating power long after an equal reduction in the amount of red would have left the eye in darkness. The reason is a physiological one, and, following out the indications suggested, it appeared that if lights of different colours, and of an intensity that within a wide range when bright appeared equal to the eye, were reduced to near the point where they ceased to illuminate a white object, the proportion between original brightness and actual illumination entirely disappeared. Thus, if a screen were moved away from sources of light of the following colours until it just ceased to be visible, the distances to which it would have to be moved before becoming invisible would be those given in the second column.

Red	54 feet.
Orange	100 ,,
Yellow	125 ,,
Green	1,000 ,,
Blue	14,000 ,,

Another set of direct measurements made with medium in use for the dark room gave the following results :—

Ruby	40 feet.
Stained red	120 ,,
Canary medium	220 ,,
Orange paper	180 ,,

It now became pretty evident why the dark corners of a room were better illuminated by canary medium than by ruby. They were five times more visible. A point to be noted was that the colour of very faint illumination always appeared to be white, but with red this effect is seen only just before the illumination vanishes. The question was a physiological one, and although it had been known that blue and violet light affected the vision, when faint, more than red, he did not think that any one had suggested the enormous amount of difference which he had found to exist, namely, from 700 to 7000 times as much sensitiveness of the eye to one colour, when faint, compared with the other. If pure green light could be used, that would be best; but, of course, glasses and other mediums in use did not give pure colours, and the results from such mediums would only come out approximately true. However, with such mediums as the red and green glasses shown, the result would be found to be, that whilst with a bright light they gave a light of about equal intensity, with a faint light the green might be reduced to one thirty-sixth part of what would be necessary with the red before ceasing to give visible illumination.

This was illustrated by apparatus, in which a disc was illuminated by either colour, and the power of the light diminished gradually by revolving sectors, until the light disappeared. The President, Mr. J. Spiller, and Mr. W. E. Debenham looked into the apparatus while experiments were made, and with each observer the proportion was about the same, *i.e.*, five parts of green light serving to illuminate equally with 180 of red.

Mr. J. Spiller said that it was the practice to use red for danger signals, and green for safety. Now, did it not appear from Captain Abney's paper that this was wrong, since danger was what it was necessary to see the farthest, and green now appeared to be visible when red was by thirty-six times less so?

Captain Abney said the case of signal lights was very different from that of dark-room illumination, and brightness was very different from illumination.

Mr. W. E. Debenham said that it must also be considered that signal illumination was most necessary in a foggy atmosphere, and here red possessed more power of traversing than green.

Captain Abney assented, and added that the great danger of green was that when faint it appeared white, particularly in foggy weather. Red was not so much scattered by foggy particles as green.

Mr. A. Cowan inquired whether Captain Abney considered that the proportionate effect of the intensity of negatives varied with a weak and strong light, as had so often been asserted.

Captain Abney said that a photographic plate was not an eye. As far as his experience went, he would say that what applies to the eye does not apply to the photographic plate. With ordinary limits, he would say that there was no alteration of the effect of intensity in a negative by altering the power of the light. When the limits were very wide, as, for instance, when the proportionate exposure varied from a few seconds in the one case to four hours in the other, he believed there was a slight difference, but so slight that it could not be found out in the ordinary way.

Mr. Spiller said that eighteen months ago he had had an experience of colour blindness. He had taken santonine as an experiment, which, however, he would warn any one against repeating, and found that all objects appeared green to him. He asked whether the colour of the vitreous humour was altered, or what was the explanation?

Captain Abney replied that it was not due to the cause suggested, but to paralysis of the violet-sensitive nerves. Whilst on colour blindness, he would say that colour blindness due to tobacco was much more common than people had any idea of, and such cases were much more frequent than those of congenital colour blindness.

Mr. Chapman Jones said that, as a practical detail, he would mention that the golden fabric now sold was not of the same colour as that originally sent out. Then it was greenish yellow, and that was the colour he found to answer best. Now it was more orange in tone, and, to his thinking, exceedingly inferior to the old make. Perhaps the attention of the manufacturers would be called to the matter, and they might again supply the material as at first.

Mr. Debenham expressed the pleasure that it gave him to have the physiological reason for the preference for the green and yellow region as a source of working illumination so scientifically examined, and thanked Captain Abney for the light which these experiments threw on the subject.

The President, after thanking Captain Abney for his paper, vacated the chair, which was taken by Mr. Spiller.

A communication from M. Léon Vidal on the subject of his recent paper on *Polychromatic Impressions by Photography* was read to the meeting. He said that Albert and others had professed that polychromatic work could be produced by negatives not corrected by retouching. He did not doubt this, but the question was whether such reproductions were identical with the originals. He believed not, but was open to conviction if proofs could be given. He also concluded that there must be more than three plates used. Blue alone required two plates; ultramarine might do for drapery, but did not make with yellow a green proper for grass, whilst Prussian blue, though suitable for the grass, did not do for the dress.

Mr. Debenham said that for mixtures the separate colours should be transparent. Ultramarine was therefore unsuitable, but he did not think the same remark applied to Prussian blue.

Captain Abney said the opaque colours, by reflecting white light and their own colour, gave a muddy effect when mixed. The colours should be so transparent as to allow each component to transmit as much as possible. While on the subject of coloured impressions, he would say that he considered the landscapes on the walls to be abortions. There were certainly some very beautiful results of figure subjects in the recesses. He also called attention to a criticism by Dr. Phipson in the *Moniteur de la Photographie* with respect to colour theory, in which he was charged with putting forward an old theory, that of Young and Maxwell, as something new. There was absolutely no ground for this charge, and other remarks by Dr. Phipson were such that he could only feel surprised to find any one venturing to put them forth.

A photographic lamp presented by Messrs. Benham was received, as were contributions to the library from Messrs. Warner, Shepherd, Warnerke, and Cembrano.

It was announced that on the 23rd inst. the discussion will be on "Orthochromatic Photography."

Messrs. J. Howson, T. W. Harrold, and D. R. Charrington were elected members of the Society.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 4,—Mr. A. Cowan in the chair.

A few sample bottles of sulphoquinone developer were received from the manufacturer and distributed among the members.

Mr. Sinclair exhibited a camera stand made by Messrs. Adams & Co., the characteristics of which were the ease and rapidity with which, although folding in three, it was set up, and firmness when erected.

A question from the box was read: "Can platinotype be employed for printing on wood for engraving, and, if so, what way?"

Mr. Cooke replied that it certainly could be so used.

Mr. W. E. Debenham said that Mr. Willis had shown some specimens of platinum printing on wood by the cold process at the April meeting of the Photographic Society of Great Britain. Some description would be found in the reports of the meeting.

Another question was read: "Should pyroxyline be kept in a stoppered bottle or in free contact with air?"

It was replied that it was desirable to allow any gas that might be formed to be immediately dissipated, and therefore it was best to keep it merely done up in paper, or, if in a bottle, that the bottle should only be loosely covered.

The Chairman had known a certain sample to keep well in a stoppered bottle, whilst others were spoilt when tightly closed.

Mr. Teape had some that had been kept stoppered, and was now as good as ever.

Mr. Weir Brown said that a correspondent in The British Journal of Photography had stated that ten days sufficed to cause a toned bromide print to fade. He thought that writer was mistaken. He now brought a print that had been exposed, partly covered, for a period of ten days, to the brightest light obtainable. It would be seen that no mark could be found on the print to show which part had been uncovered. He believed the print referred to by the writer of the letter to which he had referred had been subjected to vapour of ammonia. He had brought two prints, one toned of a sepia and the other of red-brown colour. These prints he desired to leave in charge of the Curator of the Society, and in time for them to be shown again, so that the question of speedy fading might be examined.

The Chairman said the slowing and abnormal action of the pyro developing solution had often been referred to a change in the sulphite, whereby it had been converted into sulphate. He had recently tried the effect of adding sulphate direct to the developer, and found that it made no difference whatever.

Mr. Debenham referred to the specimens recently shown by the Chairman, as indicating a slowing action due to sulphite. For his own part he preferred to use the pyro without it.

The Chairman said the value of sulphite came in when developers other than pyro were used. With hydroquinone particularly it was necessary. He had also found the common bisulphite, sold for commercial purposes, answer quite as well as the most refined samples. A quarter of an ounce of this substance was sufficient to preserve a solution containing an ounce of pyro.

Mr. Sinclair inquired whether any member had tried Lumière's plates with ammonia and pyro development. He found that he could not at all succeed with this developer on these plates, although they came up well with the ferrous oxalate.

The Saturday outings of the Society were discussed, and it was decided to fix upon Beddington and Carshalton for June 20, Limehouse for July, West Drayton for August, and Greenwich Park for September. The October outing to be held, as was customary, at Hampstead.

CAMERA CLUB.

June 4,—Captain Abney in the chair.

Mr. Maskell read a paper, reopening a discussion on the matters treated in Mr. Pennell's paper, *Photography as a Hindrance and Help to Art*, read at the late Conference. Mr. Pennell himself attended, and there was an unusually large gathering of members and friends, not fewer than eighty being present.

After Mr. Maskell's paper, one by Mr. A. Burchett was read, and a very keen discussion followed.

Mr. Pennell replied, and the meeting broke up about half-past eleven p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JUNE 2,—Mr. A. Mackie in the chair.

Mr. J. TRAILL TAYLOR (President of the Society) gave his second lecture on *Stereoscopic Photography*. After eulogising the action of certain men of Manchester, naming among them Mr. W. I. Chadwick, in having started a Stereoscopic Society in that centre of commercial enterprise, and incidentally expressing his regret that such had not first been done in London, he entered very fully into the history and construction of the various forms of the stereoscope from the earliest times, and exhibited several specimens of the instrument, both of foreign and of English make, pointing out what he considered the advantages of each particular stereoscope. He described very minutely several stereoscopes which were now obsolete, one or two of which, for showing the pictures as dissolving views by mechanism, he said were so unique that only knew of one specimen of the kind ever being made. The lecturer also brought with him a large collection of stereoscopic slides, each slide being illustrative of some principle or of some defect which he wished to bring before the members. He also exhibited a new hand camera of French make recently brought out, and which could be used for simple views, and by a very ingenious arrangement could be quickly altered so as to take stereoscopic pictures. Mr. Taylor entered very fully into the optical arrangements of the stereoscope, the mounting of stereoscopic pictures, and the methods of taking such pictures both in a single-lens camera and also by means of two lenses. Mr. Coventon had brought with him a Latimer Clarke's stereoscopic camera, and the construction and method of working this camera were fully described by the lecturer.

The lecture was highly appreciated by the members present.

The evening of June 16 is a technical evening, when Mr. J. G. Hudson will most probably exhibit a continuous-exposure magnesium lamp.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

JUNE 6.—A few of the members took part in the field day to West Hampstead, a district where furze, heath, fern, and broken, sandy ground affords variety to the foreground, while middle distance and far-extending vistas meet the photographer from every point of view.

JUNE 8,—Mr. W. H. Walker in the chair.

Mr. J. TRAILL TAYLOR addressed the Club on *Faults in the Composition of Photographs*. He dwelt upon the faults to which the photographer is most prone, showing numerous prints illustrating his points, and showing how, by reducing the expanse of uninteresting foreground, many an unsatisfactory view might be transformed into a picture. He pointed out that repeated straight lines and geometrical arrangements were wearisome to the eye. Dealing with the division of land and sky, he showed that while, as a rule, the horizon should be below the centre, this was an arrangement largely affected by the composition of the picture generally. Touching upon portraiture, the lecturer dealt with the arrangement of single figures and groups, advising his hearers not to yield to the pressure of their lady friends to make the details of the dresses the principal attraction, but to throw central interest upon the face.

Mr. Taylor's address was received with marked attention.

Prints from views taken by the members at Hale End were passed round, and a vote taken as to merit.

Three members were elected and two nominated.

On Monday, the 22nd inst. (Mr. Beadle in the chair), Mr. F. L. Pither will read a paper on *Art in Landscape*. Visitors welcome.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

JUNE 5,—Mr. J. A. Carter, M.A., in the chair.

No paper being down for this evening, results of the past excursions were shown by the members.

Mr. WEIR BROWN exhibited some bromide enlargements toned by uranium. He also mentioned, with reference to mounting prints toned in this way, that care must be taken not to damp the face of the print when mounting, as a stain is left when the print has dried, and, if by chance the face of the print did get damp, he used a damp (wrung-out) sponge, and then the face of the print was made equally damp all over.

Mr. CARTER asked if it was necessary to always damp the prints.

Mr. WEIR BROWN said a sizing of starch at the back of the prints would prevent moisture, when mounting, from appearing on the prints.

Mr. CARTER brought forward a proposition made by Mr. Weir Brown some time back, that members should introduce subjects that would promote discussions.

BRIXTON AND CLAPHAM CAMERA CLUB.

JUNE 4,—Dr. Reynolds (Vice-President) in the chair.

Mr. W. H. POWELL read a paper on *Hand-Camera Work*. The lecturer explained the use of several hand cameras which had been kindly lent by their respective makers.

Mr. J. A. Butler, one of the members, exhibited a hand camera made by himself, which attracted considerable attention.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

JUNE 3.—The first monthly summer meeting, for the election of new members and discussion of subjects of interest, was held this evening, the Rev. L. Macdona in the chair.

The following were elected as members :—Messrs. Brothers, Handcock, Pearle, Trengvouse, and Miss Parsons.

Dr. Sheppard was elected to fill the vacancy on the Council caused by the unavoidable resignation of Mr. Manifold.

Next excursion, Saturday, June 13, Burnham Beeches.

Future arrangements : Saturday, June 27, excursion, Chislehurst.

RICHMOND CAMERA CLUB.

JUNE 5,—Mr. Cembrano presided.

A demonstration of toning celerotype paper was given by Mr. Blackie, of the Blackfriars Sensitising Company, who also showed some fine finished prints.

The Chairman showed transparencies of the Alcazar of Seville, and the Alhambra.

LEWES PHOTOGRAPHIC SOCIETY.

JUNE 2.—A large number of members assembled to witness Mr. E. J. BEDFORD'S practical demonstration of *Development by Eikonogen*. This developer has undoubtedly many things in its favour, and has become very popular with photographers. Mr. Bedford exemplified the powers of eikonogen by developing bromide paper prints, lantern plates, and also ordinary negatives, admirable results being obtained in each instance.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

JUNE 2,—Mr. B. J. Taylor in the chair.

It was intimated that there would be an excursion to Lincoln on June 18.

The PRESIDENT gave a practical demonstration on *Toning and Fixing Gelatino-Chloride Emulsion Paper*.

Mr. T. G. HIBBERT demonstrated the working of ordinary albumenised paper. He also brought before the meeting an interior printed on Obernetter paper.

ROTHERHAM AMATEUR PHOTOGRAPHIC SOCIETY.

JUNE 2,—Dr. Baldwin (President) in the chair.

An interesting discussion on *Dry Plate Development* took place, and, from the opinions expressed, it was apparent that pyrogallic acid was the most generally preferred for ordinary work. On a recent occasion five members exposed plates (from one packet) under precisely similar conditions—as to subject, aperture of lens, light, and time—and these had been developed by means of—(1) pyro and ammonia ; (2) pyro and carbonate of soda ; (3) hydroquinone ; (4) eikonogen ; and (5) ferrous oxalate. The day selected proved most unfavourable, but the experience gained was instructive.

Mr. W. H. Smith resigned his position as honorary secretary in consequence of his contemplated removal to another town. He was warmly thanked for his past efforts to further the interests of the Society, which now has a membership of thirty-four.

Mr. H. C. Hemmingway, of 6, Stanley-street, Rotherham, kindly undertook to fill the office *pro tem*.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE eighth and presumably last meeting for this portion of the session, was held on Wednesday evening, June 3. The President, Mr. H. J. Blanc, occupied the chair.

Mr. J. M. Turnbull was requested to bring before the Society his experience with the newest printing-out platinum paper (Jacobi's).

Mr. TURNBULL gave a good description of the various methods which had been adopted since Mr. Willis first, after long and careful experiment, promulgated printing with platinum, and the improvements, or so-called improvements, by Pizzighelli and others who had studied and worked the process. He believed that every requirement on the score of permanency was met by the use of platinum, and further stated that he thought, after trying all other methods, that this, the latest development of platinum printing, besides being the simplest, was much easier to work out than ordinary silver printing. He further pointed out that the platinum processes were not like those in silver, which, in addition to printing, required washing, toning, fixing, and washing ; but that this new printing-out paper could be watched as a silver print is, and then, when fully printed, sometimes a mere breath and a wash made it a permanent print. The remarks were illustrated by a number of example of the process.

In the course of the remarks which followed, Mr. M'GLASHAN stated that the examples which were exhibited from his negatives had afforded him great pleasure in the production, and, while he did not think that they were examples of the best that those negatives could produce, yet they were, he submitted, fair examples of a comparatively new and as yet little-tried process, but which he thought should get, and deserved, the most careful attention.

At the suggestion of the Chairman, Mr. F. DUNDAS TODD brought forward the subject of *Aids to Exposure* in the way of examples of exposure-meters, photometers and instruments of that class, several of which were on exhibition, and were examined by those present. Among them were principally those to be found in the advertising columns of the JOURNAL.

Among the remarks which were expressed, those of the PRESIDENT (Mr. Blanc) may be said to represent the general feeling of the meeting. He stated that where any photographer allowed himself to be tied down to the examination of his subject with a meter—a measurer of the quality of the light and what was embraced in the picture selected—and after that, as in some of the examples before them, to an examination of the logarithmic tables necessary to guide them as to absolutely the true value of the light—in this variable climate that was a foolish thing to attempt ; it was like trying to do mechanically what should be done, or be capable of being done, by every one by a rapid glance at the surroundings, and by that intuitive judgment which all photographers should cultivate. He exhibited, as examples of this, two of the plates he had exposed on that very bad last outing-day they had had at Inverkeithing, one of which was given one-and-a-half minute and the other three minutes—the one double or half the time of the other—and yet there the negatives were, and it would be difficult to tell which of them got the long or the short exposure, and he pointed out the inutility of mechanical measures of actinism for such subjects. They might be useful for some purpose, but in cases such as this judgment was necessary to do the work, and not machines or tools.

The PRESIDENT then drew the attention of the members to the Photographic Convention for the year 1892, and in doing so stated that the Council had fully considered the matter, and had come to the conclusion to request the Society to invite the Photographic Convention of Great Britain to meet in Edinburgh in 1892. The general opinion of the Council was that in addition to the honour that would accrue to the Society and to the city, there would be added a great and just impetus to photographic art, science, and knowledge.

In order to carry things in due form, it was proposed by Mr. W. Brown, seconded by Mr. J. M. Turnbull, and unanimously acceded to, "That the Convention be requested to hold its meeting for 1892 in the city of Edinburgh."

ST. LOUIS CAMERA CLUB.

THE following shows how the manufacturers of St. Louis, Mo., encourage the members of the Photographic Society there. It accompanies an announcement of details as to a field day on May 30:—"The following prizes are offered for excellence in work done on the annual field day, 1891:—By A. S. Aloe & Company: 1. For the three best pictures taken on the field day, one each of the following subjects: (*a*) Best instantaneous view of moving objects; (*b*) best landscape; (*c*) best group of the members of the Club; prize, A. S. Aloe & Company's 5 × 8 rapid rectilinear lens, with iris diaphragm. 2. For the second-best three pictures of the same subjects; a Bausch & Lomb diaphragm shutter, to be fitted to the winner's lens, size not to exceed 6½ × 8½, model 1891. By M. A. Seed Dry Plate Company: 1. For the best single *genre* picture, size not considered, posing and all of the work to be done by the competitor; ten dollars' worth of plates. 2. For the best set of three instantaneous pictures, with the negatives; ten dollars' worth of plates. 3. For the best positive made on films; ten dollars' worth of plates. 4. For the best transparency on any plate, tone and subject to be considered; ten dollars' worth of plates. By G. Cramer Dry Plate Works: 1. For the best six pictures, with negatives, taken on the field day; ten dollars' worth of plates. 2. For the second best six pictures, as above; five dollars' worth of plates. 3. For the best six prints on albumenised paper, using any negatives; three dollars' worth of sensitised paper. 4. For the best three lantern slides from field-day negatives; two dollars' worth of sensitised paper. By Mr. J. C. Somerville: 1. For the best six bromide prints of field day negatives; twenty dollars' worth of bromide paper. 2. For the second best six, as above; ten dollars' worth of bromide paper. All competing prints go to Mr. Somerville as his property. By Mr. H. A. Hyatt: For the best single *genre* picture made on the field day; a Mound City 6½ × 8½ landscape lens. Mr. Hyatt is to receive a copy of each competing picture. By A. P. Erker & Brother: For the three best lantern slides from field-day negative; a fine focussing glass. All work, unless otherwise mentioned, must be entirely done by the competitor himself from his field-day negatives."

Correspondence.

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

A GRUMBLE FROM THE COLONIES.

To the EDITOR.

SIR,—In your issue of February 6 you make some remarks on the quality of gelatine plates that you had examined, and there are few of the fraternity who will not endorse every word that you have said. But, if such is the case with goods supplied to customers at home, you may guess what it is frequently when the customers are many thousand miles off, and cannot return the goods, and, having prepaid for them, have no resource but to sue for damages, which it would be difficult to prove at such a distance. Not infrequently has the writer been asked to try and report on plates, paper, &c., which unlucky amateurs had ordered, and which were evidently old, rejected lots, and were supposed to be "good enough for the Colonies." Very recently a gentleman well known in this colony as an old and experienced photographer, of over thirty years' standing, received a batch of large-sized plates from a well-known house in London, and, on opening the boxes, found that in every dozen at least one-half were sticking to the dividing tissue-paper, that could not be removed without tearing the film or soaking the plate. In addition to this, most careful tests showed the plates to have flaws in the emulsion. The plates were submitted to two professional men, who both declared the plates to be useless. However, the suppliers of the plates, on being applied to, declared that they were part of a batch of exceptionally good plates, and that the remainder had yielded splendid results with them! The result was, of course, a loss to the unlucky customer of about 10*l.*, although he will probably take good care how he deals with the said parties again.

In another case, a firm that advertises extensively in your columns supplied a quantity of albumenised paper, and it is a fact that the spots and imperfections were quite visible when held up to the light, whilst the paper was utterly useless for printing, evidently having been damp and damaged. Now, it is scarcely to be expected that manufacturers or dealers will pay attention to the fault-finding of every owner of "a complete set" of apparatus; but, in the above cases, both of the dealers knew they were dealing with gentlemen of good standing and long experience. It may be mentioned to his credit that Mr. Carbutt not only supplies first-class articles, but pays every attention to the wishes of his customers.—I am, yours, &c., PAKEHA.

New Zealand, April 11.

RESULT OF EXCESSIVE EXPOSURE.

To the EDITOR.

SIR,—Will you allow me a short space in your paper to give the results of some experiments I made lately on the effect of excessive exposure on photographic plates? The plates I used were "Ilford Rapid," and the method of exposing them was as follows:—In a slide I first put three or four pieces of black card, then came the "Ilford Rapid," film up, then a moderately good and plucky negative, film down, so that film came to film. The black cards were to stop reflection and hold all tight. The negative used was a copy of a picture of a girl's head and shoulders, dark hair. The slide was opened (negative side) and exposed to diffused sunlight about the middle of the day in a room close to window. Then the plate was developed up and fixed in the ordinary way. The developer used was pyro and ammonia, normal strength, and the same strength for each plate. The results obtained are given in the following table:—

No.	Exposure in Seconds.	Result, looked at by Transmitted Light.	Remarks.
1	¼ (about)	Positive.	Full of detail, but a little thin.
2	About ½	Positive.	Same as No. 1.
3*	1	Positive (the best).	Slightly better than No. 1, but difference is very slight.
4	2	Positive.	Same as No. 3; perhaps not quite so good.
5*	4	Neutral.	Began quickly developing as a *positive*, then turned dark all over, ultimately the result was as much a positive as a negative, the hair being lighter than the face, as it should for a *negative*, but the eyebrows and eyes and shadows on the neck are darker than the face, as it would be for a *positive*. It shows faintly as a positive by reflected light.
6	6	Negative.	A decided negative, but rather too dense; appears faintly as a positive by reflected light.
7	10	Negative.	Same as No. 6, but slightly better.
8	20	Negative.	Better than No. 7; more contrast; positive by reflected light.
9*	60	Negative (the best).	Fairly good negative; high lights and shadows appear about correct; positive by reflected light.
10	120	Negative.	Slightly thinner than No. 9; not so good; positive by reflected light.
11	840	Negatives	These six appear much about the same in quality; they are thin, but have plenty of detail. Perhaps No. 11 is the best of them, but the difference is very slight. They appear faintly as negatives by reflected light. These negatives have another peculiarity: on looking at the plates before development, I found a faint *positive* image there; thus, they priuted out as positives, but became negatives after development.
12	1080		
13	1200		
14	2400		
15	4200		
16	6600		

Two more exposures were made, of three hours and five hours respectively; these had positive images on them before development, slightly more distinct than Nos. 11 to 16. These two were not developed, but only fixed, and the results were *very thin positives* by transmitted light, and more decided *negatives* by reflected light. The films were very green in colour. The above table, I know, contains a lot which is superfluous, the only essential results being Nos. 3, 5, 9, and perhaps 12.

Have these phenomena ever been observed before? If so, would some one kindly tell me where I can obtain some information on the point?

I am sorry I have occupied so much of your time and space on a subject which may be as old as the hills as far as I know, but which is perfectly new and inexplicable to me. An explanation from some one would greatly oblige.—I am, yours, &c., CROM. H. WARREN.

Hazlemere, Chertsey-road, Redland, Bristol.

POLYCHROMATIC PHOTOGRAPHY.

To the EDITOR.

SIR,—I read in your issue of the 5th inst, that Mr. Ives, of Philadelphia, opposes my assertions relative to the difficulty of realising the theory of obtaining correct representations in colour of subjects reproduced by one of the published processes. He appears, nevertheless, to have clearly supposed my opinion to have been based on what has been proved and published, and not on simple affirmations, which, so far, are not known to have been demonstrated as facts.

I know well enough that Mr. Ives, whose writings deserve attention, has said that he has a method, founded on "colour sensation," which yields the results desired, but I cannot combat such an assertion, since I have never seen anything purporting to support it. I await particulars of it. I admit, however, that among the pigments one works

with, we find, for example, one—blue—which at once gives the effects sought after.

I hold that for producing commercial and artistic work, the subject to be reproduced should be judiciously chosen, and that careful retouching is necessary to give the reproductions a satisfactory exactitude. This reliance upon outside means may not harmonise with pure theory, but it is indispensable to success.

Let me add that I only spoke of what I had seen, and that I reserve my opinion as to Mr. Ives's process, as I have had no opportunity of criticising it, and am, in fact, unable, from mere theoretical outlines, to say anything upon it one way or the other.

Complete success is to be obtained by the method I wrote of, no matter how it is arrived at, or what the means employed may be.—I am, yours, &c.,

LEON VIDAL.

Paris, June 6, 1891.

Exchange Column.

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

Will exchange cabinet burnisher for graduated vignetted background.—Address, H. G HAMBLIN, Romilly Crest, Cardiff.

Exchange, scarf pin, ruby and pearls; wanted, rigid tripod for 10×8 camera, or washer and lamp.—Address, A. ULLMAN, 38, Upper Park-road, Haverstock Hill, N.W.

Wanted, half-plate landscape camera and lens in exchange for new brass taps, force pump, coil boiler and piping for warming studio, small lathe, lapidary's machine, and hydraulic ram for raising water.—Address, PLUMBER, Albany-buildings, Shrewsbury.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

W. H. Bayfield, Richmond.—*Two photographs of W. G. East.*

John Stuart, Glasgow.—*Two photographs of Professor W. Stuart, D.D. Photograph of Professor J. Robertson, D.D. Two photographs of Professor J. S. Candlish, D.D. Photograph of Principal Douglas.*

A. ULLMANN.—Ten shillings a-week will be a fair charge for a month's loan.

C. FRANKLIN.—You cannot be a constant reader of the JOURNAL as you say. A question identical with yours was dealt with a fortnight ago. Refer back to that date.

W. WAKELING (Plymouth) asks where he can obtain particulars of the City and Guilds of London Institute examinations. He should write to the Secretary, Gresham College, E.C.

E. DUBARD (Levallois).—The method of lighting was not found to answer in practice, the battery being found too troublesome. English photographers now use the current of electricity generated by dynamos.

ANTIQUARIAN.—What is known as the plain salted paper of olden times is widely different from the rough surface paper of the present day. It was paper similar to that now used for albumenising. In fact, the Saxe and Rives papers were those generally employed.

W. FORBES complains that a burnisher he has recently purchased, second-hand, makes longitudinal marks on the prints. If this be the case the burnishing bar is scratched. The remedy is to repolish it by working it longitudinally on an oilstone until the scratches are taken out.

J. COOKE.—By placing the components closer together the lens will cover a larger field, but only at the expense of time, inasmuch as a much smaller stop must be employed. Instead of having the tube cut shorter, we should advise a new mount to be made. Then the lenses can be at any time replaced in their original setting bearing the maker's name, and thus restore it to its original value.

R. C. writes: "I am a beginner in photography, and recently bought at an auction sale a ream of albumen paper, but I cannot get a picture upon it, however long I expose. That I get from —— prints in a few minutes. Can you explain the reason?"—The reason is that the paper is not sensitised, while that you get from —— is—that's all. Float the paper on a solution of nitrate of silver, strength, say, fifty grains to the ounce; it will then be sensitised.

W. MCDONALD STUART.—1. The Voigtlander lens will answer your purpose. 2. Messrs. Reeves & Sons' address is Cheapside, London, E.C.

DR. C.—It is quite true, as you say, that none but certificated pharmaceutical chemists are, legally, entitled to supply such chemicals as bichloride of mercury, cyanide of potassium, &c. But you appear to be unaware that the sale of these and other poisons is permitted for manufacturing purposes in wholesale quantities by others than pharmaceutical chemists. There is often less difficulty in getting a hundredweight of a material than there is an ounce.

PHŒNIX says: "Herewith I send you a 'zinco block' and a print from it. You will see it is very coarse, and some of the finer lines are quite lost. This is the best of about twenty I have made, and yet I have followed the directions given in a manual on the subject closely."—The block appears to have been subjected to a too deep etching in the first instance. Supposing the bitumen, or other image, was perfect, much depends upon the initial stages of the process. Zinc etching, simple though it be, requires learning.

C. WILLIAMS.—The samples of cardboard enclosed are of excellent quality as cardboard, but it by no means follows that the best cardboard is suitable for mounting photographs upon. For ordinary purposes to which cardboard is applied the presence of chlorides, hyposulphite of soda, &c., is of no moment. Not so, however, when it is used for mounting photographs upon. Some of our best card-makers will not guarantee their boards as free from matter that will be injurious to photographs mounted upon them. This may be not so much from want of confidence in their manufacture as from the mountants that may be used. As much, or more, injury may arise from the adhesive material employed as from the mounts.

H. H. H. writes as follows: "I recently obtained an excellent negative of an opening ceremonial, and before issuing any prints made it copyright. A fortnight after, and a week after the prints were issued, one of the illustrated papers had an illustration which I am certain was made from my photograph, as no other photographer was admitted to the ceremony, and no artists were present, and, moreover, not the slightest alteration has been made from my picture. The paper does not credit me with the photograph nor mention my name in any way. This treatment is very shabby. Have I any remedy?"—If the facts be as stated, our correspondent has a remedy, and a very substantial one too. The penalty for infringement of copyright is ten pounds for every copy sold. "H. H. H." had better put the matter into the hands of a respectable solicitor, who will then take proceedings against the publisher of the paper, who will then gladly make substantial amends. If photographers were to take vigorous action against many of the illustrated papers for piracy they would often recover heavy damages.

RECEIVED.—J. Stuart (Limited), Glasgow; *The Societies' Reporter; Photography Annual;* W. K. Burton; Charles Street. These in our next.

NEW SOCIETY IN FROME.—We are much pleased to see that a photographic society has been started in Frome, and from the fact that that skilful artist, the Rev. H. B. Hare, fills the presidential chair, we have no doubt of its success. Dr. Dalby is the Hon. Secretary.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, June 17, *Photographing Animals.* June 24, *Actinometers and a Series of Lantern Slides of Hildesham,* by Mr. Frank Haes. Saturday outing, June 13, Whetstone. Train from Moorgate-street to Oakleigh Park at six minutes past two; from Finsbury Park at twenty-five minutes past two.

MR. JAMES WOOD, Liverpool, informs us that his well-known "Washer," with all his patent rights, have been made over to a company who will continue its manufacture at 25, Cumberland-street, Victoria-street, Liverpool. Mr. Wood adds, "The sale have increased 100 per cent. this season, and are in no small measure due to advertising in your widely-read publication."

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, June 18, *Collodio-Bromide Emulsion.* June 20, Outing to Carshalton and Beddington, conducted by Mr. Weir Brown. Train to East Croydon from Charing Cross, five minutes past two; Cannon-street, seventeen minutes past two. June 25, *Orthochromatic Photography.* July 2, *Lantern Microscope,* T. E. Freshwater. July 16, *Means for Obtaining Gradation whether in Negative or Printing,* W. E. Debenham. July 18, Outing to Limehouse, conducted by Mr. C. H. Cooke. August 15, Outing to West Drayton, conducted by Mr. R. P. Drage. September 19, Outing to Greenwich Park, conducted by Mr. A. Haddon.

MR. JOHN CARBUTT, Philadelphia, writes: "As certain dry-plate makers have recently made use of the same letters, A and B, on their labels, and the United States Patent Office having granted me the exclusive use of the letters A and B as a trade mark when applied to photographic dry plates, I hereby give notice that I intend to maintain my exclusive right to the trade marks A and B as applied to dry plates, and will cause proceedings to be taken against any one who infringes upon my rights."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1624. Vol. XXXVIII.—JUNE 19, 1891.

A NEW STYLE OF PORTRAIT WANTED.

Since reference was made last week to the pretty general stagnation of business amongst professional portraitists, we have received several letters on the subject from different parts of the country, as well as from some Metropolitan artists, fully confirming the fact. A very common complaint with the majority is that not only have they a lack of sitters, but competition has caused such a reduction in price that the profit on the little business done is gradually becoming less and less each year.

There can be no question that the cost of producing portraits is far greater now than it was some years ago. At the present time it is customary to take several negatives in different poses, expend much time on retouching them, and then putting them on expensive mounts, in many instances only to find, however good, that the pictures are rejected, resittings having to be given free of charge. Hence, what with the reduced receipts and the increased cost of production, it is not at all surprising that many find portraiture just now anything but remunerative. Two of our correspondents seem to endorse the idea referred to last week, namely, that the public are getting nauseated with photographs of the ordinary type. If this be really true, then the profession should lose no time in introducing some new style of picture that would be likely to become popular.

It will be remembered, when the *carte* business began to flag, that the cabinet picture was brought out, and it quickly gained on public favour. Since then other sizes have been introduced, under different names, but none of them can be considered as commercial successes—at least, in the sense that *cartes* and cabinets have been. The mere change in size or shape of the pictures will not, we fear, be sufficient at the present time to give sufficient impetus to revive the portrait business. What is really required appears to be an entirely new or distinct style of picture altogether. Cold tones and matt surfaces have of late years been much appreciated by those of more refined taste, but the great majority of the public seem to still prefer albumen paper, and its glossy surface.

It is, of course, easy enough to suggest that some new style of picture is required, but it is quite a different matter to say what it should be, and this we shall not attempt to do. We content ourselves with calling attention to the necessity. It may, however, be well to direct attention to some of the older styles of portraiture that did not, at the time of their introduction, receive the attention they appeared to deserve; possibly because photographers were then busy enough with their regular kind of work. A style was mooted—as a new one—a short time back, of taking three or more positions of the face in the same pictures. Those of our older readers will well remember their experience with the old "diamond cameo portraits," in which four views of the face were depicted in the same negative, and they are scarcely likely to adopt any such style again, owing to the impossibility of obtaining several pleasing positions and expressions in the same picture.

Many years ago, Bergamasco, of St. Petersburg, showed some very pleasing pictures with the head and bust vignetted into a black ground, which were very effective, and are easily produced, inasmuch as the vignetting may be done direct on the negative in the camera. This kind of picture is sometimes done now, but as a rule it lacks the vigour of those which used to be produced by Bergamasco. Then, again, there were the Denier pictures. These were very effective, and as, just now, microscopical sharpness is not so much sought after in portraits as it was formerly, they might meet with a certain degree of success if introduced commercially. Although Denier's method of producing the pictures was maintained as a trade secret, equally as good results as his may easily be obtained. It is done as follows:—The printing is carried to a certain depth with the paper in contact with the negative, and is then completed with the paper slightly separated therefrom. This may be done by the interposition of a thin sheet of transparent gelatine, or, better still, a sheet of celluloid.

The greatest, and no doubt the most successful, novelty would be the introduction of a suitable, and different, material from paper as a basis for the picture. Xylonite or celluloid, for they are practically the same thing, may now be had in sheets of various thickness, and with different surfaces. It is also made of different tones and colours, either opaque or transparent, or grained in very close imitation of real ivory. In a previous issue we alluded to some carbon pictures on this material that were very pleasing. Pictures on xylonite need not be expensive, and they would not require mounting. The probability is that this material would not prove more costly than many of the card mounts in general use. This kind of picture would certainly be a novelty, and most likely would be well appreciated.

Many are sanguine that the stereoscope will once more become popular. In anticipation of this it might even now be worth while to introduce stereoscopic portraits, and make them a speciality. In this event, we should advise that they be in the form of transparencies. But pictures on glass are open to the objection that they are easily broken. They might, however, be made on xylonite, which can be had quite as transparent as glass, and backed up with an opalescent sheet of the same material. Such pictures would not be costly to produce, while they would be very effective.

If any new style could be fixed upon, it should be adopted by the profession with unanimity, and be made a speciality of by all to make it a success commercially. Some time ago we heard of an association of professional photographers. If it is still in existence, this is a topic that might well engage their attention with advantage possibly to the whole of the profession.

VARIETY OF RESULT WITH GELATINO-CHLORIDE PAPER.

Resuming our subject of last week, we shall proceed, first of all, to give a working formula for the emulsion, together with comments on the method of procedure. The formula itself may stand as follows:—

Gelatine	600 grains.
Chloride of ammonium	20 ,,
Citric acid	40 ,,
Carbonate of soda (crystals)	40 ,,
Water	20 ounces.

The gelatine, after thoroughly softening in cold water, is liquefied by heat, and the salts and acid added in the order named and in the dry state, the solution being shaken or stirred well after each addition until the crystals are dissolved. The addition of the carbonate of soda will cause violent effervescence, for which reason the mixing should be performed in an open vessel, or in a bottle of much larger capacity than is actually required for the above quantity. The solution is then set aside until the froth has subsided, or it may be passed through a muslin filter to expedite matters, and at the same time transferred to a bottle if the mixture has taken place in an open vessel. The sensitising is effected by means of one hundred grains of silver nitrate, added as before in the form of crystals, and the bottle well shaken until they are quite dissolved, when it may be placed in a vessel of hot water to ripen.

At this stage the emulsion presents a very feebly opalescent, or milky, appearance, as compared with one of bromide, but, viewed by transmitted light, exhibits a beautifully rich orange colour. If poured on to glass, it is scarcely distinguishable from plain gelatine, until placed in daylight, when its colourific power becomes apparent.

With regard to the gelatine used, there are one or two points of importance to be observed. In the first place, it must be perfectly colourless, or as near so as possible, and some of the foreign sheet gelatines are superior to the purer English makes, in this respect at least. But they are not invariably found to suit the process in other ways. For instance, we have met with samples of beautifully transparent and colourless foreign "leaf" gelatine that could scarcely be got by any means to give a warm tone in the printing frame, a result due, no doubt, to some detail in the process of manufacture. Such gelatines, nevertheless, often give every satisfaction when used for bromide emulsion for development. Then, again, these foreign samples are generally of the type known as "hard," and do not give so fine a gloss, when that is required, nor such depths in the shadow, when "matt" pictures are in question. We deem it desirable, therefore, to adhere to the home manufactures, which, though slightly more expensive, make up for their extra cost by the superior results they give.

A word may be said with regard to the use of alum for the purpose of hardening the films. Most of the commercial gelatino-chloride papers are found very difficult to handle, especially in warm weather, on account of the softness of the gelatine, which dissolves away in patches, but chiefly at the edges, where the warmth of the fingers suffices to cause solution. We have heard it frequently asked why the makers do not harden the film with alum, as is so commonly done by photographic *plate* makers. The answer is not far to seek. Alum, but especially chrome alum, exercises a powerful influence on the colour of the image; indeed, with chrome alum in the emulsion itself, or even present in the substratum, if such be employed, it is next door to impossible to secure a satisfactory tone. Ordinary alum in the silver bath for albumen paper has a tendency to produce red images, though not of a very pleasing kind; but with gelatine, though its action is not so bad as that of chrome alum, it only tends to produce a foxy yellow image that is difficult to tone to any pleasing colour. Therefore we strongly advise that a pure gelatine be used, and, to avoid as much as possible the danger of the film dissolving as we have described, that the emulsion be not exposed at any time to a temperature any higher than is necessary to keep it liquid for coating purposes.

The formula we have given may be regarded as a stock one from which to make deviations as may be required. As it stands, it gives a moderate gloss—similar to unburnished albumen paper—without any special treatment, but, if stripped off polished vulcanite or glass when dry, presents a very fine enamel surface. If a higher gloss be required, more gelatine may be added to it, say, from ten to thirty grains or more to each ounce. If the gelatine be allowed to swell first in cold water, it will absorb sufficient to so far increase the volume of the emulsion, that the quantity of silver spread over a given area remains nearly the same, the film being thicker, but containing proportionately less metal. This results in greater transparency, which is the beauty of the highly glazed picture.

If, on the other hand, a "matt" surface be required, simply dilute the emulsion by the addition of water until it carries not more than twenty grains of gelatine to the ounce, or until the desired degree of "mattness" is obtained. If, when this point is reached, it is found that the image lacks vigour, this must be supplied by increasing the proportion of organic salt, as will be explained presently. But the very fact of rendering the surface "matt" adds to the apparent vigour of the shadows by lowering their transparency, and it is seldom recourse will have to be had to that remedy.

As it stands, the formula is well suited for negatives of moderate density; but, if it is to be adapted to thin delicate images, increase the organic element, and, if necessary, the margin of free silver, and generally dilute the emulsion. What is required is to produce a very sensitive film that will darken rapidly to a rich deep colour, one, in fact, that will allow the shadows to gain depth before the half-tones become heavy. A good excess of silver nitrate and a fair proportion of citrate of silver will effect this; but, if the resulting prints should prove heavy and wanting in transparency, then dilute the emulsion by means of a plain gelatine solution of the same strength. In any attempts to modify the character of the emulsion in this manner, the various ingredients should be used in the proportion of one grain of citric acid, two grains of carbonate of soda, and two grains of nitrate of silver, in the order named, and these quantities may be accepted as the normal for each ounce of emulsion, to be varied as circumstances require, but always retaining the proportion. If the free silver is also to be increased, this must be added in addition to the above.

For dense negatives the free silver may be increased without any further addition of citric acid or citrates, and the emulsion diluted by the addition of water or of plain gelatine solution, according to the character of the surface required.

Very many other variations may be made, though it is impossible to do more than briefly indicate their nature; for instance, the alteration of the salt, substituting sodium, potassium, or calcium for the ammonium chloride. Barium chloride would be a useful salt if it were not for its tendency to cause the gelatine to clot. The organic acid may also be varied, though, as we stated last week, citric acid appears to be altogether the most suitable. But it must be borne in mind, in so altering the formula, allowance must be made for the differences in combining equivalents of the various salts.

As a systematic manner of using this emulsion, we would suggest that it be kept in stock in the above form, a little alcohol and a very small quantity of salicylic acid being added to make it keep, from five to ten per cent. in volume of the former, and a quarter of a grain to the ounce of the latter being suitable quantities. The salicylic acid is very slightly soluble in water at low temperature, but is freely soluble in alcohol, so it will be well to dissolve it in the latter before adding to the emulsion. If, when the emulsion has set, a little alcohol be formed on top of it, it will prove an additional safeguard against decomposition.

When the emulsion is wanted for any purpose that necessitates a modification in its composition, it is an easy matter to liquefy it by heat, having first poured off the protective alcohol, and to take such quantity as may be required for treatment, setting the stock aside again intact. But, if any considerable amount of printing from negatives of different kinds is to be executed, it will be just as easy to prepare the various grades of emulsion separately, working on the lines we have laid down, and to keep them all in stock ready for use. This plan will prove itself all the more desirable when it is remarked that it is far more difficult to manipulate paper with small quantities of emulsion than glass; indeed, it is possible to coat glass plates easily from a stock of emulsion that it would be hopeless to attempt to spread on paper, except by the primitive method of pouring it on to a sufficiently large sheet, and allowing it to spread as far as it would.

There is indeed little need to be parsimonious in the matter of quantity, for, as may be seen by a glance at the formula, one ounce of nitrate of silver will make over half a gallon of emulsion, and the rest of the ingredients are cheap enough.

We conclude this article by repeating what we said last week, namely, that the manufacture of a chloride "printing-out" emulsion is very much easier than one that is required for negative work or for development. No special apparatus, no special dark room or manipulation, and, what will be the most important to many, no special nicety or accuracy in weighing out the materials. The whole operation of making the emulsion may be carried out in an ordinary room, even in daylight. The coating and drying the paper requires a little more care, but not much, and that we shall deal with next.

UNSOLVED PROBLEMS IN PHOTOGRAPHY.

In some of the text-books on the rudiments of chemical science that were extant a generation or more ago, we can remember that in the treatment of such divisions of the subject, for instance, as that combining weights and atomicity of the various elements, the student was in substance advised not to cultivate such a deep belief in the certainty of the views then current among chemists as would stand in the way of his acceptance of new and possibly more correct theories which the future might call into existence. Such counsel as this, to students of progressive science, bears its own value on its face, and in no sense stands in need of confirmation, although, if it were sought at the present time, it might virtually be obtained by contemplating the great changes that have taken place in the state of scientific knowledge since the date we write of—changes which point the expediency, if not the necessity, of avoiding, as far as possible, a dogmatic system of teaching which automatically closes the mind to the entire reception of new truths as they may be discovered, and thus directly leads to the perpetuation of error; for the difficulty of unlearning a principle is much increased when the mind has acquired the conviction, either spontaneously or under tutorial influence, that it is immutable, and thus an early recognition of its liability to emendation or abandonment, if occasion should ever arise, is invaluable.

The theoretical side of photography forms the subject of a tolerably large number of modern treatises, and many of their authors have themselves taken part in the experiments and investigations that constitute the foundations, or, at least, a portion of the structure, of recorded knowledge. In some of these works the chemical changes that occur, or are assumed to occur, are referred to in such a way as to prevent the approach of doubt, or even of inquiry, to the mind of the student, while leaving in it no uncertainty as to the unassailable confidence felt by the writers in the perfect accuracy of the reactions described. Now, if ever there was an instance where great caution and no little reserve in entertaining the teachings of theory was advisable, photography supplies it. Progressive in every sense of the word, there are so many of its fundamental points which, from the diversity of views expressed with regard to them, cannot possibly be thoroughly understood by any but a comparative few, that the desirability of dealing with them in a guarded manner is palpable. It is true that there are some writers to whom this reproach cannot justly be addressed, but from an intimate knowledge of most, if not all, of what has been written on the subject, we can say that they form the minority. Over this, that, or the other theory, the remainder "take sides" with that fatal kind of ardour which easily communicates itself to others, and finds expression in innumerable papers and articles published in the photographic press, all breathing a spirit of partisanship and sometimes of prejudice.

It would be well, therefore, if those whose task it becomes to deal with theoretical photography for the benefit of those commencing the study of it were to borrow a hint from many professors of the older sciences, who in their writings are careful to abstain from that tendency to dogmatise which too often characterises photographic authors. The action of light on silver compounds has formed the subject of long and constant investigations, and the change that takes place has found several plausible explanations which, when put to comparison, exhibit discrepancies and disagreements of the most vital kind. Besides the authors of them, these theories have secured many more or less unprejudiced outside adherents, so that there exists at this moment something like a three-sided battle of the theories, the end of which no man can foretell. Clearly, not all of these theories can be true; and, if there ever comes a time when one of them is proved to be the correct one, the adherents of the remaining two will find it a hard matter to reject their old opinions—if they succeed in doing so

at all. Such a state of affairs, we contend, would be directly the fault of those who have started to lay down the principles of photo-chemical theory according to their own prejudices, and after the style of the most dogmatic of theologians.

The one mentioned is not the only unsolved problem found in photography towards which an attitude of open-mindedness is the wisest to take up pending its unmistakable settlement, as we are reminded when recalling some points of the discussion on *The Influence of Development upon Gradation* which took place at the last technical meeting of the Photographic Society of Great Britain. An old and undoubtedly well-grounded belief among photographers that development in its many methods and modifications placed in one's hand perfect control over the principal qualities of the negatives has recently been strenuously and ably attacked and denied, so that there is a possibility of being called upon to unlearn, at the bidding of the experimenters, what most of us have hitherto regarded as a well-proved truth. This would be no easy thing to do. Some of the experiences and views related and expressed at the meeting in question, when regarded by old lights, are decidedly heterodox. Mr. Hurter correctly said that "photographers generally were under the impression that they could overcome the effects of under and over-exposure by treatment in developing." But "a gentleman had recently assured him that there was not a photographer in existence who thought the effects of over and under-exposure could be overcome," which, on the part of the gentleman (whoever he may be), is a statement in urgent need of proof. It all hinges upon what is meant by "under" or "over"-exposure. The controversy as to whether the ratio of density—in other words, the gradation—of a negative is, or is not, alterable by development has, we fear, only just begun, and most photographers will not be deeply interested in the battle; but we do not think their attitude towards the point in dispute, expressed in ordinary language, will undergo any change. We say so much without any wish to range ourselves on either side.

Whether in the case we have just cited a new theory is destined to supplant the old one, it gives us a fair idea of the value of the advice quoted at the commencement of our article. It will be all the easier for us to regret a long-standing belief in the elasticity and power of the developing solutions if we have simply entertained it as a proposition convenient enough to hold, but still open to question, or even discussion; and if, moreover, we have not been guilty of what Mr. F. Hurter evidently regards as an unpardonable offence in photographers—namely, "trusted to the eye" instead of to the "exact measurements" of an instrument *admittedly* "not absolutely correct." Let us here premise that our intention at starting was not to criticise the Hurterian theory, and that we only make these references in passing. We may on a future occasion have something to say upon the slender support which this theory receives from practical photographers.

To conclude. Some conscientious experiments in the chemistry of intensification by and with mercury, by Mr. Chapman Jones, not long ago, illustrated the advantages of keeping one's self in a state of being able easily to unlearn old theories. The author proved that the nature of the intensified image is something very different from what it had previously been supposed to be; and, moreover, clearly pointed out the true value of the process, on both of which heads we can now see that a world of misconception has existed for years. There is undoubtedly room for a great deal more work of this "correctional" nature in photography. The rapidity of shutters, and of sensitive films, are the favoured sport of amateur arithmeticians, whose "answers" unfortunately do not, and cannot, prove. There are sceptics who smile when mention is made of pictures being taken in the five-hundredth part of a second, when the great practical sensitiveness of modern dry plates over the practical sensitiveness of old wet plates is descanted upon, and who suppress all displays of enthusiasm when reference is paid to the "permanence" of recently introduced printing processes. Their attitude is reasonable enough. They say, in effect, what we should advise the student of photo-chemical theory ever to keep before him when asked to accept a great many so-called explanations of the phenomena of his subject, namely, Not Proven; nay, even, at present, to apply those same words to that ingenious iconoclast himself, Mr. F. Hurter.

The Annual Convention of the photographers of the United Kingdom at Bath is fast approaching, and those who purpose availing themselves of this pleasant reunion ought to be making their arrangements for it. Manufacturers and dealers who intend to exhibit apparatus for which no charge is made to members, non-members paying only ten shillings for the privilege, should send their best and latest novelties in time. It opens on Monday evening, July 6, and continues till the end of the week. We direct special attention to a letter on this subject from Mr. C. H. Bothamley, which will be found in our correspondence columns.

Dr. Schobben's lantern stereoscope seems to have promise of real usefulness. It was exhibited at a recent meeting of the Physical Society, and the effect was considered very striking. It consists, as some of our readers will remember, of a double lantern, by which the two pictures of a stereoscopic slide are projected on a screen—so far like the well-known plan of all unskilled theorists. The difference in the use of the new lantern consists in making the two pictures coloured, the tints being complementary, by means of two pieces of glass, one red and one green, placed in front of the lenses, and then viewing the pictures through spectacles the eye-glasses of which are also coloured red and yellow.

In the discussion that followed, Mr. Boys stated that he had tried to obtain similar results of stereoscopic vision with the aid of polarised light, by viewing two polarised images through Nicol's prisms. He failed, however, to obtain any effect, owing to the fact that the screen polarised the light elliptically that fell upon it. He thought, however, that if a dead-gold screen had been used, instead of an ordinary one, the effect might have been obtained. We can only say that, if the scheme were practicable, there is much probability that the effect would be better than that produced by coloured glasses; but the need for a dead-gold screen would be prohibitive as to its practical success, even bearing in mind the possibility of being able to convert the screen gilding into chloride of gold, if, after all, success did not attend the experiment.

We think that some photographers would have been able to give expert evidence in a remarkable case that recently came before a metropolitan magistrate. An expert in metals, under the *ægis* of a nobleman, offered, for a very large consideration, to show how to increase the weight of gold many times by a particular process, and, before payment, actually to perform the act of transmutation before the purchasers. The experiment was tried, and the gold increased in weight. Unfortunately, the police then stepped in and arrested the conjurer, for such indeed he was rather than chemist. He had added a certain brown powder, which appeared to be neither more nor less than the familiar brown precipitate made when gold solutions are precipitated, by sulphate of iron, for instance. It was alleged that he had done the same thing before, the plan being to get a large lump of gold to augment in weight, and then to assemble the party to the investment

round him, his furnace, and crucible. Very soon a nauseous smell arose, which increased so much as to compel every one to fly from the room, and when it was dissipated, and they returned to the room, there was no chemist visible, and—no gold.

The colour of the sky in England has been found by Lord Rayleigh to be more saturated (that is, free from alteration by reflected white light) than that observed at Potsdam by Professor Vogel, and M. Crowe finds that, at Montpellier, in the January of last year, the saturation was greater than that of either English or German skies. It is obvious that the quality of saturation must play an important part in the successful delineation of white cloud against blue sky by photographic means.

Silver fluoride has been prepared by M. Henri Moisson in the form of light yellow moss, tough and elastic. Its fusion point is 4·35° C. It reacts very energetically upon the non-metallic chlorides.

Two valuable papers on the result of the action of light on chloride of silver have recently been published. One, by Mr. Arthur Richardson, of University College, Bristol, details the results of investigations to ascertain whether silver chloride, which has been darkened by exposure to light under water, contains oxygen. He found (1) that oxygen was evolved during exposure; (2) when small quantities of water were present, chlorine and hypochloric acid were found in solution; (3) when a large volume of water was taken, hypochloric acid was detected, but no chlorine. His experiments showed that even minute quantities of this acid exercise a marked influence on the stability of chlorine water when exposed to light, the rate of decomposition of the silver chloride being dependent upon the readiness with which the chlorine in solution and water interact to form hydrochloric acid. Not to load this brief abstract with details, we may say, Mr. Richardson's conclusion was that the possibility of the presence of an oxygen compound in the darkened product was entirely precluded by the results of his experiments. He noticed that when the carefully dried chloride was exposed to light in a tube containing dry tetrachloride of carbon, from which all air had been removed, darkening took place. From all these experiments he concludes the darkened product to be of the nature of a subchloride rather than an oxychloride.

The other experiments we refer to are by M. Guntz, and bear upon the variations of colour in the subchloride; they may have a practical bearing upon some questions of the tone of silver prints. He states that, according to the temperature at which it is produced, the subchloride varies in colour from deep violet red to a black violet. The action of light tends to produce the black modification without a loss of chlorine. By the action of heat the subchloride is decomposed, turning pale yellow, and leaving silver and silver chloride. Dilute nitric acid has no action. Strong nitric acid reacts, especially in heat, and produces silver chloride more or less mixed with subchloride, and forming lakes of various colours (Mr. Carey Lea's photochlorides).

ON THE UTILISATION OF SPOILED PLATINOTYPE PAPER.

Platinotype paper is such an expensive article now that one cannot afford to lose a single sheet of it that can, by any means, be made to do service.

A few days ago I came across a forgotten calcium tube in which I found ten sheets of platinotype paper 26 × 20 inches. They had been coated more than a year, and, as I had expected, when I tried to get prints on this paper, working in the usual way, the result was that the whites were horribly degraded, and this pretty well the same whatever variations of the hot oxalate of potash bath I tried.

In my mind I had vague recollections that there were ways of getting good results out of platinotype paper that had become greatly fogged. There were somehow mentally associated, fogged platinotype paper, Mr. A. Haddon, and carbonate of soda. Also, I had a dim recollection that there was a note on the subject in some recent volume of The British Journal Photographic Almanac.

I set to to search for the latter. No slight task this, because the "table of contents" in The British Journal Photographic Almanac is so ingeniously buried among the advertisements that it generally takes less time to go through the whole matter in the volume, in search for any particular piece of information that is wanted, than to find the aforesaid table of contents. If there is any alphabetical list of contributors, I have not been able to find it yet. In spite of all this I found, on p. 492 of the volume for 1888, just what I wanted. It was a note to the effect that Mr. H. M. Hastings had purposely fogged platinotype paper in various ways (or rather had so treated it that it would have fogged if developed in the ordinary way), but had, nevertheless, got prints with pure whites by the use of a cold solution of carbonate of soda, with a trace of hypochlorite of potash added, as a developer, printing the proofs much longer than usual.

Unfortunately, there were no particulars as to the quantities either of the soda or of the hypochlorite that should be used; moreover, hypochlorite of potassium was a substance that I knew nothing of, and concerning which nothing was to be learned from the local dealers in chemicals. The first difficulty, however, could be got over by trial, the second was got over by an appeal to Dr. Edward Divers, F.R.S., who is always a friend in chemical need. A "chit," as we barbarously call a short note in this country, sent to Dr. Divers, elicited the following information. "The hypochlorite of potassium is not a salt which can be prepared in the solid state. A solution is made occasionally if wanted. . . . The solution I send is *sodium hypobromite*, and I cannot think of a case in which you will not find it replace, without objection, potassium hypochlorite." The information was accompanied by a promise that some hypochlorite solution would be sent to me in a few hours.

Dr. Divers presently brought me the solution, and gave me, when I explained the object for which I wanted it, the following information. Hypochlorite of potassium cannot be prepared in a pure state, and even the solution always contains several other salts. Moreover, the hypochlorite is very unstable, especially under the action of light. It will, therefore, be necessary, every time that a developer is made up, to find out by trial how much is needed of the solution for the particular batch of fogged paper that is to be worked.

Further, there can be very little doubt that a hypobromite would do as well as a hypochlorite, and that hypobromite of sodium would serve as well as hypobromite of potassium. In this case there would be the great advantage that the hypobromite of sodium would be produced *in* the developer by adding bromine water to it, the reaction being as follows:—

$$\underset{\text{(Bicarbonate of soda.)}}{2\,Na_2CO_3} + H_2O + \underset{\text{(Hypobromite of sodium.)}}{Br_2} = 2\,NaHCO_3 + NaOBr + NaBr.$$

There is the immense advantage that bromine water (a saturated solution of bromine) is a constant solution, so that it would be possible to find out, once for all, how much of it should be used.

All this was most useful information, and I intend to try the thing as soon as I have time. Meantime, I had the hypochlorite solution that Dr. Divers had kindly made for me, and set about to use it.

I began by making several random shots, with the natural result of wasting both platinotype paper and the precious hypochlorite solution, and then set to find out systematically what strengths of solution should be used, and how long printing should be continued. There were three separate things to determine—(1) What strength of soda solution should be used? (2) What amount of the hypochlorite was needed to prevent fog? (3) To what extent printing should be carried?

The strength of soda solution needed could best be determined by making several prints and developing them with different strengths of solution. This was done (printing considerably more deeply than for development with hot oxalate of potash), the result being that there appeared to be considerable latitude allowable, but that a five per cent. solution seemed to act particularly well. Development took from about fifteen seconds to a minute, according to the nature of the negative and the depth of printing. The whites of these prints were degraded, but not so much as when developing with hot oxalate of potash.

To decide what quantity of the "dilute solution of hypochlorite of potassium" should be used, forty ounces of a five per cent. solution of washing soda were made up, and a number of small strips of unexposed paper were taken. One of these was placed for one minute in the soda solution, and was then transferred to a hydrochloric acid

clearing bath. Result: decided fog. One drachm of the dilute solution of hypochlorite of potassium was added to the solution, and a second strip was developed. There was no apparent improvement; but a second drachm added began to give a reduction of the fog. The hypochlorite solution was added a drachm at a time, a strip of paper being developed after each addition till, when the ounce of the solution had been added, the strip of paper showed pure white after development. Another half-ounce of the hypochlorite solution was added to give a "safe edge" in working.

It is to be observed that this process should be gone through every time that a quantity of developing solution is made up, if any length of time has elapsed since the hypochlorite was last used, on account of its instability and consequent want of constantness. Even if the constant bromine solution proves effectual, it will be advisable to vary the quantity used according to the *amount* of fogginess of the paper. The action of the hypochlorite is, I imagine, to oxidise any ferrous oxalate that has been produced from the ferric oxalate with which the paper is coated back to the ferric state again, and the amount of hypochlorite added must be just enough to oxidise that quantity of ferrous oxalate that causes the fog before it has time to begin to reduce the platinum salt in the paper, but must not be strong enough to oxidise that slightly greater quantity of ferrous oxalate that represents fine, high, light detail. In fact, it is a case of striking a very fine balance; but, as the balance can be struck in a few minutes by developing a few scraps of paper as described above, that is no great drawback. The indication of too much hypochlorite is, that the high lights are chalky and without detail, even if the paper has been very fully printed. If, in developing a number of prints, there appears, after a time, any tendency to fog, more hypochlorite must be added; but the best way to work is to put a scrap of paper in the solution from time to time, leaving it there for two or three times as long as is necessary to develop a print, and to add hypochlorite if *this* strip fogs. The smell of the solution is a fair guide to the amount of hypochlorite present, after once it has been mixed up of the right strength.

To find out how deeply it was necessary to print, there was nothing to be done but to try several prints. It was found that, with the quantity of hypochlorite of potassium that I had had to add to prevent fog with the particular sample of paper that I was using, it was necessary to print till every bit of detail that was wanted became visible. Development did not bring out a scrap of detail that could not be seen as the print came from the frame. The time taken for printing was fully as much as that needed for printing on albumenised paper.

By the time all these determinations had been made, two sheets of the paper had been used. As I wanted a number of platinotype prints at once, I determined to print the whole of the paper, cutting it into quarter sheets of 13×10 inches, and printing from 12×10 negatives, washing the picture down a bit in nearly every case.

These were all developed in the quantity of solution mentioned above, a little hypochlorite of potassium being added from time to time as already described above. At the end of development the solution was of a deep red colour, and, I presume, contained a considerable quantity of recoverable platinum.

Of the thirty-two prints then made, the following was the result:—Four were over-developed. Here it is to be observed that over-development seems to be the fault that one is most likely to run into in working by this method. There are several reasons for this. In the first place there is the well-known fact that platinotype prints darken a little in drying; but there is the further reason that, whereas in working the hot-bath process it is necessary to print to the exact amount necessary for the temperature of bath to be used, after which a definite result is got almost instantly, with the method I am writing of, the best results, from most kinds of negatives, are got by printing rather more than is necessary to get a dark enough print, if development be carried as far as it will go, and, by stopping development short at the right instant, watching the print closely as the detail comes up. This has the advantage that, by varying the tone of printing and that of development, different kinds of prints can be got from the same negative. There is the still further fact that the deep orange colour that the whole paper assumes the moment that it goes into the soda solution makes judgment of the result a trifle difficult at first.

The difference in the finished print in the case of over-exposure and over-development is that, in the first case, there are both degraded high lights and over-deep shadows; in the second, there are only over-deep, or "mucked-up," shadows, the high lights remaining pure. Two prints were under-exposed, and, being left for several minutes in the developer, in the hopes of bringing them up, were fogged in the high lights and the margins.

One print was spoiled through uneven coating of the paper.* One print was accidentally taken out of the frame too soon by mistaking one frame for another. The other twenty-four prints were all that could be wished.

It seems to me that this process has decided advantages. In the first place it makes platinotype paper, otherwise useless, available, and this without taking the usual precautions against dampness. In the second place, it is a great advantage to be able to see distinctly all the detail wanted in the printing frame. This is particularly so when clouds have to be printed in. Indeed, the advantage in this case is so great that if, on trial, it turns out that fresh paper can be used in this way without giving hard and chalky high lights, I should much prefer the method to the hot-bath process. After sufficient practice, the fact that results can be greatly varied by variations in the times of printing and of development should be a great advantage.

Two things I wish yet to try, namely, whether fresh paper can be worked satisfactorily in this way, and whether bromine water will give the same results as hypochlorite of potassium. When I have investigated these matters I shall, with the Editor's permission, report the results in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY.

W. K. BURTON.

DECIMAL WEIGHTS AND MEASURES.

FOR several years the decimal question has been quietly slumbering, but the development of foreign competition and other causes are now forcing renewed attention to it. The subject is certainly one of great importance, and our readers will, doubtless, be glad to have a short statement of the present position of the matter.

If our coinage, weights, and measures were decimal, fractions could be added, subtracted, multiplied, and divided in the same way as whole numbers, and compound arithmetic would be superseded. From an educational point of view the advantage of such a change would be immense, and during the past year many of the leading School Boards petitioned the Education Department in favour of decimals being taught on completion of the four simple rules. Chiefly, in consequence of this, the New Code (1891) provides that "the scholars in standards V., VI., and VII. should know the principles of the metric system, and be able to explain the advantages to be gained from uniformity in the method of forming multiples and sub-multiples of the unit."

It is, no doubt, an important step to familiarise the rising generation with the metric system, always supposing that the weights and measures of this system are to be generally used. If the metric system is not to be adopted, the question will naturally be asked, Why should our overworked teachers and scholars have this additional burden cast upon them? The educational gain will be great if we adopt the *metric* system instead of our odds and ends of incongruous and perplexing weights and measures; but the gain will be greater still if we also have a decimal coinage. It would, however, be Utopian to suppose that all could be changed at once; but a complete, though gradual, change should be contemplated. As a question of practical politics, it will not do to attempt too much, and there appears to be a general agreement among the advocates of the proposed reform that the weights and measures should be dealt with first, and the coinage afterwards. This opinion is strengthened by the fact that the last Royal Commission on Decimal Coinage reported (1857) that it was undesirable to change the coinage "while our weights and measures remain as at present, and so long as the principle on which their simplification ought to be founded is undetermined."

Various proposals have been made for decimalising some of our existing weights and measures, but the Select Committee of 1862 (on Weights and Measures) pointed out that "it would involve almost as much difficulty to create a special decimal system of our own as simply to adopt the metric system in common with other nations; and, if we did so create a special national system, we should, in all likelihood, have to change it again in a few years, as the commerce and intercourse between nations increased, into an international one." The Weights and Measures Act, 1878, has led the way by providing for the verification of metric weights and measures used for purposes other than trade, and sets forth the equivalents in imperial weights and measures. More recently the Board of Trade Standards Department has obtained metric standards of the highest scientific precision.

* The paper was coated by myself. If an amateur coats his own paper, he is likely to lose a print now and again by uneven coating; but, if he is decently careful, the percentage of such loss should be very small, and I wonder that so few platinotype workers, so far as I can ascertain, coat their own paper. The process seems a formidable one when the instructions of the Platinotype Company are read, on account of the painstaking minuteness with which they have been written; but it is, in reality, very easy. It is easier to learn than to learn to float albumenised paper without getting either air bubbles or streaks of solution on the back, and the advantages are great of being able always to have fresh paper, and of being able to vary the quality of the paper to suit different kinds of negatives by varying the quantities of the "A" and "B" solutions of the Platinotype Company's sensitiser.

Many persons think the metric system simple, rational, and good, but fear trouble if we adopt the French names usually associated with this system. The French metric tables are, no doubt, complete and symmetrical, but in the ordinary affairs of domestic and commercial life barely a third of these names are used, even in France. In the elementary schools of Germany only *nine* names are taught for the metric weights and measures, viz., metre, decimetre, centimetre, and millimetre; litre and hectolitre; gramme, kilogramme, and centner. These names are sufficient for Germany, and there is no reason why we should have more; moreover, it cannot be said that they are more difficult to learn or understand than such words as multiplication, subtraction, diameter, telegram, telephone, &c., which are in familiar use by all classes.

The Select Committee of 1862 reported very strongly in favour of the adoption of the metric system, and it is urged that, good as their reasons then were, the need for the change is now very much greater, and it could be effected more easily than thirty years ago. Since then, elementary education has been made compulsory, and is controlled by the representatives of ratepayers under Government supervision. The School Boards wish the change, and all classes of the community are better prepared for it; we have also seen that experience in other leading countries has shown that the French metric tables, formerly proposed, can be greatly simplified. Apart from these considerations, there is the important fact that, excluding our own dependencies, the United States and Russia, all the civilised countries of the world (with an aggregate population of nearly 330 millions) have now adopted the metric weights and measures. Put in another way, nearly sixty per cent. of our imports (excluding British possessions) and over seventy per cent. of our exports come from and go to countries which have adopted the metric weights and measures. Not only is this so, but the foreign makers who compete with us come chiefly from countries where the metric system is used exclusively. Thus, while our foreign customers are troubled and perplexed with our absurd weights and measures, our competitors are able to offer them goods and machines in terms of the only weights and measures with which our customers and competitors are familiar.

There is little doubt that this gives a real advantage to our competitors. Suppose, for instance, that a manufacturer in Barcelona requires some new machinery for spinning, for dyeing, or for finishing. He will probably require detailed drawings and specifications to be submitted to him, and he will expect to have them based on the metric system which has been adopted in his country. On their part, our competitors from France, Germany, and Italy will also follow their usual metric scales for the drawings, and will specify the work to be done in terms of the metre; but if the English maker follows his usual scales, and his usual weights and measures, the Spaniard will either not understand them, or must be at the trouble of converting them into metric equivalents, so as to compare them closely with those of the other competitors; or the Englishman must prepare his drawings and calculations in a way he is not accustomed to. This, however, is not the only drawback, for, as the negotiations proceed, various alterations and details will have to be discussed, and the Englishman must be *au fait* with the metric system, not only to make himself clearly understood, but to prevent his entering into engagements he cannot profitably fulfil. Further than this, if an English machine is eventually ordered, the maker will probably have to send an English mechanic to erect it abroad, and the latter, in his turn, will be perplexed with the foreign weights and measures, and will have much difficulty in giving instructions as to the dimensions to be followed. This is no unusual case, but is the every-day experience of all makers of machines, and of the merchants or agents who so often act as intermediaries. If we take the common case of a portable engine required for agricultural purposes, in any country where the metric system is used, the steam pressure, the horse power, and the fuel consumption must all be expressed in terms of the metric system. So also with pumps, and an endless variety of the commonest machines. Again, if so simple a thing as a gas-stove is required for heating or cooking, the consumption of gas and the heat developed must be based on the metric system. Or, suppose a purchaser in Spain or Italy requires cement, he will naturally specify the weight in kilogrammes, and the tests to which the cement must be subjected will also be based on the metric system. The same with coals, iron, and many other natural and artificial substances; and the general result is that the merchant or manufacturer who competes with foreign sellers must either put himself at a disadvantage if he quotes in English weights or measures, or he must adopt the metric system in his calculations and in his contracts.

The Chambers of Commerce are all in favour of the proposed change; and, when a joint deputation of the London Chamber of Commerce and the Decimal Association waited on the Chancellor of the Exchequer the other day, he admitted that the change would be an improvement, and that on theoretical grounds it was right. He did not even discuss the question on its merits, and merely referred to the difficulties of effecting the change. On this point the experience of other countries is reassuring, and the best example is probably that of Germany. In that country four years were allowed within which to effect the change, but as a matter of fact it was over practically in a few weeks. There certainly appears to be a *primâ facie* case for adopting the metric weights and measures without further delay, and it seems desirable that a Select Committee should be appointed to consider the question in all its bearings, and especially in the light of our present requirements. Over 150 Members of the present Parliament signed a petition for further inquiry by a Royal Commission or Select Committee, and many other Members are known to be in favour of such a course. The Education Department has already ordered that the metric system shall be taught in the primary schools; the Chancellor of the Exchequer has just said that the Government will not oppose the appointment of a Select Committee; and it now remains for the pressure of public opinion to make itself felt through the usual channels.

In conclusion we may add that, as a step in this direction, the following memorandum is now being extensively circulated in workmen's clubs, &c.:—"We, the undersigned, after having carefully considered the subject, are strongly of opinion that the reform of our present system of money, weights, and measures is a question which is deserving the earnest attention and support of all Trades Unions and of the working classes generally. We believe that it would be to the advantage of commerce and industry, that it would tend to reduction of school rates, relief of mental pressure to scholars, and the simplification of accounts generally, were the decimal system, now so universally in force in all civilised countries, adopted by the United Kingdom." Signed by Thomas Burt, M.P.; C. Fenwick, M.P.; John Burns (London County Council); Tom Mann (President of the Dockers' Union and Member of Royal Labour Commission); Malcolm McGregor (Labour Representative on the School Board for Leith); and Henry Tait (General Secretary Amalgamated Society of Railway Servants for Scotland, and Member of Royal Labour Commission).

It is right to say that we are indebted to the Decimal Association for several of the above particulars, and, if any of our readers desire further information on any point, they will do well to write direct to its London office, Botolph House, Eastcheap, E.C.

PHOTOGRAPHY AND FICTION.

"The House with the Seven Gables."

In Nathaniel Hawthorne's romance of *The House with the Seven Gables*, which was published in the early days of photography, we find Holgate, one of the most prominent characters in the story, is a photographer, who plays an important part in the working out the plot of the tale.

A retrospective view covering some two hundred years is made by the author at the opening of the story, in which is given a brief outline of the family's rise and gradual decline, down to the date when the romance begins.

The house with the seven gables was built on a piece of ground which previously belonged to one Maule, and the roadway was known as Maule's-lane, but afterwards the name was changed to Pyncheon's-street. For years there had been a feud between Maule and Pyncheon regarding this bit of ground, but Maule occupied the soil and retained it during his life. He, however, came to an untimely end. Maule was accused of witchcraft, and Colonel Pyncheon on the occasion pursued the prosecution with the bitterest personal enmity, so much so that Maule said "he was being hunted to death for his spoil."

Maule was executed, but before the fatal moment, as he stood upon the scaffold, he turned and pointed to Colonel Pyncheon, saying, "God will give him blood to drink."

When Maule was dead the humble homestead fell an easy spoil into the Colonel's hands.

On the ground was built the house with the seven gables. On the day of its completion it was opened with great rejoicings, but in the midst of the festivity the Colonel was found sitting in his chair—in his own room—dead, with his shirt, and ruff, and beard all saturated with blood. "God had given him blood to drink."

When the action of the story begins the Pyncheons that inhabit the house with the seven gables are much reduced in circumstances, yet still they cling to their gloomy abode.

One of the gable ends, however, had been let to a Mr. Holgate, a photographer. This was in the days of the Daguerreotype. Holgate's apartments opened out on the garden.

Of the Pyncheons there was only a brother and sister left in the house, until they were joined by a lively, pretty girl—a niece named Phœbe—who came to reside with them.

The little old maid, Miss Pyncheon, to make ends meet, had to start a little shop in one of the gables. She kept her brother Clifford, who was a weak, wandering sort of mortal. He had been accused of having some hand in the murder of an uncle, and from that time forth he had been cruelly nervous, and quite unfitted for ordinary intercourse with the world.

Jaffrey Pyncheon, a cousin, who lived in the town, was the only one that hinted at Clifford's guilt, but no one trusted or believed him, for he was a hard, grasping, rich, unjust man.

It seemed that Clifford had said in his wanderings at some time or other that he knew of some papers that to possess would convey endless possessions in land to the Pyncheons, and it was on the track of these papers that the cruel Jaffrey came about the house and kept pestering Miss Pyncheon and Clifford, her brother.

Holgate, the photographer, and little Phœbe, being such near neighbours, often met in the garden, and got to be firm friends. In the midst

of their little confidences Holgate showed Phœbe many of his Daguerreotype portraits, asking her opinion upon them. She considered that all the pictures he took had an unamiable appearance.

Holgate had a theory on this matter, and expressed it in words to the following effect: "Heaven's broad and simple sunshine, while it gets credit for only depicting the merest surface, brings out the secret character with a truth that no painter would ever venture upon." And, being in days when retouching was unknown, he asserts "that there is no flattery in his line of art."

Judge Jaffrey, still on the hunt for those papers, one day enters the house of the Pyncheons, and insists with Miss Pyncheon to fetch Clifford to him at once. In great terror Miss Pyncheon goes, and while she is gone death overtakes Judge Jaffrey in the chair where he sits. When the two frail ones appear, and see the strange, still figure, rigid in the chair, they take fright, and run away from the house. Next day, Holgate, fancying that the place was unusually quiet, goes round, when he found the house empty, and the dead man sitting rigid in the chair. He guessed at once that the two weak ones had fled for very fear of this dread silent form, and he felt how foolish it was, for might they not be charged with the murder of the Judge? He bethinks himself of producing some evidence in their favour, and sets about photographing the room just as it is, with the dead man sitting there, the place in perfect order, without signs of violence of any kind.

The fugitives return. Judge Jaffrey was buried, and all matters were satisfactorily settled. Miss Pyncheon, Clifford, and Phœbe became sole possessors of the Pyncheon properties.

Holgate, in examining the Pyncheon picture, showed them a secret box cut out of the back of the frame, from which he brought forth the title deeds that had been so long existing, so eagerly sought for, and now so utterly useless.

"How came you to know that secret?" asks Phœbe of Holgate, to whom she was now betrothed.

"My dearest Phœbe," said Holgate, "how will it please you to assume the name of Maule? As for the secret, it is the only inheritance that has come down to me from my ancestors. You should have known sooner, only I was afraid of frightening you away. In this long drama of wrong and retribution I represent the old wizard, and am probably as much of a wizard as ever he was. The son of the executed Mather Maule, while rebuilding the house, took the opportunity to construct that recess, and hide away the Indian deed on which depended the immense land claim of the Pyncheons."

Thus they bartered their Eastern territory for Maule's garden ground, and Holgate, the photographer, turns out to be Maule, the descendant of Mather Maule, and on his union with Phœbe the feud die out.

MARK OUTE.

NOTES FROM THE CAPE.

THIS is not an inventive colony, neither for that matter is Australia in any great degree, although that mightier commonwealth is often held up as an example to "Wait a bit, Cape," for "Going-aheadiveness." But photographers, I know, like to hear what is doing in other parts of the world, and an occasional letter from this corner of the eastern hemisphere may let you know that at least we are not asleep. The presence of Dr. Gill in Europe at this time must inform you that in some scientific work at least it is very wide awake. Firstly, then, let me tell the reader that Cape Town has at last awakened to the necessity of possessing a Cape Town Photographic Club.

This institution has been wanted for many years, but the number of amateur photographers has been few, and scattered well along the suburbs from Sea Point to Wynberg. Professional photographers, on the other hand, are few, but sufficient for the population, and what with business rivalries amongst themselves and jealousy of amateurs, especially a few members of the class equally disliked at home, they have never taken the social photographic question in hand. Now that our Club has been in existence for six months, the dire prophecies that "Cape Town will soon be flooded with bad photographs for sale," &c., show no sign of coming to pass, and it is to be hoped, therefore, that more professional men will soon take part in an organization which wisely ignores all distinctions, and yet, by bringing amateurs and professionals together but leaving them to fight their grievances out in private conversation, may bring about a more cordial understanding.

The Club now numbers some seventy members, with a good average attendance at the ordinary meetings on the first Tuesday evening of the month, and an attendance of six to sixteen members at the mid-monthly outdoor gatherings, an attendance which, from the writer's experience in England, compares favourably with your societies at home. Should any of your readers be coming this way, say on their way to Mashonaland or some similar auric paradise, let them inquire the way to Dix's rooms in Shortmarket-street, where they will find a fair assortment of current photographic literature, and perchance meet, or be told where to meet, some kindred spirits. Of course, we number amongst us a good few hand-camera men, who turn out very fair work; and, *apropos* of hand cameras, I could myself a tale unfold. Many months ago an American friend brought here an instrument designed for exposing films on an Eastman roller. I believe the pattern is known as one of the "Waterbury" series, but am not sure. I believe it may be an efficient instrument for those who like it, but I did not, neither did my friend. His reasons were more forcible than mine. I did not particularly care for film work, for which the instrument was designed; but he had found also that the damp and heat of the tropics had stiffened some part or another, which he might with a little patience have remedied. I suggested that he should adapt the camera to carry plates; but, as mechanical work was not his *forte*, he left me to carry out my own suggestion by presenting me with the apparatus as a return for some lantern slides. For some months after that the said camera was a veritable nightmare to me. The lens, I found, was really a good one, but, as covering a 5×4 plate with a lens of four-and-a-half inches focus appeared to me a preposterous notion in an instrument necessitating a large aperture, and as I only wanted lantern slides and quarter-plate prints of exceptional sharpness, I decided on quarter-plates. The use of dark slides appeared the simplest plan, but I was loth to cut up a pretty leather-covered box with rough tools used by my unskilled hands. Then I fitted in a sort of magazine, with shields, to be changed by the hand thrust through a sleeve. This would have answered well enough had I had suitable material for the sleeve, but unfortunately I was in Cape Town, and not London. By the time, therefore that I thought I had sufficient layers of black lining to be proof against our summer sun, I found I could not fold all—nor nearly all—of it into the small space left at the back. And so the camera was laid aside for a few weeks until I had concocted another plan.

Then I tried an over-and-over dodge, like a changing box introduced many years ago. The plates, in sheaths, were to pass halfway across a separating piece of metal, which only allowed one sheath to pass above or below between the two magazines. Having been exposed, a stop was to be pushed back by a spring, a shake given to the camera, the exposed plate to pass into one chamber, and another to take its place from the first. This plan cost me much time and trouble—every little fitting I had to make myself, for, as I said before, this is Cape Town—but without success. I tried it in the dark room, and it worked well. I tried it in the field, and every plate was a mass of fog; some plates partly exposed, others partly exposed to one subject, and wholly to another, &c., &c. I verily believe I should have succeeded had I had one-eighth of an inch more space to work in; but, as it is, I forbear to give full details. Some American firms complain that some camera-makers purposely construct their apparatus so that it shall not carry roll holders without much alteration. Of this I am certain, that some firms construct their apparatus so that it shall not take dark slides. And so I laid the thing aside for a few more weeks.

Then I tried a changing box with small bag attached, but, being still unwilling to cut up the original apparatus, instead of a slide to draw out and expose the plate, I tried a blind roller, working between two diaphragms of zinc. It worked well when the changing was done in a subdued light, but, as soon as I tried to work it in, the open streaks of black across my negatives showed that the light had streamed in, not through my changing bag, but between my blind roller and zinc diaphragms, which I had thought safe. And so I laid the thing aside for a few more weeks.

Then I started afresh. I took the lens—a good one—I made a finder, I made a single-grooved magazine after a model which, I believe, is not patented, I found room for a drop shutter, and obtained a complete success.

MORAL—for this tedious detail of trials should have a moral—*Do not try to convert one piece of apparatus into another. Take only the suitable parts, and make a fresh start according to your own ideas or the best ideas of others you may have met with.*

I have since found the instrument most useful, and have secured, not surreptitious delineations of good folk in awkward situations, a piece of work I despise, but subjects of life and scenery which the ordinary camera would not give me time to hit. I exhibited some views, taken at one of our outings, to the club, together with my home-made apparatus, with a result flattering to my vanity, but not altogether satisfactory to my reason. Many of the members have employed themselves recently in making hand, or so-called detective, cameras, and at the next meeting are likely to bring them forward; but I, nevertheless, consider that an easy-working hand camera is a dangerous instrument to put into the hands of any amateur who has not already gained an insight into the possibilities of photography and the delination by its means of the picturesque.

Again, *apropos* of the hand camera, I must tell you how a smart, but revengeful, deed has just been perpetrated here by its means. You have most of you seen a certain advertisement wherein a young gentleman with thick curly moustache and twinkling eye is waiting round the corner for a certain aged gentleman with long flowing coat, baggy umbrella, and tall stiff collar. You have heard, too, how a certain noble lord, famous or notorious (whichever you please, my little dears—you pay your money and you take your choice!—tired of apparent inconsequence in his native isle, resolved on a journey into the inmost recesses of Borioboologha. The vessel arrived at Cape Town; an excited murmur rushed through its quiescent shades; amongst those who sallied forth was a gentleman I met on the Observatory-road platform the next evening, and he showed me an untoned photograph of the gentleman stepping on shore. The shore itself looks groggy, the launch was awry, the noble lord himself was looking down to the ground, and, as he had not got his land legs on, the effect was as if he had been broaching the so many dozen of champagne which the *Pall Mall Gazette* sneers at. As my friend remarked, the photograph is one taken at a moment on an emergency with the crowd

pressing this way and that, but it is, nevertheless, a ludicrous caricature. Truly, O Grand Old Man, thou art revenged! The South African hand camerist is on the war path. When a Fourth Party is introduced into the gloomy discord of Charter Company, Portuguese, and Native question at the foot of the upturned washtub throne of mighty Lobengula, the avenging Nemesis will be there too. If Cape Town does not do it, Kimberly, proud Kimberly, sore with its proffered, but rejected, public reception, will do it. If Kimberly fails, wot we of certain energetic spirits, clad in uncouth garment, with pick and spade in hand, and camera under arm, who will do it. Go to the North Pole—the camera will be there.

I should just like to conclude with a description of a lantern slide-carrier I have just made, and intend to introduce at the next meeting of the Club. It is constructed on the old "panoramic" model, but contains two features, one of which, at least, or so I believe, is novel. The strip nearest the condenser is not of wood, but of sheet zinc, about one-thirtieth of an inch in thickness. This, I am aware, is not new, but it is a great advantage in bringing the slide close to the condenser. The other feature is the introduction of light springs to bring the slide close up against the metallic strip, and so minimise focussing, and entirely obviate the danger of getting two thin slides jammed in the middle. Watch spring of the ordinary kind is a little too strong for the purpose, and necessitates the use of some little force to push the slides through, but the long thin spring of the Waterbury watch is just the thing. I attach a little sketch to give an idea how the springs are placed.

a a. Metal strip nearest condenser.—*b b*, *b b*. Fine sawcuts to admit spring. At *b*, the spring passes right through the sawcut, and is clamped down by the back-board, and held in position. At *b*, the spring has free play but cannot spring out of the sawcut. *c c*. Back-board or metal plate to be tightly screwed on to wooden grooving *d*.

No spring is required at the taking-out end. The carrier is made to fit the lantern exactly, and has a stop fixed to the side, so that, when the carrier is put in, it can only be central, and cannot shift its position. It may seem strange to introduce lantern matters at the fag end of your season, but remember we are just at the beginning of ours, and this hint will be in plenty of time for your next. C. Ray Wood.

THE PHOTOGRAPHIC EXHIBITION AT THE AUSTRIAN MUSEUM.

It is well known that in pictures by the Chinese the near and the distant, foreground and background, are all represented equally clearly and definitely. The reason is not a want of knowledge of perspective, for the Chinese has his reason, which is seemingly quite good and plausible. He says it is a mistake, a failing in our eyes, if we do not see the distant as plainly and exactly as the near, and it is the duty of art to correct this failure; it can do so.

Until now photography in a certain sense has had the same point of view as the Chinese. It made a trial, and found its duty to be to represent all objects, near or distant, as clearly and sharply as possible. And in this direction it certainly has attained the most wonderful perfection in which no human eye will ever follow it. Will the eye ever be able to see a rifle ball in its flight, the waves of air before and behind the ball, the opening and closing of the air before and behind the flying ball? The photographic machine not only sees that but fixes it.

Thus photography has made the apparently impossible possible. It teaches us to see things we never could have seen with the naked eye. It draws for us the heavenly bodies, every leaf on the tree, every blade of grass; it counts, as it were, the hairs of our heads; and, considered photographically, that is very satisfactory; considered artistically, very Chinese. No objection could have been taken to this had photography been satisfied to be a useful art, but it desires to be also a fine art. It is not contented with portraying everything on earth that lives or does not live, but it will make pictures—pictures in an art sense; but in the so-called Chinese manner the sum will not work.

From this artistically right feeling has arisen among photographers a new tendency, that of the "impressionists," after the nature of the impressionists among painters. It is not a question of what photography can achieve in clearness and distinctness, but of what the human eye sees—it is the impression made on us which should be fixed. We see what is near more distinctly, and the remoter things gradually decrease in distinctness and finally become *verschmuren* and then disappear; we see air intervene, surround things, soften down light and shade, and make them run into one another. It is this which photography also, if it will be an art, will produce pictures, must represent; subjective not objective truth, things not as they are in themselves, but as they are seen, especially by the artist's eye.

It is this newly awakened contrast in photography as a graphic art which makes this exhibition of the Club of Amateur Photographers at the Austrian Museum so interesting. Doubtless it is the first time that this contrast appears so decidedly without being expected or intended.

This year's international exhibition of the Club of Amateur Photographers—its second—has a purely artistic purpose. Only that was to be exhibited which is acknowledged to be artistic, picturesque, satisfactory, or excellent. With this intent was formed a jury of artists, painters, and sculptors, who would probably regard the photographs differently from what photographers would. The purely technical was not taken into consideration, all that the artist eye recognised as artistic was retained. Photography had to prove itself an independent art, as much a means of art as are oil colours, water colours, Indian ink, brush and pencil, but also the photographer had to prove himself to be an artist. And both proofs have been brought. It is true that of the 4000 photographs sent in only 600 were hung. The rest fell victims to the eye and judgment of the artist jury. But, indeed, these 600 afford the purest and finest artistic enjoyment—too fine, perhaps, to make the exhibition popular as it deserves to be.

Among the 600 photographs, landscape greatly predominates, and, again, among the landscapes English ones; in the second place comes the *genre* picture, mostly in connexion with landscape scenery; in the third place, portraits. The heroic and historical picture is, of course, absent, for the present and its history do not present it to the photographer, and he cannot himself compose such an historical picture, say, of a battle. It would be necessary to direct him to an agitated sitting of Parliament, such as does happen nowadays; but it would be somewhat tedious to stand with the apparatus and wait for such a dramatic moment, like the Englishman who travelled about with a lion-tamer, waiting for the moment when the lion should seize the tamer's head in its jaws. But, even in the life of a legislative assembly, such precious moments are not all too numerous.

But landscape presents itself to the photographer everywhere, and stands still for him. Yet he must know how to catch nature, and must possess an eye for art. And, indeed, these amateur photographers, ladies and gentlemen of the finest breeding, partly from the most elegant circles of human society, have understood how to catch Nature both in her familiarity and her grandeur. As exhibitors *hors de concours*, we find the patroness of the exhibition, Her Imperial and Royal Highness the Archduchess Maria Theresa, then the Princess of Wales, His Imperial and Royal Highness the Grand Duke Ferdinand of Tuscany, and His Highness Prince Henry of Bourbon, Count of Bardi; among those who submitted themselves to the judgment of the jury Prince Henry Liechtenstein, Count Wilczek, Count Charles Brandis, Charles Chotek, and others; further, three members of the Rothschild family, the Albert and Nathan of Vienna, the Baroness Adolphe Rothschild of Paris, Prince Antonio Ruffo, the Countess Loredana de Porto, and others. Numerous and distinguished are the names of those who have sent from afar—from France, America, Italy, Russia, and those from England so numerous that the exhibition may almost be regarded as an English one.

The best landscapes have come from England, and it is the English amateurs in particular that have started the now fashionable school of impressionists, who are most brilliantly represented at our exhibition. There are George Davison, of London; J. Gale, of London; Pattison Gibson, of Hexham; Horsley Hinton, of London; H. P. Robinson, of Tunbridge Wells; Frederick Thurston, of Luton, &c., before all of whom we must reckon W. Clement Williams, of Halifax, with his sea pictures. That which characterises them all is the picturesque reproduction of nature, which does not consist in their individual choice and conception of the subject, but in the reproduction with the indistinctness of the human eye, in perspective, with the fading and vanishing in the dim distance, with the impressions and humours which towering or flying clouds, lights and shadows, sunshine and moonlight, morning and evening, mist or a clear sky, make on or produce in us. It is astonishing with what perfection all that is shown by means of the simple gradation of the tones. A photograph, as *e.g.*, *A Misty Morning*, by Thurston, is an admirable picture in itself, quite apart from its technique. Just so the wonderful blue sea pictures by Williams, with the hurrying storm-clouds, and the light flashing on the water. There are three of them, *Sturmwolken* (Storm-clouds), *Mondnacht auf der See* (Moonlight Night at Sea), and *In Stiller Nacht* (The Dead of Night), which are among the most beautiful things in the exhibition, and probably, too, the most beautiful that photography has yet achieved. Here, in one moment, photography seized and retained all the details; but all the details, the moving waves, the flashing light, are so subordinated to the general effect that the whole makes an impression as though it were a perfect painting made with deliberate intention. In general, the sea seems to have become a favourite subject of the impressionists in England, even in its most agitated and

disturbed moments. The rising tide, the water slowly and calmly ebbing from the strand, spray dashing against the rocks, waves rolling one over the other in the surf—all of them motions to be reproduced only by instantaneous pictures—here they are represented true to nature, and with artistic feeling. Other amateurs prefer taking the peaceful quiet of English landscapes, the soft forms, the beautiful scenery of the parks, the trees overhanging the brooks, the cornfields on the undulating ground, the comfortable settlements by the wood, the whole charming sweetness of the English landscape, which, under the changing moods of the day, from dawn of day till dark of night, offers so much diversity. And all this usually takes place with characteristic natural figures, not placed on purpose, so that here only instantaneous pictures are allowable. How beautiful in this respect is the picture by Thurston, *Changing Pastures* (a flock of sheep coming towards us through a wood), or the two others, *Trespassers* and *Our Village!* A masterpiece of another sort by the same master is *Frosted Trees, i.e.*, a wood covered with hoarfrost.

In such pictures the English undeniably stand first, but in regard to sharpness many compete with them. Thus, there are altogether excellent strand pictures by Dreesen of Flensburg, who understands how to represent ship-life in harbour, the sea itself in motion and like a mirror, together with other scenery. But here the landscape passes over into the *genre* picture, and that is a second department in which these amateur photographers have earned laurels. There is much in the exhibition uniting landscape and figures, *e.g.*, country people in the fields, herds of cows, of flocks of sheep at pasture, village scenes, fishing scenes, groups of children lying down in the open air, scenes from military life, and many other things, almost all demanding instantaneous exposure, and just for that reason—because only the fleeting unconscious moment is fixed—they appeal to us with the truth of nature in contradistinction to a 'posed' picture.

Even this 'posed' *genre* picture may have its charms under certain circumstances, as in the two Weidenhof Ninetta pictures, by Baron Adolphus Rothschild, which seem as though the idea were borrowed from Eugen Blaas' well-known pictures. From this point of view of designedness, or rather, of avoiding design, *genre* photographers have had a more difficult task than landscape photographers, or those that have understood how to harmoniously unite landscape and figures. Certainly it was more difficult in placing the figures not to allow the intention to be noticed, to preserve the naturalness of the motive or the group, and at the same time to give the picture the charm of right gradation or the opposition of light and shade to make, as it were, a Dutch picture of common life out of photography, not only of merely photographic value, but of purely artistic value. In this respect mention must be made, first of all, of the Countess Loredana de Porto's works. The jury did not do wrong in accepting, from this lady alone, eighteen photographs all of the character of *genre* pictures.

But a yet more difficult task was that of the portrait-takers. Here amateurs are in full competition with professionals, who, in this department, perhaps achieve their best, but also, in respect to the purely artistic side, sometimes their worst. Making the picture, or rather the portrait, a perfect likeness and a perfect photograph, is the least part of the work that the professional does with ease and certainty. But here the photograph must be raised to a work of art, the portrait to a painting—the original must be represented in the simple, grand style of the old masters, with the omission of all photographic pettiness. That has been attempted in different ways, and often accomplished—sometimes as a study, sometimes a real portrait. The portrait studies of Prince Antonio Ruffo charm us like portraits in Rembrandt's manner, like Ribera or Caravaggio.

Very beautiful, but somewhat in the far-fetched French manner, are the portraits and figure studies by Edgar de Saint Senoch, of Paris, but quite perfect as a picture and a man is the portrait of Professor Stuart Blackie, by R. Faulkner, of London. To these we would add an exceedingly fine lady's portrait in profile, by Mrs. Susan Hodgson, and the portrait of Arthur Chevalier de Burchelt.

In truth, we had many others to name—not only portraits and figure studies, but also *genre* pictures and landscapes; nay, if we would be just, one would have to copy the whole catalogue, so good is everything the exhibition contains. It affords high enjoyment to the finest and most select taste, presenting a multitude of things interesting to him who is to some extent acquainted with the movement and progress of photography. In this last respect I would now point only to the diapositives, to the pictures in sunlight, and to those on rough water-colour paper, although the technical manner of the English impressionists is still unknown, or at least not clearly known to our photographers.

Note.—The word "impressionism," so much used in these days, literally means the reproduction of the impression made on the artist's eye. It may, however, have two meanings. Firstly, the common one, the one understood in artistic circles, namely the dissolving and indefiniteness of the forms and tones, as, for example, a landscape appears to the eye with its foreground and background. Secondly, we may and must understand by it the impression which a landscape produces on the spectator's eye by virture of its inherent character, and not by one put into it.

The reproduction of this impression, or *stimmung*, as it is generally called in German, also is "impressionism." That nature really possesses such feeling or *stimmung* is proved by photography, which reproduces it most expressively; for photography cannot first put it into nature, as certainly the artist can. In this latter sense it is used throughout this article.

JAMES VON FALKE.

Foreign Notes and News.

We have to hail the birth of and wish good fortune to a recently born foreign contemporary, the *Paris Photographe*. The new journal, of which two numbers have already appeared, is edited by M. Paul Nadar, which fact alone is sufficient to ensure the new venture being well launched and conducted in a manner thoroughly up to date. The frontispiece of the first issue has been designed by M. Emile Bayard, and produces a very artistic impression. It is further embellished by a portrait of Daguerre and a series of Madame Sarah Bernhardt. It contains articles of value on "nitrogen," "orthochromatism simplified," and other matters. We heartily wish the new publication every success.

It appears that we made a mistake some time ago in stating that the coming Belgian International Exhibition was to be held in Antwerp. We, nevertheless, do *not*, as our contemporary, the *Bulletin Belge*, insinuates, imagine that Antwerp is the political capital of Belgium, though it is the commercial, and, for the matter of that, the photographic capital too.

The French Exhibition at Moscow appears to have been opened with all due success, and it is stated that the photographic section reflects great credit upon our French colleagues, both amateur and professional alike, though but three French societies, the "Société Française," the "Société Versaillaise," and the Paris "Photographic Club," are represented. M. Lippmann has sent one of his photographs of the spectrum in natural colours. This, we understand, is consequently the first time which his results have formed part of an exhibition.

A simple but useful *quantitative* test for silver, which, although once well known, may have ere now been well-nigh forgotten, has been published by M. Mercier in the *Bulletin de la Société Française*. An ordinary pipette of 3 mm. bore is employed. One drop of water omitted by such a pipette weighs exactly 0·02 gramme, *i.e.*, fifty drops weigh exactly one gramme—a fact which may be determined experimentally. A solution is then made of 68·82 parts of chloride of sodium, and 4 parts of bichromate of potassium, and the whole made up to 1000 parts. Twenty drops of the silver solution to be tested are then allowed to drop from one of the above-described pipettes into a test-tube, neutralising if necessary. The above-mentioned bichromate solution is then added drop by drop, and the test-tube shaken. A red precipitate is first formed, which gradually becomes redder; but, when a certain point is reached, the whole precipitate turns suddenly white on the addition of another drop. The percentage of silver is shown by the number of drops of bichromate solution used up to this point. Thus, if ten drops were used, the silver solution was a ten per cent. one.

Dr. Stolze, commenting on this method which he has, he says, found practical and accurate, recommends considerable dilution of the silver solution before applying the test, as there is then formed not a precipitate, but a sort of emulsion, the change of colour in which takes place with greater rapidity, and is capable of being more easily observed.

An archæological discovery of interest has recently been made at Conflans. M. Cosserat, the works manager of the Chemin de Fer de l'Ouest, in making a cutting, has lighted upon the remains of a Merovingian cemetery. The relics were carefully collected and put together by M. Cosserat, and the Antiquarian Society of *Seine et Oise* made an expedition thither, in company with the Versailles Photographic Society, to photograph them. The collection comprises some very artistic pottery and a drinking-glass, so made that it will only stand up straight when *empty*. Among the relics were also considerable quantities of jewelry and some silver ornaments bearing the name of Justinian II., which enables the date to be fixed, at any rate approximately.

A somewhat new departure in the many hundred magnesium lamps is announced by M. Paul Nadar. There does not appear to be anything specially new in the construction of the burner, except the arrangement of ring to catch any unburnt magnesium that may escape. The ordinary ball is, however, supplemented by a reservoir which, when the lamp is to be employed, is first filled with air by repeatedly squeezing the ball. A cock is then turned on, and the air from the reservoir carries a continuous supply of magnesium through the flame, producing consequently a continuous light as long as the cock is turned. The light is said to be most powerful, and the ability to prolong it as desired renders it most useful for interiors.

A method of direct platinum printing is given by Herr Wischeropp in the *Atelier*. The main point of his method is to use a chemically pure solution of an iron-salt, and to dry it on the paper so quickly that it cannot penetrate to any appreciable depth. To effect this, the paper is hung up to dry in a box at a temperature of 56° C. for two minutes. The solutions employed are :—

A.

Sodium ferrous oxalate	40 parts.
Sodium oxalate three per cent.	100 ,,
Chlorate of potassium	0·1 ,,

B.

Distilled water	60 ,,
Potassium platino-chloride	10 ,,

In A, the solutions which Pizzighelli keeps separate are combined, and the useless glycerine omitted. It requires to be renewed frequently, but B will keep for any length of time. To produce a good effect the paper, after having been dried, should be kept in the dark room for some time. The more quickly the printing is done, the better are the tones obtained.

A chloride of silver emulsion for transparencies is made up by the Abbé Sobacchi as follows:—Thirty-five parts of gelatine are moistened in 500 parts of water, and the three following solutions then prepared :—

Solution I.

Nitrate of silver	7 parts.
Water	36 ,,

Solution II.

Chloride of strontium	1·6 parts.
Water	35 ,,

Solution III.

Citric acid	3·3 parts.
Water	35 ,,

The gelatine is melted in a water bath, solution I. added, the whole being stirred with a glass rod meanwhile. The chloride of strontium solution is then added, and the mixture vigorously shaken until an equable emulsion is obtained, when the citric acid solution is added, with fifty drops of strong ammonia. The plates are poured as usual.

An account of a new printing frame, devised by P. Chaumeux, is contained in a recent number of the *Journal de l'Industrie*. The top is divided by two cuts at right angles to one another into four parts. Each of these quarters is hinged, and also provided with a spring at the corner to keep it in position. In this way practically any part of the frame may be opened for examination.

Our Editorial Table.

"Photography" Annual.

Iliffe & Son.

In a preface to this large and handsome volume, Mr. Sturmey, the editor, while graciously allowing that "other journals had their annuals —such as they are," announces that he has sought to produce one with "several original features of its own," including "the best points of contemporary publications." As regards these "home contemporaries, the only points of similarity are the inclusion of tables of reference, the directory to the telegraphic addresses of the trade," &c. Now, several of these features have enjoyed the appreciation of the readers of The British Journal Photographic Almanac for a quarter of a century, and others recently introduced have met with the same kind of reception, so that the wisdom of reproducing them is as obvious as the compliment paid to their originators. We observe that the paper on "Equations relating to Foci," prepared for our pages by Mr. J. A. C. Branfill over a dozen years ago, is printed by our contemporary, credit of it being given to an American publication, and that some of the other tables found here (which we also originally published) are not acknowledged at all. These mistakes and omissions will doubtless be rectified next year.

Of the "new" features "*Photography*" *Annual* deserves to possess a monopoly, and we trust its title thereto will never be invaded. About 500 pages of the book are occupied by illustrated descriptions of apparatus, and so forth, in fact, a compendium of dealers' catalogues (with prices), after the fashion which the same publishers' *Indispensable Handbook* had already familiarised us with. Despite the editor's dislike of a "chaotic collection of articles upon miscellaneous subjects," there are over thirty pages of reprinted paragraphs of tyros —served up "chaotically." In the compilation of the paper on "Photographic Optics," by Mr. Chapman Jones, the author makes most flattering levies upon our own pages—an example which finds several imitators in the *Annual*. There are twenty other articles by "the best and most practical workers and writers of the day," some of whom, notwithstanding these qualifications, photographic readers will make the acquaintance of for the first time.

In other publications of this class, "such as they are," a calendar and a few selected formulæ are thought useful, as readers of the Almanac constantly assure us. They are, however, omitted from "*Photography*" *Annual*, so that here, at any rate, a genuine "novelty" may be claimed. The work, besides the features mentioned, contains a directory of dealers and dark rooms, and, technically speaking, does credit to those responsible for its production, among whom the printers by no means come last.

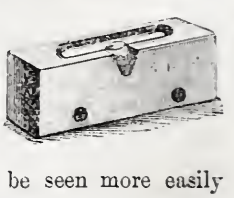
Anthony's International Annual for 1891.

E. & H. T. Anthony & Co., New York.

The editors of the "International" (Dr. Elliott and Mr. W. I. Scandlin, of New York, and Mr. W. J. Harrison, of Birmingham) have this year brought out their summer annual in a style quite equalling its predecessors. Although the book contains some eighty pages of advertisements, it is really full to repletion of practical little articles contributed by 160 writers, many of whom are Englishmen, for the work is international. Among these, Mr. A. R. Dresser, who contributed to last year's volume an article on "Hand Cameras," continues the subject, and gives an article on the negatives taken by such cameras, devoting himself mainly to bromide printing. Mr. Geo. Bankart treats of "Carbon Printing;" Mr. E. Dunmore "On the Illumination of the Dark Room," advocating yellow or green in conjunction with ruby glass; Mr. R. Keene speaks of "Places worth Photographing," and so forth. Astronomical photography has several exponents, including Mr. Albert Taylor, who writes on "The Future of Nebula Photography;" Professor S. W. Burnham, on "The Camera for Celestial Photography;" and Professor E. H. Barnard, "Photographing with a Non-photographic Telescope." Among the various American contributors are several with whose names we are well acquainted. The "Half-tone Study," by Kurtz, of New York, is one of the most charming of the illustrations. The book will prove a useful companion during the summer.

New Level for Camera.

We have received from Messrs. Taylor, Taylor, & Hobson, Leicester, a sample of a new level which they are just introducing. It is a neat little thing, and is used on the side of the swing-back, by which means it is easy to insure absence of distortion or leaning, so frequently to be seen in photographs of buildings. Another of these, placed on the back of the camera frame, affords the means of seeing whether the camera is truly horizontal. The advantage of these over the ordinary levels is that they can be seen more easily when the camera is mounted on a tall stand.



Flashlight Pictures.

By John Stuart, Limited, Glasgow.

Mr. Stuart, who has recently been taking much interest in flashlight photography, sends us an album of pictures for our criticism. Many of the pictures are of larger dimensions than is usually attempted with this kind of illuminant, being on 12 × 10 plates, and embrace interiors of churches and private dwellings, with and without figures. One quality about them is that the lighting is more generally uniform and natural than is usually seen in flashlight work, while the definition to the extreme corners of the pictures is as perfect as it can well be.

Amongst the examples sent are a number of cabinet portraits, most of them in fancy costumes. These, Mr. Stuart informs us, were taken at a fancy ball, at which he obtained no fewer than fifty-three single portraits and groups between ten p.m. and half-past one a.m., with only one failure. The light was an arrangement of his own. We consider that this is a most excellent collection.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9906.—"An Improved Adjustable Photographic Printing Frame." F. Dresser.—*Dated June* 11, 1891.

No. 9971.—"Improvements in or pertaining to Portable Photographic Cameras."—A. D. Loman.—*Dated June* 12, 1891.

No. 9984.—"A New Permanent Photographic Printing Process." J. Gray.—*Dated June* 12, 1891.

No. 9993.—"An Improved Pencil for Retouching Photographic Negatives, Bromide Prints, and the like, applicable also for ordinary Drawing Purposes." Communicated by E. G. Kerby. Complete specification. E. T. Hughes.—*Dated June* 12, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 11,293.—"Photographic Cameras." Thornton.—Price 8*d*.

No. 11,476.—"Photographic Apparatus." Mattioli.—Price 8*d*.

1891.

No. 5106.—"Optical Lanterns, &c." Hughes & Woodruff.—Price 11*d*.

No. 6715.—"Photographic Cameras." Norton.—Price 8*d*.

PATENTS COMPLETED.

Improvements in or connected with Photographic Spotting and Retouching.

No. 2390. Frederick Charles Davis Beacham, 29, Litchfield-street, Charing-cross-road, London, W.C., Middlesex.—*May* 16, 1891.

It is well known, when photographs are printed and toned, there are often white spots, which have to be covered with spotting mediums.

To the present time the photographer uses spotting mediums which usually wash away when photographs are undergoing the process of enamelling, and frequently rub off while being burnished.

The use of camel-hair, sable, or other brushes, and such inconvenience, is also avoided by the use of the crayon hereinafter described. My invention mainly consists of a crayon composed of the following ingredients and proportions :—white wax, 32 parts ; curd, yellow, or Castile soap, 27 parts ; mutton suet, 4 parts ; salts of nitre, 1 part, dissolved in eight times its weight of water ; pitch, 4 parts ; shellac, 6 parts ; calcined lampblack, 4 parts ; dyes or stains in powder brown, 7¼ parts, scarlet, 3½ parts, blue, 3 parts, violet, 3½ parts. These colours produce a useful photo-shade, but the proportions can be varied according to the shade required ; other colours can also be produced if required.

As soap contains more or less moisture, according to age, it must be cut into small pieces and dried before using. The suet and wax are first melted (in a copper or iron vessel with a lid) ; the soap, having previously been cut into small pieces, is then added a small piece at a time, allowing each piece to dissolve before another is added. When dissolved, allowed to burn until reduced to the same volume as before the soap was added. Care must be taken not to allow them to burn too much or too quickly (it may be necessary to take the vessel off the fire to prevent the contents from boiling over). The flame is now put out. When these three ingredients are dissolved, and the salts of nitre has been mixed with eight times its weight of water and warmed (in a separate vessel with a lid), it is added by small quantities to prevent too much effervescence. The shellac and pitch are now added. The requisite colours, in powder dyes or stains and calcined lampblack, are mixed with a stiff varnish, or suchlike suitable substance. (One varnish may be made thus : By heating linseed oil until it will ignite by touching the surface with a lighted taper, and the whole allowed to burn until reduced to one-half.) When mixed, it is added little by little, and kept stirred to incorporate into one mass. The temperature is then increased until the mixture will catch fire upon touching the surface with a red-hot iron, and allowed to burn one minute fifteen seconds, the flame put out (by covering the vessel with the lid). The flame is set in again only to burn the scum formed on the surface.

It is essential for the whole to be dissolved into one substance, and kept stirring during the whole of the foregoing process with an iron spatula or pallet-knife. When a little cool, it is poured out on a marble slab previously rubbed with soap or suet. When set a little, it is cut into small pieces and remelted (remelting is done to give a finer texture to the ingredients), then moulded into suitable form and pointed, cutting them (the crayons) the opposite way to pointing a lead pencil, finally finishing off the point by rubbing on paper ; fine glass paper or emery cloth may be used.

It will be understood that the exact process may be varied if desired.

In spotting a photograph according to my invention the point of the crayon may be moistened by dipping it in clean water, and if the spots are very obstinate to cover, acetic acid or carbolic acid must be added to the water, about three parts acid to one part water. The acid (carbolic acid pure I find best) must always be added to the water when photographs are to be enamelled, and when the film is thin on the negative in spots, if the photographs are spotted in quick succession after mounting, there will be found sufficient moisture to dispense with the use of water, unless the spots are difficult to cover, when the acid, or acid and water, must be used as aforesaid. Blotting-paper will be found useful when using the acid or acid and water. The crayon may also be used dry, especially for some purposes, for instance, in spotting unalbumenised photographs and platinographic prints, or where the surface is not required to be shiny. Various acids may be used to bring out and change the colours, but I find acetic and carbolic acids the best to retain the original colours.

If photographs are spotted after burnishing, and should show dull spots when spotted, a slight rub with a piece of clean rag or chamois leather over the finger dipped in French chalk will be sufficient to remove the dullness. Those who prefer spotting with a brush can do so by slightly warming the saucer or pallet, and rubbing the crayon on dry, then add a small portion of water and acid (carbolic preferable), proportions as before mentioned, and mix with the finger or brush. Another way I find very serviceable of using the crayon, by mixing it into a liquid with acid and water, as before mentioned, to about the consistence of cream, and coating a pellet ; when dry can be used as required, can also be bottled. The two last methods apply to spotting photographs only. I find the ingredients made in the form of a crayon the quickest and most convenient way of using. For retouching negatives, I find the hard crayon most suitable. The degrees of hardness may be obtained in two ways, first, by increasing the salts of nitre ; secondly, by cooking it longer ; it is better to obtain the degrees of hardness by cooking, as too much salts of nitre will make the crayon too brittle. Copal varnish may also be used to mix the colour when required harder.

Only two colours are necessary in manufacturing the retouching crayon, viz., brown and black, nine parts of each, added to the ingredients before mentioned, leaving out the other colours. The crayon can be used on the negative film without negative varnish or retouching medium, or on the negative varnish without the retouching medium, or can be used on the retouching mediums without the negative varnish.

Should the retoucher accidentally stipple too heavily, the spots can be reduced to the shade required by the point of a brass pin, not too sharp, or can be removed by rubbing with a piece of pointed ink-eraser, or a piece of chamois leather over the finger, without removing the varnish or retouching medium in the usual way with methylated spirit.

Thus the process of manufacturing the aforesaid crayon or other suitable form for retouching negatives, and spotting photographs on any material to be enamelled or otherwise, consists essentially in employing dyes or stains in combination with the before-mentioned ingredients made into a crayon or other suitable form, according to my invention, also the use of acetic and carbolic acids or the like in retouching negatives when the film is thin in spots, and in spotting photographs when the spots are obstinate to cover, and when photographs are to be enamelled.

The claims are :—1. The production of a crayon, or other suitable form, by employing dyes or stains in combination with the before-mentioned ingredients, manufactured in the manner and for the purposes and uses substantially as set set forth. 2. A process of spotting and retouching by the use of a crayon, substantially as set forth in my invention. 3. The use of acetic and carbolic acids, or the like, in retouching negatives when the film is thin in spots, and in spotting photographs on any material when the spots are obstinate to cover, and when photographs are to be enamelled, substantially as described in my invention.

Improvements in Optical Lanterns and Dissolving View Apparatus.

No. 5106. William Charles Hughes, Brewster House, Mortimer-road, Kingsland, Middlesex, and Henry Woodruff, 336, Kingsland-road, Kingsland, Middlesex.—*May* 23, 1891.

This invention relates to improvements in apparatus for the display of oxy-hydrogen limelight dissolving views and panoramic effects, for use in optical lantern entertainments, the object of which is to combine the means for producing the best effects within the smallest possible space, with a method of folding and packing the whole to facilitate portability, and consists of—

Firstly. An improved compound tap device for regulating the raising and lowering of the light, by maintaining and controlling the flow of oxygen and hydrogen gases under varying circumstances.

Secondly. An adjustable sliding bracket for holding and supporting said regulating device and jet, and similar apparatus.

Thirdly. A novel manner of constructing an optical lens, whereby we are enabled to slide or enclose the same within the dimensions of its outer case, or nearly so.

Fourthly. An improved adjustable slide guide and stop for levelling the path of the object slide, and arresting its progress at a predetermined point.

Fifthly. A novel method of constructing or building a single, biunial, or triunial optical lantern, by which it may be folded or packed within the very smallest possible compass consistent with its power of effect when in use, thereby enabling the same to be carried from place to place in the same manner as an ordinary small portmanteau.

Improvements in Photographic Apparatus.

No. 11,476. Gaëtan Mattioli, 42, Boulevard Bonne-Nouvelle, Paris, France.—*May* 23, 1891.

This invention relates to photographic apparatus, and comprises a shutter arranged in such a manner that it can be automatically put under tension and closed for instantaneous exposures whilst it can remain open for long exposures.

The device for operating the shutter comprises a kind of piston which is either set in motion by compressed air through the medium of a pear-shaped indiarubber bag, or by hand through the medium of a knob.

This piston carries a small flexible arm having a pin which acts upon two projections on the shutter plates for moving the latter apart either for long exposure or for instantaneous exposure.

This arrangement can also be reversed, that is to say, the two projections may be rendered free whilst the pin is fixed.

In order that the device shall fulfil the aforesaid twofold object, I provide it behind with a horizontal slide having notches, which bears on one side a sign for instantaneous exposure and on the other side a sign for long exposure. For instantaneous exposure the slide presents a large notch opposite the slot wherein the above-mentioned pin is displaced, so that this pin can move against and behind the projections of the plates, and which has the effect of first causing these shutter plates to move asunder and to be closed directly afterwards under the action of a helical spring.

For ordinary photography the slide is pulled so as to uncover the sign for long exposure, which has the effect of presenting above the said pin a smaller notch, wherein this pin is stopped just between the projections on the plates in order to keep the latter apart as long as pressure is exerted upon the pear-shaped bag by which air is forced against the piston. On discontinuing the pressure upon the bag, the plates are closed again under the action of the aforesaid helical spring.

By opening gradually from the axis of the lens instead of commencing from the periphery of the same, my improved shutter gives greater clearness to the image, because all the rays pass through the centre of the lens.

The front plate of my shutter is designed to receive the objective and the lens case. It is provided with a sleeve having a groove and adapted to receive a ring of elastic material, so that by exerting pressure upon a cap through the medium of screws a tight joint is produced and the lens case is fixed.

All the parts of the above-described device are made of metal, and are therefore strong and not bulky. This device can evidently be varied in its details, forms, accessories, and dimensions, without departing from the nature of my invention; the same is the case with the shutter, which may also be made either of a single plate or of several plates, the arrangement of the engaging and disengaging device being adapted to these modifications.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 22	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 23	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 24	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 24	Burnley	Bank Chambers, Hargreaves-street.
,, 24	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25	Burton-on-Trent	The Institute, Union-street.
,, 25	Halifax Photographic Club	Mechanics' Hall.
,, 25	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 25	Oldham	The Lyceum, Union-st., Oldham.
,, 25	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 11,—Mr. T. E. Freshwater in the chair.

The HON. SECRETARY read a communication on a printing-out emulsion process for matt surface which had been received by the Camera Club from Mr. W. K. Burton, and by the courtesy of that Society forwarded on. The paper was accompanied by specimens which had much the appearance of platinum or bromide prints developed on a matt surface. One important point in the formulæ given was that they would yield prints of different degrees of vigour according to the modifications indicated for that purpose, so that negatives of strong, medium, or weak intensity might all be successfully employed. An essential thing was that the quantity of gelatine must be kept low in proportion to the silver, and this could not be achieved by merely increasing the quantity of silver with any given gelatine solution, as in accordance with some observations formerly made by the writer the quantity of silver haloid which could be emulsified depended rather upon the amount of water than of gelatine present. He had found that if more than one ounce of silver nitrate were used to ten ounces of solution some of the silver haloid formed would not be emulsified, but would form a coarse deposit. There was a difference between that which had thus not been emulsified, and that which having been emulsified was separated by deposition, in that the latter could be re-emulsified to form a useful mixture, while the former could not. For dense negatives the following formula was recommended :—

A.

Nitrate of silver	400 grains.
Water	4 ounces.

B.

Soft gelatine	80 grains.
Chloride of ammonium	80 ,,
Citric acid	120 ,,
Water	8 ounces.

The two solutions are mixed at a heat of from 110° to 120° Fahr., by adding A to B with much stirring. For negatives of medium density, 45 grains of dry carbonate of soda are included in the solution B, and for thin negatives 80 grains of carbonate, and only 60 grains of citric acid are used. The solution made by the first formula keeps fairly well, but that made by the last variation does not keep even with the addition of alcohol and thymol. The coating must be done in a room at a temperature of not less than 70°, or the emulsion itself must be warmed, and may either be performed by floating or brushing. In the latter case two applications of the solution are necessary in order to ensure a surface having everywhere a sufficiency of the emulsion. The quantity of emulsion given was sufficient for eight sheets of the size of the ordinary albumenised paper if the coating were accomplished by brushing, and for ten to twelve sheets if the paper were floated. The time of printing was, with the third formula (that for thin negatives), extraordinarily short, and all the operations of preparation and toning should be carried on by artificial light. The toning might be with gold, or very successfully with Mr. Lyonel Clark's formula for platinum toning.

The thanks of the Society were given to Mr. Davison and the Camera Club for forwarding Mr. Burton's paper.

Mr. G. W. Atkins showed some photographs of the recent solar eclipse taken with one of the components of a symmetrical lens, having in the form used a focal length of about eighteen inches. For focussing, a piece of coloured glass had been laid against the ground glass of the camera.

A question from the box was read: "Would the distance between the diaphragm of a rectilinear lens and the plate, divided by the diameter of the stop, give the correct value of such stop, or must an allowance be made for what is called refraction, and if such allowance is made, would it cause a stop marked *f*-64 to measure one-seventieth of the focal length?"

It was suggested that the question be put into more intelligible form as concerned refraction, but a member present stated that a maker of photographic lenses had put the matter in this way when he (the member) had complained on finding that a stop marked *f*-64 measured one-seventieth of its distance from the screen when focussing a distant object.

The subject of hand cameras having been announced for discussion, Mr. Cusworth showed a repeating back, and this was followed by a display of one by Mr. Roberts and by others which have already been described.

Mr. J. S. TEAPE showed two plates, one of which had been exposed unbacked behind a cut-out star in opaque paper to the light from one inch of burning magnesium wire. The star-shape was quite lost in halation, whilst a second plate similarly exposed, but to the light from twelve inches of magnesium, and backed with Mr. Debenham's caramel and gelatine mixture, gave the outline of the star clear and without halation. He considered the result very satisfactory.

Messrs. J. Smith and R. Beckett were elected members of the Association.

HOLBORN CAMERA CLUB.

A SPECIAL general meeting of the members of the Club was held, Mr. D. R. Lowe (Vice-President) in the chair, to elect a Secretary in the place of Mr. J. E. Smith, who had resigned membership of the Club. Mr. Frederick J. Cobb, of 25, South Lambeth-road, S.W., was elected to fill the post, and Mr. A. Plumbridge was elected a member of the Committee in the place of Mr. Cobb. The prize given by Mr. T. O. Dear, for the best picture taken at the Pinner outing last month, was awarded to Mr. A. J. Golding, who sent in a very pretty picture of an old cottage. Mr. A. Bell announced that he would give a prize for the best picture taken at the Purfleet outing, and the Chairman said he would also give one for the best picture taken at the London (Colney) outing on the 28th ult.

At last Friday's meeting, Mr. E. H. Bayston in the chair, Mr. Herbert Thompson read a paper on an *Ideal Hand Camera*, offering suggestions which the writer thought would be improvements on some of the hand cameras at present in the market, especially in regard to the finder, the lens, and the shutter. An interesting discussion followed, chiefly on the use of hand cameras.

Mr. J. Bush was elected a member of the Club.

Twenty-one members, including five ladies, journeyed down to Purfleet on Saturday last, and spent a very enjoyable day there. The members divided the plates in their slides between the annual fair, "Botany," and the river, taking shots at some of the vessels outward bound. After tea a party went on the river, some strolled through the woods, and others enjoyed themselves at the fair.

HACKNEY PHOTOGRAPHIC SOCIETY.

JUNE 11,—Mr. J. A. Sinclair (Vice-President) in the chair.

Mr. J. O. Grant presented the Society with twelve books.

Mr. FUNSTON asked at what strength should a hypo solution be used.

Mr. HUBERT said twenty per cent. for prints, but rather liked a strong bath, though it bleached.

Mr. BECKETT advised putting a little gold in the fixing bath for weak prints.

The CHAIRMAN liked the Alpha combined bath, as it seemed to bring out density.

Messrs. Gosling and Rodes showed negatives taken of the sun and the eclipse.

From the question box: "What is the best hand camera about 5*l.*?" The Ideal and Facile were recommended.

The HON. SECRETARY advised the purchase of a camera where dark backs were used, as there was then nothing to go wrong.

Mr. CAPEL asked which were the best plates for a hand camera.

The CHAIRMAN said that with very rapid plates density was not very easily obtained. He liked Lumière's and Paget's; but in the former case it was necessary to use hydroquinone or eikonogen, as pyro-ammonia did not seem to work well with them.

Mr. BECKETT thought more sulphite would make them workable.

Mr. MCENTER then demonstrated the working of the air brush. The great ease with which it is used and the results obtained ought to be seen by all photographers. Retouching, bromide enlargements worked up, putting in clouds in pictures and on negatives, are a few of its achievements.

Dr. HERBERT SMITH then gave a paper on *Photography and Cycling*. He made his paper practical by riding to the meeting-place on his machine with a full photographic outfit. The machine he preferred to use was one with pneumatic tyres, a preventative of vibration. He carried his camera and sundries in a suspended arrangement in front of his steering bar. The only disadvantage he suffered from was dust.

Mr. HUBERT thought glycerine would overcome the difficulty.

The CHAIRMAN observed that there would be a danger of dampness.

The excursion last Saturday to Box Hill was well attended, Mr. Hensler acting as leader.

IPSWICH PHOTOGRAPHIC SOCIETY.

THIS Society, including a contingent of lady members, had a very enjoyable excursion to Coddenham on Saturday last. Plates were exposed on many of the picturesque spots of this quaint village. The Church, with the "Hall" family pew containing a fireplace for the benefit of its occupants was also visited. A move was afterwards made to Shrubland Park (kindly thrown open by Lord Saumarez), and, on returning to Coddenham "Crown" for tea, a few more negatives were secured, including the inevitable "group.

PROPOSED NEW CLUB FOR HALIFAX.

DURING the past week a memorial has been signed by a number of photographers desirous of forming a photographic club for Halifax and neighbourhood, and at a meeting held on Monday night it was unanimously resolved to form an association for the purpose of advancing the careful study of the photographic art; and, as those present strongly expressed the opinion that the object in view would be more perfectly attained if the Association had its own premises, it was determined to make an effort to obtain suitable premises and have them thoroughly fitted up as a first-rate studio, embracing not only studio proper, dark room, enlarging room, and dressing rooms, but also a large room for meetings and lantern entertainments, and a reading room provided with the current photographic literature of the day.

The project is a large one, and the expenses will necessarily be great, not only in the first fitting up but in annual outgoings; but from the enthusiasm shown there is little doubt that the idea in its entirety will be carried out, for during the evening no less than 20*l.* was promised towards a furnishing fund in addition to subscriptions.

As it is intended to partake more of the nature of a club than of a simple photographic society, the name "Halifax Camera Club" was determined upon. The annual subscription was fixed at 10*s.*, and the Club is to be open to both ladies and gentlemen, professionals and amateurs. A small Provisional Committee was appointed to look up members, and see what premises could be obtained, and report to a future meeting.

At the close of the meeting the names of forty-two persons were taken down as members, and it is requested that any others wishing to join the Club will send their names and addresses, without delay, to the Honorary Secretary, *pro tem.*, Mr. E. Finlinson, Union Bank, Halifax, from whom the names of present subscribers and full information may be obtained.

Correspondence.

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

THE PHOTOGRAPHIC CONVENTION AT BATH.

To the EDITOR.

SIR,—Will you kindly allow me to draw the attention of your readers to the forthcoming meeting of the Photographic Convention at Bath?

In the first place I would point out to those who are not already members that the Convention has amongst its adherents a very large proportion of the best-known amateur and professional photographers in the kingdom, and affords the best existing means of bringing together photographers from all parts of the country, and thus enabling them to meet their fellow-workers in the art, and discuss with them its later developments and the means of promoting their common interests.

The President at the Bath meeting will be Mr. William Bedford, whose name and work are familiar to every photographer, and his well-known tact and skill in the conduct of affairs are a guarantee that the control of the arrangements, and the guidance of the discussions which it is hoped will follow the papers, will be in safe hands.

With the help of our friends at Bath, we have been able to arrange a programme which, both from the point of view of excursions and papers, will compare favourably with that of previous years.

The railway companies will not give special terms to members on their journey from their homes to Bath, but members from a distance are recommended to avail themselves, as far as possible, of the ordinary tourist tickets. We shall, however, have considerable facilities for making excursions from Bath, either singly or in parties. During the week of the meeting, the Great Western, the Midland, and the Somerset and Dorset Railway Companies will issue to any member, on production of his *signed* ticket of membership at the booking office at Bath, return tickets at a single fare to any station on their respective lines not more than fifty miles distant.

The excursions are of special interest, and, as already announced, include Chepstow and Tintern, Glastonbury and Wells, Salisbury, Corsham and Lacock Abbey, Bristol and Clifton. In addition, the Local Committee has obtained permission for members to photograph in the churches and other places of interest in and about Bath.

The papers are fewer in number than in previous years, with a view to prevent hurry, and to give time for discussion, which hitherto has often been cut short in order to make way for the following papers. The paper by Mr. W. Lang, on the *Photographic Work of Herschel and Fox-Talbot*, and that by Mr. Common on *Recent Work in Astronomical Photography*, are especially appropriate at a meeting in a district that is so intimately associated with the names of Fox-Talbot and of Herschel.

One very important feature of the meeting will be the final report of our Lens Standards Committee, and the discussion thereon; and the discussion on International Standards that Mr. Warnerke has promised to open. It is hoped that every one interested in this important question of standards will take part in the discussion, and that we may afterwards be able to appoint a committee to draw up a report or series of recommendations for presentation at the forthcoming International Congress in Brussels.

The Convention Group will be taken on the Wednesday, and the Dinner, which has always been such a great success, will, as usual, take place on the Friday evening.

In order that members may know where they are most likely to meet their friends, two hotels, the "Castle," in Northgate-street, and the "Royal," near the Great Western Station, have been appointed headquarters.

An exhibition of Lantern Slides will form one of the features of the opening meeting, and it is particularly requested that members who have slides of places visited at the last Convention, whether actually taken during the Convention meeting or not, will send them to me at the Yorkshire College, Leeds, or to Mr. W. Bedford, 326, Camden-road, N., at least a week before the opening meeting. Slides of other subjects will also be acceptable for exhibition either on that evening or at the other evening meetings.

The annual subscription is only 5*s.* Tickets of membership are now ready, and can be obtained from the Hon. General Secretary, Mr. J. J. Briginshaw, 128, Southwark-street, S.E., or from the Hon. Local Secretary, Mr. E. J. Appleby, 8, Argyle-street, Bath.—I am, yours, &c.,

Yorkshire College, Leeds, June 15. C. H. BOTHAMLEY, *President.*

PERSPECTIVE DRAWING AND VISION.

To the EDITOR.

SIR,—As an old perspective draughtsman I felt interested in the article on *Perspective Drawing and Vision*, by Messrs. Emerson and Goodall, but after repeating most of the so-called proofs of the alleged theory, I have almost come to the conclusion that it is an elaborate joke, to test the credulity of those who will believe anything that is said in a plausible and scientific kind of way.

My eyes may be abnormal; but, as they enable me to see stereoscopic pictures either with or without a stereoscope, there cannot be very much wrong with them, and they obstinately refuse to convey the impressions which are said to be made in the various experiments given as proofs, although at first sight there is an appearance of confirmation in one case, that is, placing a tapered slip of paper on the nose and looking at it. When both eyes are used the overlapping of the two images gives the appearance of solidity where they overlap, and that looks like vanishing *towards* the eyes; but if first one eye, and then the other, is used, the cause of this is evident, and the usual apparent reduction in size, due to distance, is plainly visible.

One of the experiments may almost be called impossible; that is, to take, with a pencil, the binocular measurement of the width of an object at some distance, as such a measurement can only be taken with one eye, in consequence of the overlapping of the images, either of the object or the pencil. It may be done when both eyes are open, but the image received by one eye alone must be used, and the result must of necessity be the same as when one eye is shut.

So far as I understand the matter, I am inclined to think that any difference between a correct perspective delineation of a subject and its appearance as we see it arises, first, from our binocular vision, and, second, from our seeing it from a wrong point of view. A perspective drawing, or a picture taken by a lens, gives a correct representation of the subject as seen from one particular point, whereas our eyes receive images from two points of view, and the combining of these, bit by bit, and, in reality, only a little bit at a time, gives us an impression entirely different from what either the right or the left eye sees by itself. Surely no one, not even Mr. Emerson or Mr. Goodall, doubts that the two admittedly correct perspective delineations produced by a twin camera and combined in the stereoscope give us the exact representation of what we actually see with our two eyes. If so, then the *Notes on Perspective Drawing and Vision* may be said to be an attempt to prove that a single photograph is not a binocular representation of the subject, a fact which has surely been known before.

It cannot be too strongly impressed on those who think they find errors of perspective in drawings and photographs, that to see them in their true proportions they must be seen by only one eye, and from only one particular point of view; any deviation from that point gives an appearance of distortion. Thus, if a photograph taken with a lens of six inches focus, or a drawing made for a point of view six inches distant, be looked at from a distance of twelve or twenty inches, the relative proportion of the parts are completely upset, and objects in the foreground

appear considerably magnified, but when the eye is brought to the proper distance the proportions are at once rectified, and every part seems to take its proper and natural position. I venture to say that to those who have not tried such an experiment the change which seems to take place will apper almost marvellous.

The longer the focus of the lens with which a photograph is taken, the truer it will seem to be to an ordinary observer, and the less need will there be for seeing it monocularly, because the so-called errors of perspective are less marked, and it is more likely to be seen from an approximation to the correct distance, while the difficulties or errors caused by binocular vision are much less apparent than when a lens of short focus is used. GEORGE H. SLIGHT.

CLEARING BROMIDE PRINTS.

To the EDITOR.

SIR,—Some time ago, when working with argentic paper of Eastman's manufacture, I found I had carried on the development rather far, and, knowing that it was useless if washed and fixed in the ordinary way, I thought I would not be much the loser if I mixed my fixing solution with some alum (knowing that alum and hypo mixed has a wonderful effect in clearing negatives).

I therefore mixed two ounces of a saturated solution of alum with my fixing solution and poured over the print, and watched carefully the progress.

The result exceeded my most sanguine expectations. Gradually the lights began to clear up, and the result was a first-rate enlargement out of what I had just a few minutes before regarded as washed paper.

To test it more thoroughly, I exposed another small piece of paper and treated as above. On this piece, however, I kept the solution on for some considerable time, and found that the image could almost be wholly cleaned off the paper.

The above requires great care in working, as the reducing power is very great and rapid, and although it will prove itself a very good friend in careful hands, yet it will be a deadly enemy to careless manipulators.

I forgot to mention that the print should not be washed before fixing this way, as the iron in the developer plays an important part.—I am, yours, &c., CHARLES STREET.

Albion Studio, Rothsay, N.B., June 8, 1891.

'PROTECTION" AS APPLIED TO INTENDING EXHIBITORS IN AMERICA.

To the EDITOR.

SIR,—I have a communication from Mr. F. C. Beach, the worthy Secretary of the joint Photographic Exhibition just concluded at New York, stating that some pictures which I sent to it were delayed by the Customs House authorities there until considerably too late to be judged. These latter enterprising gentlemen have also charged 11*s.* as duty on the pictures, although they were sent as not for sale, but to be returned. This practically means that I must pay this sum for my goods to be allowed to be shown to the "free" Americans at home. If such regulations obtained in, say, such a country as China, it might occasion less surprise; but that it should be the narrow-minded policy of a nation having such vital interests in being accessibly in touch with the rest of the world surely augurs badly for that present and future "licking all tarnation" which they so liberally suggest of themselves.

Of course the present case I cite is only trifling, but the same out-of-date conservatism, I presume, will attach to more important transactions, and, while isolating their own people, will doubtless also imbue interested outsiders with the same resolution as I feel at present inclined to register, namely, to as much as possible in future leave "America to the Americans."—I am, yours, &c., LYDDELL SAWYER.

Singleton House, Newcastle, June 13*th*, 1891.

EXPOSURE METERS AT EDINBURGH.

To the EDITOR.

SIR,—It is, I know, difficult to compress a society report into due limits and yet to give a fairly representative report, but I feel bound to call attention to the fact that the report of the meeting of the Edinburgh Photographic Society in your last issue is, as regards the discussion on exposure meters and tables, altogether onesided and misleading. Mr. Dundas Todd, who introduced the subject, is dismissed in two or three lines with no indication of what the result of his investigations were, while the remarks of Mr. H. J. Blanc (who had never used such aids, did not want to, and did not think any one else ought to) are fully reported.

No one reading this report could surmise the fact that Mr. Dundas Todd had provided himself with "everything relating to his subject that was advertised," had made thorough and practical trials with each system, and reported upon the result to the Society, giving an emphatic approval to one instrument and system. Surely practical investigations like this are important branches of the work of a photographic society, and, as such, should not be altogether shelved.—I am, yours, &c.,

Hereford, June 13. ALFRED WATKINS.

[On reading a report which appeared in the Edinburgh *Scotsman*, we find that Mr. Watkins' exposure meter was *by far* the most accurate of those tabulated by the speaker on the occasion alluded to. We are pleased to be able thus to supply the omission of the writer who supplied our report.—ED.]

"PALMAM QUI MERUIT FERAT."

To the EDITOR.

SIR,—Or rather a good deal should not be forgotten. From time to time allusion is made in this JOURNAL and others to the attempts of conventions and societies to standardise the weights, measures, and formulæ used by photographers, but I have not seen the slightest allusion to the energetic attempts of the Photographic Club some few years ago in the same direction, and at a time when these matters had been apparently dropped or given up in despair by other societies. The Committee of the Photographic Club communicated with all the important societies in this country, and requested their co-operation, which in most cases was promptly accorded. The consensus of opinion thus obtained was published by the Photographic Club, and was decidedly in favour of the use of the decimal system for weights and measures, and that all photographic formulæ should be expressed in grains for solids and minims for fluids, the ordinary fluid measure in general use being approved as the most convenient, the French method of fluid measurement being considered the best that could be used. This was duly reported by the Committee to the members, and by them unanimously adopted, and a rule was made that, whenever it was necessary to give a formula or record weights or measurements at the Club, strict adherence should be given to these systems, several leading members undertaking to adopt the same in their every-day practice, and to impress upon their photographic friends the advantage of so doing. It was hoped that *gradually* these advantages would become recognised, and would sooner or later become the general modes of expression, and minimise the confusion that had existed up to that time by the various methods of writing formulæ in common use. I believe this action of the Photographic Club did more to bring home to photographers than anything previously done the advantages to be gained by uniform methods of expression in these matters, and certainly think *some* credit at any rate is due to the Photographic Club, whatever means may be adopted by other societies to forward this most desirable end.—I am, &c. EDWARD DUNMORE,

Ex-Hon. Secretary of the Photographic Club.

Exchange Column.

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

Will exchange about seventy half and whole-plate negatives of Northumbrian and Newcastle scenery for hand camera.—Address, PIKE, Sedgwick-place, Gateshead.

Wanted, Ashford's three-fold six-inch top stand; will give in exchange four-fold stand and half-plate bold rolling machine.—Address, W. MORRISON, Homedale, Luton.

I will exchange twenty good whole-plate negatives of the English Lake District for a good bulldog.—Address, EDWIN ENSELL, Lake-road, Ambleside, Westmoreland.

Exchange, whole-plate landscape lens for C.D.V. portrait lens; large showcase, folding glass doors, for good interior background.—Address, ROBINSON, Photographer, Hedingham.

Wanted, 6½×4¾ camera, three double slides, rectilinear lens, and case, in exchange for a Chadwick lantern, with eight-inch focus lens, safety jet, carrier, case, twelve-feet screen, and frame.—Address, E., 331, Walmersley-road, Bury, Lancashire.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—
G. P. Abraham, Keswick.—*Three photographs of Mr. Hall Caine.*

MECHANICAL asks if dry plates prepared for stripping the film from the glass are to be had in London as they are on the Continent?—Yes; such plates are supplied both by Messrs. Mawson & Swan and by the Autotype Company. State your requirements to either firm.

R. STEWART.—Apply to Messrs. England, 7, St. James's-square, W.

J. ULLMANN.—The Shenstone Clip is a handy appliance. We have not tried the other.

ANGLO-FRENCH.—It will be three weeks yet ere the definite formulæ are given to the public.

J. HARRIS.—We have examined the piece of plate sent, but cannot discover the cause of the spots.

A. Y. E.—A lens of the old triplet form of eighteen inches focus, by a good maker, should cover a twelve by ten-inch plate perfectly.

OPERATOR.—We fear you have no remedy. You might perhaps recover a week's salary, but it would entail trouble and expense to do so.

A VICTIM.—We applied to the firm complained of, and have received from them a most satisfactory explanation, which may be seen on application at our office.

D. STEPHENS.—In making up a solution of pyrogallic acid with sulphite of soda, or the meta-bisulphite of potash, either salt should be thoroughly dissolved before the pyro is added.

INQUIRER will be glad to know what is the best remedy when a silver bath becomes charged with albumen?—Add a little kaolin to the bath, well shake the bottle, allow the kaoline to subside, and filter the clear solution.

BICHROMATE.—You will have no difficulty in mounting carbon prints, developed on glass, so as to retain as much gloss as the example sent, if you apply two thicknesses of transfer paper to the picture while on the glass; then, in mounting, a thin solution of glue, sparingly applied.

J. RHINE writes: "I am desirous of taking some positive photographs on metal. Where am I to obtain the plates, and what is the formula?"—Ferrotype plates are supplied by Mr. Jonathan Fallowfield, Charing-cross-road. Any elementary manual of ten or a dozen years ago will give full working details of the positive process on glass. They will answer quite as well for ferrotypes. Formulæ will be found on pp. 747, 748, of the current ALMANAC.

T. H. JOHNSON says: "I have a great many faults in sensitising my paper. When I come to cut it up, it is covered with black spots in some parts, and is not dry after hanging up all night. Can you please tell me the reason?"—The spots may be due to several causes. They may be caused by the paper, by particles in the solution, or by floating particles in the atmosphere. We rather suspect the latter is the reason, as the paper is long drying. The drying may be hastened by hanging the paper in a drier room, or by drying it before a fire.

N. W. wants to know whether it is really possible to produce all the colours and tints of nature with three printings from plates made from negatives taken from nature, on colour-sensitive plates through coloured screens, without retouching at any stage?—It is asserted that it is possible, but the results we have seen, that we have known to be so made, were all very imperfect. We have, however, seen some fairly good results in colours with very little retouching or dodging on the negatives or plates that could be detected. Still they were palpably retouched.

B. ROBERTS.—In making enlargements by daylight on bromide paper a condenser is not required; all that is necessary is to direct the negative towards the sky, or to reflect the light through it, as shown in the sketch, sent but dispensing with the condenser. We can give no idea of the exposure necessary, as that must necessarily depend upon the sensitiveness of the paper, the density of the negative, the quality of the light, the degree of enlargement, and the angular aperture of the lenses used. One or two trials on small slips of paper will determine the time required.

H. S. W. writes: "In your JOURNAL last week Mr. Chesterman gives the following developer as a good one:—No. 1. Pyro, 6 grains; soda sulphite, 36 grains; sulphuric acid, 1 minim; water, 1 ounce.—No. 2. Carbonate of soda, 36 grains; water, 1 ounce. Will you kindly give me the correct weights and measures of the above for making up an ounce of pyro, and also say which is the best quantity for a stock solution?"—We fear we misunderstand our correspondent's query. Surely, with the proportions so clearly given, he could calculate them for any given quantity of pyro himself. Probably this is not what is meant. With regard to the quantity for a stock solution, that will, of course, depend upon the consumption.

ALPHO writes: "Two years ago I took a youth as an apprentice for four years, and agreed to pay him a progressive salary. There was no proper indenture. The agreement was verbal, and an understanding made that he was not to set up business for himself, or to enter the service of any other photographer, in this town. Now he has left me and gone to another photographer, who is giving higher wages. I have been to a solicitor, who tells me I have no remedy inasmuch as the fellow was not legally apprenticed. Can you tell me the custom of the trade, as it seems hard that after teaching the fellow his trade he turns round and opposes me?"—It seems to us that the solicitor's opinion is indisputable, inasmuch as there are no indentures of apprenticeship.

H. EVANS says: "I have a few old paintings to be copied, and as I have no experience whatever in this department of photography, I should be glad if you would give me a few hints, so as to get the best possible results. The enclosed shows my attempt and utter failure. I ought to say the gentleman who has commissioned me to do the work will permit me to unhang them, sponge them, have them outdoors, or anywhere, so that I do not take them off the premises. They are very brown with age. If it is possible to get passable results, I shall esteem it a favour for a few practical hints in 'Answers to Correspondents' column next issue."—Old oil paintings, in inexperienced hands, are sometimes difficult to copy. With the facilities given, our correspondent ought to obtain good results. He should first wash off all dirt from the pictures with cold water; next, the paintings should be so arranged that there are no reflections from the varnish to be seen from the camera. Orthochromatised plates should be used in conjunction with a colour screen. By following these hints, with some little experience, success will be obtained.

C. J. CAVE.—In making collodion for enamelling photographs, it is not usual to add glycerine. Are you not confusing this with castor oil?—a small proportion of this is generally added. With regard to the lenses, take the ordinary rectilinear in preference to either the portrait, combination, or the wide-angle, for general all-round work. When stopped down it will include quite as wide an angle as is artistic.

A. M. F. writes: "Might I trespass on your indulgence for a little information? 1. I have lately been making a few transparencies ($7\frac{1}{2} \times 5$), one or two of which I mean to present to some of my friends. Had I foreseen the difficulty I have now to face, I would have made them on ground-glass plates. As it is, they are on Thomas's transparency plates. How am I to mount them without making each cumbersome by reason of a protecting glass in front and ground-glass at the back? Matt varnish would itself require to be protected. Is there any hard varnish that I could use? The addition of Chinese white would likely do. I wish to avoid *three* glasses. 2. I have five or six large transparencies of Niagara—wet plates evidently—and they are backed with glass coated with a milk-white varnish, for all the world like an opal plate. I should like to know what it is. 3. As I am writing, at any rate can you give me some idea of the exposure for the collodion emulsion for which you give the formula in the late edition of Hardwich? You give only one dry process for collodion, the one you give being the most sensitive—say for *f*-16. I purpose, when on my holiday this year, reverting to my old friend collodion, and the above will exactly suit."—1. There is no help now; a glass must be used back and front; but, if the thin French glass be used, the transparencies will not be unduly bulky. If they had been made in the camera, one glass would have done. Some of the commercial hard varnishes would be a protection, though not equal to glass. 2. Probably collodion holding a white pigment in suspension, such as oxide of zinc, or sulphate of baryta. 3. All depends upon the subject. The exposure of two or three plates will teach more than anything we can say.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—June 23, at eight p.m., subject for discussion, *Orthochromatic Photography*. The rooms will be closed from July 29 to August 4, 1891. The exhibition of photo-chromo work will remain open daily between two and nine p.m. till the 30th inst.

PHOTOGRAPHIC CLUB. — Subject for discussion, Wednesday, June 24, *Actinometry*, to be followed by a series of lantern slides of Hildesheim, by Mr. Frank Haes. July 1, *Sensitometry*. Saturday outing, June 20, Chesham. Train from Baker-street at twenty-six minutes past two.

MESSRS. NEWTON & CO., the eminent opticians of Fleet-street, who hold several appointments to the Royal Family and the Government, have just received the further distinction of being appointed Philosophical Instrument Makers to the Royal Institution of Great Britain, a position of recognised honour.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—June 20, Outing to Carshalton and Beddington; leader, Mr. Weir Brown. Train from Cannon-street, seventeen minutes past two. Subject, June 25, *Orthochromatic Photography*. July 2, Ordinary meeting. July 16, *Means for Obtaining Gradation whether in Negative or Printing*, by W. E. Debenham.

LAST week the Dowager Crown Princess, the Archduchess Stephanie, went to the Austrian Museum to inspect the International Exhibition of Artistic Photographers in Vienna. She was received by the Director of the Museum, the President, and Vice-President of the Club. First she looked at the photographs exhibited by the Archduchess Maria Theresa, the patroness of the Exhibition, the Grand Duke of Tuscany, the Princess of Wales, and Count Henry Bardi. She told the gentlemen accompanying her that she occupies herself with photography a good deal for making sketches for pictures afterwards. She has taken many photographs at Venice and Naples. It was the seascapes which especially pleased her, and particularly the picture of Jersey, by A. R. Dressen, which work of art she desires to possess. The President will take the steps necessary for procuring her the picture. After staying nearly an hour and a half, her Imperial Highness took leave, after again expressing her appreciation.

ON Saturday afternoon the Royal Observatory at Greenwich was visited by a large number of scientific people. It was the day of the annual visitation, when the Astronomer Royal presents his Report on the work of the past year. It was a most appropriate occasion for drawing attention, as the Astronomer Royal did, to the neglect with which science is treated by the Government. Everybody present saw and felt the justice of the complaints made in his Report of want of space and adequate buildings. Probably few of the outside public fully realise that modern navigation is all but dependent on the labours of the Astronomer Royal and his staff at the Greenwich Observatory. Still fewer know what humble little wooden sheds are considered good enough for the carrying out of a large part of the work of the Observatory. Even in the main building there is a lamentable want of space, and the outbuildings, though they would do well enough for some temporary purpose, are a reproach to the nation. The cost of a single gunboat would be far in excess of the outlay necessary to give the Greenwich staff a set of permanent buildings worthy of their work and of the maritime people for whom it is done. It is a matter which the Government should take in hand without delay, in the interests of the navy and the mercantile marine, and for the cause of science.—*Daily News.*

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THE BRITISH

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THE POWER OF THE SUN AT DIFFERENT ALTITUDES.

The general consensus of opinion among experienced men is that "tables of exposures," however valuable in themselves, are not made use of in outdoor photography by experts. The relative value of the sun's rays at a given altitude being known, the exposure to be given to the plate is a function of the modification of that value by variations in the actinic transparency of the atmosphere, combined with the quality and quantity of the light reflected from the clouds; and this modification requires knowledge and experience, applied on the spot, to gauge the extent of its incidence.

Sir H. Roscoe's observations, placed on record many years ago, show that, granted a perfectly clear sky, the chemical effect of the sun at a certain altitude is always the same, and these observations coincide with numerous other similar ones made at various times in India (at Dacca) and in England (in Somersetshire) by the author of a very valuable paper on this subject read at a meeting of the Royal Society a few months ago, and to which paper we draw our readers' attention.

The author, Mr. William Brennand, made a series of experiments upon the darkening of sensitised paper by the action of the sun for a graduated series of times, and compared them with similar darkenings produced by a standard stearine candle, founding the tabulation of the extent of colouration upon the assumption that the actinic effect of the candle-light was directly proportionate to the weight consumed. In view of a practical application of these values to photography in the field with dry plates, it may at first be objected that the rays of the spectrum, effective on paper and on dry plates, are not the same; but, on the assumption (as proved) that the actinism of the sun's rays is equal for equal altitudes, it will be seen that the value of a table of chemical action will not really be interfered with, seeing the figures are relative, and not absolute, and that any correction—plus or minus—is simply the application directly or inversely of one single co-efficient.

Mr. Brennand, in the course of his investigations, soon had reason to differentiate the action of the sun and sky, and he was led to devise a kind of "mitrailleuse actinometer," as he termed the instrument he constructed. He mounts a number of similar cylindrical tubes in one plane in a semicircle, to the centre of which the axis of each tube is directed; one extremity of each tube lies in the circumference of the circle, the other extremities lie on a concentric circle of about one-half the radius. In the circumference of this smaller circle is a semicircular series of holes, against which a semicircular block, carrying the sensitised paper, is pressed by a screw. Each cylinder cuts out of the sky a circle of 8° 28′ angular diameter. One of the tubes near its top carries a small plate of wood, on which stands a stile parallel to the tube, by means of which this particular tube can be brought in a line with the sun. By another motion the plane of the tubes can be adjusted to the plane of symmetry (or elsewhere), by which term is understood a vertical plane through the sun at any time dividing the visible sky into two exactly similar portions.

The author's observations show that there is a point of minimum sky intensity at 90° from the sun.

The paper to be darkened was always placed at right angles to the sun's rays. Sir H. Roscoe's were placed on a horizontal plane. These introductory remarks will, with the author's notes, be quite sufficient explanation of the one table which, for the purposes of our readers, we only deem it necessary to quote. The explanations and mode of reading will be found in the headings to the columns.

Table B.—*Chemical Action of the Sun and Sky.*

Sun's altitude.	Sun alone.	Sky alone.	Sun and Sky together.	Sun's altitude.	Sun alone.	Sky alone.	Sun and Sky together.
1	·001	·003	·004	31	·110	·064	·174
2	·002	·005	·006	32	·113	·064	·178
3	·003	·007	·010	33	·116	·065	·181
4	·004	·010	·014	34	·118	·065	·184
5	·006	·012	·019	35	·121	·066	·188
6	·009	·016	·025	36	·124	·066	·190
7	·012	·019	·031	37	·126	·067	·193
8	·016	·022	·038	38	·129	·067	·196
9	·020	·026	·045	39	·131	·068	·199
10	·024	·029	·052	40	·133	·068	·201
11	·028	·032	·060	41	·135	·069	·204
12	·033	·035	·068	42	·137	·069	·206
13	·038	·038	·075	43	·138	·069	·208
14	·043	·040	·082	44	·141	·069	·210
15	·047	·042	·090	45	·143	·070	·213
16	·052	·045	·097				
17	·057	·048	·105				
18	·061	·049	·110				
19	·066	·050	·116				
20	·070	·052	·122	50	·150	·071	·221
21	·075	·053	·128	55	·157	·072	·229
22	·079	·054	·134	60	·162	·073	·235
23	·083	·056	·139	65	·166	·073	·239
24	·086	·057	·144	70	·170	·073	·243
25	·091	·058	·149	75	·172	·074	·246
26	·094	·059	·153	80	·173	·074	·248
27	·097	·060	·158	85	·175	·074	·249
28	·101	·061	·162	90	·175	·074	·249
29	·104	·062	·166				
30	·107	·063	·170				

N.B.—For sun altitudes 50° to 90°, the figures are not the result of direct observations; for sun altitudes 1° to 10°, the figures are less certain by reason of thin haze often present.

The numbers of the table were obtained by taking the inverse of

the times required at each altitude for producing the darkening of the candle unit.

I found the chemical action of the sun, as far as my experiments went, the same at all hours of the day and at all seasons of the year. And in Somersetshire I got exactly the same chemical action of the sun as at Dacca. Observations near the horizon cannot be depended upon.

RESULTS OF EXCESSIVE EXPOSURE.

In our issue of June 12 there is a letter from a correspondent containing an account of some experiments on the effects of excessive exposure of gelatine plates, the results being embodied in tabular form, and with sufficient clearness and detail to enable any one to arrive at a good idea of our correspondent's experiences. The sixteen exposures were made through a negative to daylight, and varied in duration from a quarter of a second to a hundred and ten minutes. A developer of uniform strength was employed, and, quoting the results which our correspondent regards—and we may say very rightly regards—as essential, development of the plate which had had one second exposure gave a positive full of detail but thin; that which had four seconds yielded an image partaking of the character of both negative and positive, in fact, a neutral result; while the exposures ranging from one minute up to the maximum period given produced negatives which we gather were, under the circumstances, of fair qualities. Our correspondent is confessedly unaware thatthese phenomena have been known to experimentalists for a considerable number of years, and that from time to time attempts have been made to turn them to practical account; and, as there are probably many of our readers who are also unfamiliar with the subject, in one or both of its aspects, we will briefly state what has been discovered and achieved by the two classes of workers.

Solarisation, or, as it is sometimes called, the reversal of the image, has been explained on these grounds. The immediate result of prolonged exposure upon a film of gelatino-bromide is the evolution of bromine, which, coming in contact with gelatine, liberates a body, assumed to be hydroxyl, that oxidises the invisible impression formed, and, in effect, renders it undevelopable. The appearance of a positive instead of a negative, or *vice versâ*, can, therefore, on this hypothesis, be easily understood by the least scientific among photographers. The view of the phenomenon thus put forth is very much strengthened by the ascertained fact that, if a plate be treated with a solution of a substance which has the property of absorbing oxygen, and then exposed, no matter to what extent it may be over-exposed, a reversed result cannot be obtained.

In all probability the foregoing explanation is the correct one, and we are not aware that it has ever been disputed by any competent experimentalist. It is sometimes said that reversed effects may be produced by prolonged development or by employing a strong solution containing little or no restraining bromide; but, so far, no investigations have reduced this theory to a form that would allow of its independent examination. Such results as are alleged to have been arrived at in this manner have also presupposed extreme under-exposure as the primary cause at work, and thus the difficulty of reconciling one theory with the other is greater than it may seem at first sight, since there are few precedents for accounting for so marked a phenomenon as the reversal of the photographic image on two such distinct—if not antagonistic—grounds as over-exposure and oxidation, and under-exposure and strong, unrestrained development.

Granting, then, that over-exposure induces the oxidation o the developable image, we can trace approximately wha happens in the production of the reversed result. The firs effect of over-exposure is to cause fog on development, and w may therefore imagine that the reducible impression has no yet been attacked by the oxidiser. But, by continuing th exposure, the fogged negative picture begins to disappear, whil to a very great extent the film loses its tendency to fog i development. The plate marked No. 5 in our correspondent' table probably exhibits this change in progress, the exposur having been arrested ere the oxidation was complete, some o the shadows only being attacked. A further prolongation o the exposure results in the practical destruction of the im pression first formed, and the creation in its place of an exact'y opposite effect, as instanced by the results numbered 6 to 1(in our correspondent's letter.

Ever since this phenomenon began to be studied, it seem to have been understood that a complete reversal was only t be obtained by an exposure hundreds, or even thousands, o times greater than that required for a negative; and it wa also, we believe, proved by experiment that if a plate receive a brief exposure beforehand to weak light the exposure behin the negative or positive could be very materially reduced The image in a film of pure bromide was also said to revers more readily than one in bromo-iodide, although we are under the impression that later experiments, particularly since very rapid plates are made of the latter compound, do not confirn this view; indeed, the experiences of a friend altogethe indicate the contrary. Be that as it may, our readers will b quite safe in taking it as settled that with the rapid and extra rapid plates now in the market there is no more difficulty i finding out the correct exposure for reversed results than there is for negatives.

There was an obvious way of taking advantage of thi reversing action of light which was immediately recognised by the early investigators of the phenomenon; we allude to th reproduction of negatives and positives; and one of the first t suggest a practical working method was Mr. Thomas Bolas, a we have pointed out in previous volumes, where our readers wil find the details of it. But in more recent times some attempt have been made to utilise the principle without any inter mediate treatment of the film such as Mr. Bolas's plan necessi tated. Some two or three years ago Mr. John Annan exhibite to the Glasgow Photographic Association prints from som reversed negatives which he had obtained by exposing a plat under the original negative sufficiently long to cause a reversa of the image. Some of the reversed prints were said to b quite equal in quality to the originals; and it was found that th exposure required was about three hundred and fifty times tha necessary to obtain a positive. Assuming the plates used b Mr. Annan to be somewhat slower than those employed by ou correspondent, it will be instructive to compare these particular with those given by the latter gentleman in line 9 of his tabl which refers to the best negative he produced, especially (a Mr. Annan stated that the exposure permitted considerable lat tude. This was, practically, from forty-five to sixty minutes at s inches from a No. 5 gas-burner, or (and here we find suppor in our assumption of the relative rapidity of the plates used b Mr. Annan) from fifty to eighty seconds in daylight. Mr Annan used a developer weak in ammonia and bromide an strong in pyro.

We have referred thus fully to Mr. Annan's experiment because, to the best of our recollection, they constitute, per

haps, the most practical testimony on behalf of the feasibility of directly utilising the reversing property of light, and, moreover, to our mind, lay down in a clear and simple manner the principal lines upon which those desirous of making a trial of the method should proceed. Our correspondent, Mr. Warren, appears in dependently to have gone to work on those lines; while some seven or eight months ago Mr. Humphery, of the Camera Club, read a paper before that body on the subject, at the same time passing round a number of examples of reversed negatives obtained by the method described.

Although the practical value of this reversing process has been here and there called into question, we are inclined to think that it contains the elements of a really useful method of multiplying or reversing negatives, and that a few experiments as to the most suitable form of development necessitated will destroy the main obstacle to uniform success. Mr. Annan appears to have succeeded remarkably well in his attempts, and in now drawing attention to the subject we trust that others may be induced to take it in hand for experiment. This is one of the many comparatively untrodden paths in photography which await exploration by those sighing for more worlds (of experiment) to conquer, among whom we venture to class the numerous unfortunates called upon to read papers before the societies.

VARIETY OF RESULT WITH GELATINO-CHLORIDE PAPER.

It is scarcely probable that the amateur, or small consumer, will resort to an elaborate mechanical means for coating the paper, nor is such a course either necessary or desirable. It must be borne in mind that, as the emulsion described in previous chapters contains a considerable excess of free silver besides other soluble matters, neither it nor the dry films prepared from it can be expected to possess unlimited keeping qualities, and it is therefore advisable to prepare such quantities as are likely to be used up within a reasonable time. Besides, mechanical coating necessitates not only the selection of a special quality of paper, which must also be in considerable lengths if any real advantage is to be reaped; but the temperature of the emulsion and other conditions of cooling must be so carefully regulated in order to secure uniformity of result that it is very questionable whether "the game will be found worth the candle."

Let us start, then, with the idea of cooling in the simplest manner possible, namely, either by floating the paper upon the emulsion, or by pouring a measured quantity of the latter on to the paper previously stretched upon a suitable support. The former will be found the easier plan for small sheets, while the latter perhaps gives the better result at the expense of a little more trouble.

But, first of all, it is important to select a suitable sample of paper. In the earlier or experimental stages it will suffice to secure a good paper of tolerably even texture and as free as possible from watermark; a good quality of printing paper answers well here, as it exhibits less tendency to warp and curl under the influence of moisture. But the best results are, of course, only attainable with a properly prepared photographic paper, many varieties of which are now obtainable from the principal dealers in materials. A word of warning may be given, however, against the selection of some of the highly surfaced papers prepared for special purposes, chiefly in connexion with collotype and process work, but especially the glazed and calendered paper used for Woodbury type. This last possesses a beautifully smooth hard surface, admirably adapted for coating, and for rendering "enamel" effects; but, unfortunately, the glaze consists of shellac dissolved in borax, and the alkali exercises the most deleterious action on the emulsion, not only destroying the colour of the print and its power of toning, but giving rise to mottling and unevenness of the worst description.

If the proper sort of paper be secured, no further preparation will be required for floating; or, if the alternative method of coating be adopted, all the preparation that will be needful will be to damp the paper before laying it down on the support on which it is to be coated. If, however, the surface be at all spongy when moistened, or show any inclination to raise the fibre, it will be necessary to give it a preliminary sizing. One method of effecting this consists in pinning the sheets singly on to a flat board or table with a sheet or two of clean blotting-paper intervening, and sponging them over evenly with warm and tolerably thick starch, or arrowroot. The sizing preparation is made by rubbing down the dry starch or arrowroot into a perfectly smooth paste with cold water, and then gradually thinning it, stirring the while to prevent the formation of lumps, after which it is boiled in an enamelled saucepan until it thickens and becomes transparent. When sufficiently cooled down, it is squeezed through fine muslin or cambric, and is then ready for use.

To apply it to the paper a small Turkey sponge, previously thoroughly cleaned, is saturated with the size and rubbed gently over the paper with as little friction as possible so as not to disturb the fibre, the application being continued until the sheet becomes perfectly smooth and uniformly limp, the sponge being so manipulated as to leave the surface as free from streaks and unevenness as may be, after which the paper is pinned up to dry in a warm place free from dust. As the paper in this position will keep indefinitely, a considerable quantity may be prepared at once and stored away for future use. When quite dry, it should be smoothed over with a hot iron, a sheet of paper being interposed for the dual purpose of preventing uneven glazing as well as to keep the surface clean.

Another method of sizing consists in floating the paper upon a ten-grain solution of gelatine containing a very small proportion of chrome alum, about three or four grains to the pint of solution. The sheets are floated singly for two or three minutes or until they lie perfectly flat, and are then drawn over the edge of the dish or a glass rod suitably fixed, in order to remove the surplus solution, and then hung up to dry. A length of barometer tube pivoted on a couple of wire nails at a height of an inch or so above the edge of the dish form an admirable "scraper" for thus removing the excess of sizing solution, and will also be found useful in the after operation of coating.

As regards the size of sheets most conveniently coated, it will be found advisable not to attempt too much. As the majority of the work executed upon this class of work will be small, or, at any rate, not exceed 12×10, or at the most 15×12, we should recommend those as the limits, more especially as the difficulty of handling the paper as well as of keeping the emulsion in proper coating condition increase rapidly with the dimensions of the sheets coated. Preferably, if the work is all small, say, not larger than half-plate or cabinet size, we should recommend even smaller sizes still to be coated, and in all probability it will be found that a greater quantity of work is got through in a given time and more satisfactorily

executed under such conditions than when larger sheets are manipulated.

In floating the paper, it is, of course, necessary to have the emulsion at such a temperature that it is perfectly fluid, and it is important that that temperature should be maintained at as nearly as possible the same point. In order to secure this, it will be necessary to improvise some arrangement by which the dish containing the emulsion shall be surrounded by hot water. A very suitable form of dish for coating purposes will be found in the enamelled iron trays kept in stock by many of the dealers in photographic materials, or an efficient substitute presents itself in the enamelled baking-dishes obtainable at most hardware stores. These are comparatively light and easy to handle, and can be had in a variety of sizes and shapes. If possible, a pair that will fit into one another, leaving a space in the outer one for hot water, should be secured: thus, if two dishes of the dimensions respectively of 10 × 8 and 12 × 10 be selected, the latter being deeper than the other, the smaller one will, if placed with its longer dimension across the width of the other, rest suspended by its ends on the sloping sides of the larger, and so attain the end desired. But, if two such sizes be not obtainable, it is an easy matter to support a small dish by means of wedges or otherwise in the centre of a larger one. If the outer dish be so arranged that a small spirit lamp, or Bunsen burner, can be placed underneath it, the work of keeping up the temperature will be materially simplified.

Before pouring the emulsion into the dish, prepare a level surface—a sheet of glass, or a smooth, flat board—at one end of the dish, and raised an inch or two above the level of the edge of the latter. If it can be so arranged that the levelling slab can be made to slide over and nearly cover the dish, when required, so much the better. On one edge of the plane surface, and just below its level, fix the pivoted barometer-tube already mentioned, and the coating arrangement is complete.

A sufficient quantity of emulsion is carefully filtered on to the dish to the depth of half an inch, care being taken that no air bubbles are allowed to form. A sheet of paper is carefully laid down upon it in the same manner, as in floating albumen paper, and allowed to lie for half a minute or so, when it is carefully lifted by each corner in succession, and examined to see that it is properly covered. Such being the case, it is allowed to remain for about three minutes, or until it lies perfectly flat. If the levelling slab be movable as suggested, slide it over the dish until the latter is three-quarters covered; then, taking the sheet of paper by the two exposed corners, bend it backwards, and draw it gently with an even motion over the pivoted glass tube on to the level, where it is allowed to remain until the gelatine has set, which under ordinary circumstances will have taken place while the next sheet is floating. If the level be arranged to slide as described, the operation of coating proceeds rapidly and smoothly, each sheet as removed from the emulsion sliding out of the way to make room for the next, and when set being hung up to dry, the level being released for the next sheet. If it be not convenient to have the level movable, the roller at least should be so, and this should be placed about midway across the dish after each sheet of paper has been floated.

If the coating is to be performed by pouring a measured quantity of emulsion on to the paper, a different arrangement will, of course, be needful. A sheet of plate-glass is laid over a dish of hot water, the latter being heated from below by means of a spirit lamp or Bunsen burner, and the plate-glass surface brought to a true level. At the side of this the coating level must be arranged a second or *setting* level, and this latter must be at least twice as long as the sheets to be coated. The paper having been damped sufficiently to soften and expand, it is laid upon the coating level, and, if necessary, smoothed down by suitable means; the emulsion is poured on to it and led to the edges by means of a glass rod, and allowed a minute or two to spread and level itself.

The next operation requires some dexterity. The damp paper carrying the emulsion naturally clings to the level slab; it has therefore to be carefully but rapidly detached, which is effected by picking it up by the opposite ends, bending it slightly into a bow, and quickly lifting it on to the setting slab, upon which should be laid a sheet of smooth, dry blotting-paper. The act of lifting naturally disturbs the level of the emulsion, but, if the coating slab be hot enough, the fluidity of the gelatine allows it soon to relevel itself, and when that has occurred the blotting-paper carrying the coated sheet is drawn to the cooler end of the setting slab for the film to set.

The delicate operation of transferring the coated sheet as described may be simplified by having two or more sheets of glass on which to perform the coating, the glass being removed with the coated sheet after it has been levelled, and the gelatine allowed to set before stripping it. In any case, the setting is pretty rapid, and the sheets may be at once hung up to dry. The simplest way of hanging, in order to obviate as far as possible the twisting and curling of the paper in drying, is to pin the upper and lower edges of each sheet to a narrow lath of wood, a number of which should be provided for the purpose. The sheets then dry with but the slightest twist in them, and this is soon removed when placed under pressure.

When quite dry, the sensitive sheets should be packed together, and placed under pressure in a moderately warm dark place, free from any access of gas fumes or similar noxious emanations.

The paper read by Captain Abney on *Dark-room Illumination*, at the last meeting of the Photographic Society of Great Britain, ought to convince photographers who value their eyesight that they can, as we have often said before, use far more light in the dark room than they do, provided it be of the right character. There is no question that a large number of persons are suffering from impaired vision who would not have done so but for the exceedingly dim light once thought necessary. Not only are the eyes unnecessarily strained while working, but they suffer a severe strain from the sudden transition from the almost darkness into a strong light. Eyesight is much more easily injured than restored.

One thing in connexion with dark-room illumination often leads to inequality and negatives of impaired quality, namely, the want of a uniform light, particularly when it is dim. With artificial light this may be overcome in great measure. When candles are used they should always be of the same size and make. A uniform light will then be fairly secured. When gas is adopted, a "regulator" burner should always be employed. This, when turned full on, secures an equable light, whatever be the pressure on the main. Every one knows that a burner "full on" in the day-time, when the pressure is reduced at the gas-works, gives a very different light from what it does in the evening, when the pressure is increased. With a regulating burner this is obviated. Such burners should always be used in bromide printing, which is usually done by artificial light, so as to obtain uniform results. For this purpose we always use one consuming six feet of gas per hour, and by placing the frame at a definite distance from it we can always rely upon a fairly constant source of illumination.

An important subject was brought before the House of Lords on Friday last, when Earl Cadogan, in reply to Earl Spencer, said that the Ordnance Survey maps on the twenty-five inch scale had not been

revised since its adoption in 1863. It may be mentioned that the parish maps are all drawn, in the first instance, to the two-thousand-five-hundredth, or the "twenty-five inch" scale, so that one square inch approximately represents one acre, while towns containing over four thousand people are drawn on the one-five-hundredth, or the "ten-feet" scale. On this scale each inch represents a trifle over forty-one feet. From these two scales all the other standard maps are reduced by photography to the different scales required.

Those who can look back twenty-five or thirty years will readily realise that in most neighbourhoods, particularly in the suburbs of towns, the maps drawn then are of very little value now. We were, however, under the impression, although the answer given the other night did not convey it, that the maps, or at least the more important ones, were continually being revised as fresh editions are called for, though not perhaps to the extent desirable. Maps of the suburbs of, say London, of ten or even less years ago, would be almost useless to-day.

All the English Ordnance Survey maps are printed by photo-zincography, while the Indian ones are, or were up to a year or two ago, produced by photo-lithography. It is scarcely necessary to remind our readers that the two methods are identical, except that zinc is used in the one case and stone in the other. The advantage claimed for zinc over stone is that it is cheaper and takes up far less room in storage. As all the plates, which must number many thousands, are preserved, this is a considerable item. A zinc plate, such as the majority of those used, weighs about half a hundredweight, whereas a stone of the same size would weigh several hundredweight. An interesting account of the Ordnance Survey Office, Southampton, and the work done there, will be found in our volume for 1887.

Every now and again the subject of the standardising of weights measures, and formulæ employed by photographers crops out. It is doing so just now. Mr. E. Dunmore did well in calling attention, in our last issue, to the efforts of the Photographic Club a few years ago to establish the decimal system, and the promised support they received from all the other principal societies. Whenever this system is universally adopted, as it will undoubtedly be some day, credit must be given to the Photographic Club for the part it took in bringing the thing about.

Those who have adopted the metric system in working would not readily go back to the old method. Every formula we receive from the Continent, and a considerable number from America, come to us in grammes and cubic centimetres, and have to be translated into English weights and measures; often, when small quantities are quoted, with the sacrifice of accuracy. Metric weights and measures are not more costly than English, and, what is more, they may be had showing both French and English values. Photographers, as a body, are conservative, and we fear the grain and ounce will die hard with them.

The reputation of a professional photographer is, unfortunately for him, dependent upon many trivial things, any one of which may, under adverse conditions, tell seriously against his credit. We have known photographers' reputation to have suffered much from the use of mounts that have caused the prints put upon them to rapidly fade. On the question of mounts the artist is very much at the mercy of the manufacturers, none of whom, we are informed, will give a guarantee that their cards will be inert upon photographs. This applies to some of the best and oldest-established cardboard-makers in London. However, the majority of those English houses that supply photographic mounts do take all reasonable precautions with regard to their purity. But this is not the case with some foreign houses.

A short time since a correspondent informed us that on moistening the surface of some mounts, made abroad, with distilled water, and pressing a piece of blue litmus paper in contact, the latter was instantly reddened. Of course, such mounts were utterly worthless for photographic purposes. A few days back we were shown some cabinet mounts, which were spotted, although the spots were not noticed when the mounts were first taken into use. The spots varied in size from that of a pin's head to that of an eighth of an inch in diameter. On examining the spots with a strong magnifier, it was at once manifest that they were due to mildew. When this opinion was given, we were told that, when the cards were first received, they had a "damp and sour smell." Evidently these cards were packed before the paste was thoroughly dry in the centre, and the paste used probably contained the germs of mildew; hence the spots.

Why is it that many of the older prints, mounted with a margin, usually show the first symptoms of fading at the edges of the picture? When, as was sometimes the case, the prints were only cemented by their edges to the mount, this could readily be attributed to the cement, often sour paste or gum. But when the whole of the picture was covered with the cement the case seems different. Even when the pictures are protected with a frame the edges appear to suffer first. This is the case with many of the pictures in our possession, made twenty or thirty years ago. Possibly it may be accounted for from the fact that the edges of the print are usually pressed into more intimate contact with the mount than the other portions. Therefore, if the mount or mountant contain deleterious matter, the closer the contact with the picture the greater would be the deterioration.

PHOTOGRAPHIC CONVENTION.

Bath Meeting.

As previously announced, the Convention proceedings begin on Monday week, July 6, at Bath. There is already every prospect of there being a good attendance. Several hotels have been arranged with for the accommodation of the visitors on moderate terms.

The following synopsis of proceedings may be assumed to be practically correct—subject, doubtless, to such alterations as it may be considered prudent to make during the course of the meeting:—

Monday, July 6.—Reception at 6.30. Presidential address by Mr. William Bedford at 7. Optical lantern at 9.

Tuesday, July 7.—Excursion to Chepstow and Tintern. No papers.

Wednesday, July 8.—General meeting at Guildhall at 10 a.m. Meeting of General Committee at 11. Convention group at 12. Papers (3 to 6 and 9 to 10 p.m.): *The Photographic Work of Herschel and Fox Talbot* (with illustrations), W. Lang. jun., F.C.S. *Recent Developments in Printing Processes* (with illustrations), C. H. Bothamley, F.I.C. *Recent Astronomical Photography*, A. A. Common, F.R.S.

Thursday, July 9.—Excursions to Salisbury and Bristol and Clifton. Report of Lens Standard Committee at 8 p.m. Discussion on proposed international standards, opened by L. Warnerke.

Friday, July 10.—Excursions to Glastonbury and Wells and to Corsham and Laycock Abbey. Annual dinner at 6.30 p.m. Smoking concert to follow.

Saturday, July 11.—Council meeting at 10 a.m.

Expanding the above, the following general information will be found useful:—

Applications for membership to be made to the Hon. Sec. or the Local Hon. Sec. Subscription, 5*s*. Ladies are eligible for membership.

Papers and discussions on Wednesday and Thursday evenings.

An exhibition of novelties in photographic apparatus will be held at the Guildhall, and will be open daily from July 7 to 11 inclusive, between the hours of 9 a.m. and 10 p.m. Members must produce their membership ticket on entering.

The dinner will be held at the Fortt's Restaurant, Milsom-street, on Friday evening, July 10, at 6.30 p.m., followed by a smoking concert; tickets 5*s*. 6*d*.

The Annual Meeting will take place at the Guildhall at 10 a.m. on Wednesday, July 8.

The Castle Hotel and the Royal Hotel will be the Convention headquarters during the meeting.

Permission to photograph in the places over which they have control has been granted by the Rt. Hon. and Rt. Rev. the Lord Bishop of Bath and Wells, the Very Rev. the Dean of Wells, the Very Rev. the Dean of Salisbury, the Very Rev. the Dean of Bristol, the Rev. C. E. Cornish (St. Mary, Redcliffe), and C. H. Talbot, Esq.

Permission has also been obtained by the Local Committee for

members of the Convention, on producing their cards of membership, to photograph in the parks—best time, early morning or evening; Prior Park, any time of the day; Roman Baths, afternoons; Bath Abbey, *exterior*, west front, 1 to 2 p.m.; ditto, east front, before 9 a.m.; *interior*, afternoon before 4 p.m.; churches of St. John and St. Mary, Bathwick, from noon to 4 p.m. on any day in the week (service daily at 5 p.m.); river weirs, morning; Farleigh Castle, afternoon.

We understand that several London members intend leaving Paddington by the 1 p.m. train on the opening day.

"WHY ARE NOT PHOTOGRAPHERS RICHER?"

I DON'T think any excuse need be made for the appearance of this article. Any one who has acquaintance with photographers, any one who travels and makes calls upon them, must have had at times in his mind some such query as above. Why are not photographers richer? It may be said, perhaps without hesitation, because the market is overstocked. This is very probably the case. Most professions now are much in the same condition; but, whereas in the professions of law, medicine, and pharmacy, it is necessary for the practitioner to have passed examinations—in other words, to have qualified himself—in *our* profession it is, we know, quite different; the ease with which fairly good results are obtained with the modern dry plates is the generally accepted explanation of the glutting. The ranks of the profession contain numerous examples of men, young and middle-aged, who are destitute of the proper training, knowledge, and experience, and many commence without even the necessary outfit for a properly constituted all-round business—neither the outfit nor the skill to use it. Imagine the chemist in business obliged to ask another how to dispense a prescription or spread a plaster? We have similar anomalies in our own ranks: the portrait man, possibly one who has served his time, suddenly called upon to take an interior or landscape, and does not know how to set to work with confidence of success; the landscape man also, who knows little or nothing of portraiture, light and shade, and the rudimentary principles of art.

It is a very usual thing for photographers of the older kind (the wet-plate men) to sneer at the modern dry-plate brigade because many of them have given up other trades and occupations for that which they now practise; of course, this won't hold water, because, so far as I can gather, the old wet-plate men themselves, many of them, gave up other employments, house-painting, joinering, and suchlike useful but not particularly high-class professions, for the silver bath and collodion plate; and it may be added that the amount of collective knowledge and science which they brought to the practice of photography was small compared with that possessed by many of the more modern recruits, and on account of which the art science has wonderfully benefited. Certain men will get on by sheer force of business capacity, they succeed in making fairly good portraits, and they manage by employment of numerous canvassers and agents, to secure a good-sized *clientèle*. Their own immediate knowledge of the business may be comparatively small, but they have the wisdom (and the capital) to engage other and more experienced men for the bulk of the work. Being good business men, they succeed, and deservedly so.

Photographers are, I should say, as a class, not good business men. "Easily earned, speedily spent," is the motto of too many, and to wear a short velvet coat, a smoking-cap, and smoke cigarettes at all hours, frequent theatres and public-house bars, seems to be the "end and aim of another section. Few business men could afford to "carry on" in such a cavalier-like manner as do many of our photographers, in the matter of hours and independence; and even the assistants enjoy a freedom unknown to men of similar position in other professions. Men who succeed by dint of novel, not to say eccentric, methods of posing and lighting are rare indeed; such men can, as a rule, do little else, and we often see good posing and lighting allied to indifferent and tasteless printing and finishing. Who would say that our cabinet mounts are models of good taste? And even the larger mounts, though better than formerly, often leave painful memories.

Previous to entering the photographic profession, a man should have received a thorough training, his knowledge of all the various branches of practice ample; he should be a capable operator and retoucher, he should have good apparatus of the best make, and *some capital;* he should also condescend to take a few lessons in book-keeping, and such methods of business management as best fit the profession; he need not of necessity personally make use of his knowledge, but he should be possessed of it; such a man, married, not too early, to a sensible woman, who can not only give him assistance in the reception-room if needful, but also manage economically his domestic affairs, becomes possessed of an inestimable treasure, and is bound to succeed.

Profits are good, say what we will—so good that a small business not only *pays*, but may be made, by good management, to yield an overplus for investment in other ways. Photographic profits, unless frittered away by other and illegitimate channels, must be much higher than those which obtain, for instance, in the drug trade; the most profitable in this latter are undoubtedly those doing a dispensing business, or the retail and prescribing trade of a populous locality; in businesses of the latter kind the total returns often do not exceed 500*l.* yearly, and the profits rightly managed should not be less than fifty per cent., consequently a man returning only this small sum often finds himself, but for the long hours and confinement, in comparatively comfortable circumstances. One man I know well, whose business of this class never exceeded 1000*l.* per year, stuck to it literally night and day for over twelve years, and so well had he systematically saved and invested his surplus earnings that he then retired, and now enjoys his ease and dignity with a regular income of over 300*l.* a year; not an extravagant amount, but enough—the result of thrift and "sticking in."

The photographer often shows great want of enterprise, shown in places by the fact that local views are seldom the work of local men. The church, the pride of the district, is photographed by some one else miles away, or, if by chance the local man has a negative, this will generally be an old one, he "makes it do," and then is surprised when another man comes along and discovers beauties in the church and district he, the local man, never dreamt of. A very successful man I once knew was constantly adding to his stock of negatives, never missed a chance of improving upon his previous attempts; there was an annual "weeding-out process," and it is hardly necessary to say that the "foreigner" here had no chance whatever.

A lack of business is not due to any remissness on the part of our editors and journals. It is impossible to read through the JOURNAL and ALMANAC without finding something which, if carefully studied and digested, and thought out, will inevitably tend to improvement and profit, fresh ideas, and fresh methods. I wonder, for instance, how many photographers read and worked out that elaborate yet plain and concise article on "Iron Printing" in the ALMANAC of two years ago. There appeared here hints on the production of pictures, rivalling in appearance and artistic merit those in bromide or platinum, and at a cost ridiculous by comparison. Of course one doesn't expect the photographer to try every new thing that comes out, but *some one* is on the look-out, and profits by these hints and new ideas.

Increased attention should be paid to the spending department, to avoid waste of material, paper, plates, mounts, &c.; residues especially are valuable. Now, in spite of all that has been said and written upon this subject of residues, the most crass and wilful ignorance prevails in quarters where you would least expect to find it. Only the other day I was talking to a professional whose output would represent in the matter of residue a nett value of close upon thirty pounds yearly, without counting platinum residues, which would materially expand the sum total. No effort was made whatever to recover any of this waste. It would be easy to write a moral homily upon a subject of this kind, as to the benefits to be derived from an investment of one's residue, value, say thirty pounds a year, for instance, paid into Her Majesty's savings bank, commencing at the age of thirty—such a sum would, from a rough calculation, insure an income of three pounds per week at and from the age of sixty for the rest of one's natural life.

A little catering for amateurs would not be found to come amiss. Amateurs are more or less a nuisance. They claim a lot of time, and are not so considerate as they might be. But still it pays to keep in touch with them. With regard to dark room, my experience is that, if it is not possible to erect one specially for amateur use, the best way is to refrain altogether from lending it. I came to this conclusion after an amateur had held possession of my room the whole of one afternoon, and all he did was to develope twelve quarter-plates. This sort of thing is sickening. I have strongly suspected the delay is at times premeditated, in the hope of seeing some developing going on, as I have several times been asked, "What time do you develop?" This is hardly good enough; therefore certain well-defined and easily understood rules should be laid down, and no deviation allowed whatever. Have a fixed scale for developing, printing, retouching, and so on, and let them be adhered to. Be frank and independent (without rudeness), and it is easy enough to get on with the average amateur. Another thing to be remembered is in the matter of printing. If the negatives are of fair average quality, well and good; but, if otherwise, have nothing to do with them.

Various branches of photography are quite neglected by the majority of professionals. There are many large towns, cities,

counties even, without a professional photo-lithographer. I refer, of course, to those who prepare transfers and etched plates, &c. Men with spare time and few sitters should study and work up some mechanical branch of the profession.

On no account should such an important thing as book-keeping be neglected or overlooked; it should be possible for the photographer to know exactly any day of the week how he stands by a brief calculation; and, in the matter of debts, it's a mistake to let these run on simply because the money is not actually wanted at the time for purposes of business; there is nothing dignified about such a position as this, "Kindly pay enclosed over-due account, as I expect the landlord to-morrow for his rent;" and the man who goes to collect his accounts with full pockets occupies by far the better standpoint. It is a good plan to make use of various rubber stamps, such as, "Overdue; please remit;" "Payment of above is requested;" and any other legend that may occur to the book-keeper. The man who allows himself to be handicapped by excessive rentals, superfluous assistance and salaries, and a big list of accounts due, cannot expect to store up much of this world's riches.

The pith of the world's wisdom with regard to money-getting is said to be "to work hard, to improve small opportunities, to economise (time and money), and to avoid debt."

After all is said and done, possibly the chief reason why many photographers labour from a want of riches is that they are not sufficiently careful and thrifty. The pursuit of money, *per se*, is by many philosophers considered a mistake, and the chances are that the photographer's happiest days will turn out to be those in which he was hard at work *earning* the money. Hence, always with an eye to economy, he should not hesitate, by reading, experiment, and reasonable recreation and holiday-making, occasional visits to London and other large centres during the exhibition seasons, to improve, not only his mind and body, but his style and system of work. No matter what a man's natural gifts are, it is impossible for him to attain in any profession to a high place without taking a vast deal of pains. D. D.

CAMERA CLUB CONFERENCE.

PHOTOGRAPHY AND ILLUSTRATED JOURNALISM.*

By Major J. Fortune Nott.

As speed is a feature in illustrated journalistic work which has to be consulted, photography was formerly not to be relied upon. Now, even in this respect, it can more than hold its own with the quickest worker with the pencil, thanks to the great improvements made in modern appliances; hence its employment is practical, and I hope soon to see its position in this class of art work more firmly established by the removal of certain drawbacks from which it still suffers.

The ability to utilise modern appliances in the manner which this branch of photography renders essential is not, however, the only requisite skill which has to be exerted. As before said, it calls for a special training. At the very outset that knowledge is absolutely necessary which will enable the worker with the camera to distinguish what can be done and what cannot be done by photography. In fact, a full appreciation of its powers and a clear perception of its limitations are required, so that the results may not be disappointing. It has to be remembered that the photographer does not possess the power of altering the arrangement of figures or scenery here and there to suit his purpose, which is one of which the artist readily avails himself. It becomes all the more necessary, therefore, for the photographer to be quick in his perceptions and powers of selection, to possess patience to await the proper moment for exposure, and promptitude in seizing his opportunity, which will always arrive if he will only wait. I am assuming that the photographer who is engaged on this work has from experience a perfect command over his camera, and understands fully how it has to be manipulated. A view-finder of fairly good size is required, and for many reasons it should be a loose piece, attachable at will, on the top of the camera. This enables the view to be clearly seen when the camera is held firmly against the body without much bending of the head; and it is upon the scene in the view-finder that the photographer has to depend for any successful arrangement of scenes or figures.

In all hand-camera work, the first thing which has to be seen by aid of the finder is that the lines of the picture are correct, or, in a word, that the camera is level; then, as far as circumstances will permit, that the view, as framed within the dimensions of the finder, which should correspond exactly with that of the plate awaiting exposure, does not offend against all those laws of art which are as applicable to photography as to any other branch. Now, photographs taken by aid of a hand camera should be more artistic than those which result from the use of the ordinary camera, for the photographer has more control over its movements—hence possesses a greater power or, at least, one more readily available for correcting faulty composition. Although admitting that the truthful representation of scenes having historical importance should be the paramount consideration, nevertheless the photographer should avail himself of every opportunity to make his pictures "compose well." With experience and care he can soon master the technicalities which go to make good composition, so that in the end he will almost mechanically arrange his view in accordance with the artistic requirements, in the same way as he will unconsciously arrange the lines in correct perspective. But the one dominating idea he has to entertain is this, the photograph or photographs must correctly tell their tale, so that he who runs may read it there. You cannot put soul or sentiment easily into a photograph, but you can arrest action so that a glance thereat will tell you what was occurring at the time. The photograph must convey some idea of the culminating or central object of the gathering. For instance, take a ceremony in which an historical monument is to be unveiled by some person of eminence, with an imposing ceremonial. The photographer who undertakes to procure views of the ceremony, which will accurately convey to the minds of those who are not present some idea of the grouping and general aspect of the scene, must have this object always in mind, and not to be led away by attractive-looking "bits," or scenes here, there, and all over the place. The first thing is to fix upon a position where the lighting will be suitable, a very important consideration; then, having learnt some details of the proceedings, to select in his own mind one or two acts which will give him his pictures. For instance, the first act may be the reception; the troops presenting arms, the civilians uncovering, and the attitude of the central figures, can all be made to bespeak the fact that the band is playing the National Anthem. If this is caught correctly, it tells its own tale. Then, subsequently, the monument is unveiled, and the scene has to be taken in the nick of time, so that the rope is seen in the picture quite taut, the covering is fluttering to the ground, faces have then an upward turn, hats are raised, and, with care, a picture can be secured that will be so true to life that it will only require a slight stretch of the imagination to hear the British cheers being uttered by the crowd when the photographic presentment of the ceremony is before us.

So it is with every event which can be correctly described as important or at least sufficiently so for an illustrated journal to record. There will be periods at which the photographer can, with more life and accuracy than any artist, produce pictures which will speak for themselves. But if the moments are lost, or any indecision is allowed to cloud the judgment, or even in the event of too hasty action, then the opportunity is gone like a flash. It has passed and cannot be recalled. All that is left the photographer is "experience." With this he must be content, and with the poor consolation that it will profit him on another occasion. I say he must be content, for a photograph is not worth any consideration if it falls in any way short of the highest standard attainable. It is only when a photograph really represents the scene correctly that it has any value in the connexion which we are now considering. Do not, however, even then deem it a work of art, or expect artists to accord it praise from their point of view. Rather look upon it as something which only the marvellous powers of photography could create, a unique production, which it really is, for never again can the same scene be taken. A photograph, it should be remembered, can be given a value quite beyond that which it would possess were it merely an artistic picture. We are too apt nowadays to deny any value to work done by the instrumentality of the camera entirely because photography is such a common attainment; but it is not quite so common as the power to write. If, therefore, the same argument was somewhat expanded, no written words would have any value beyond that of causing immediate pleasure or the temporary gratification of some human desire. A photograph should not be gauged by its cost in pounds, shillings, and pence, but to give it exceptional value should be the aim of its producer. If from no other point of view than as heirlooms, certain photographs are of greater value than ninety-nine per cent. of all the contemporary pictures whose only *raison-d'être* is that they are artistic. Think how priceless photographic scenes would be, were such things possible, that represented life a hundred years ago. The value of a good photograph is cumulative. Recognise this fact and treat it accordingly.

There are many other features with respect to photography in connexion with illustrated journalism that are of great interest, but time will not permit me to refer to them. The object I have in drawing your attention to the subject must, however, be explained. It only requires a very limited experience of the duties that devolve upon an art editor to learn

* Continued from page 377.

the fact that photographers of all classes, as well as artists of every category, are ambitious to see some of their work considered worthy of reproduction in the pages of an illustrated journal. Now, not one original photograph in ten thousand is worthy of this distinction, when its artistic qualities constitute its chief or only claim for public notice. When, however, it portrays in a happy manner some phase of human nature, or the enactment of some scene that aroused general interest, then it is a welcome arrival in the editor's sanctum. It is an impossibility for any paper, never mind how enterprising it may be, to have representatives here, there, and everywhere; consequently an illustrated paper has, to some extent, to rely upon its contributions in the way of sketches or photographs. Every one, it may be said, now travels with a Kodak or similar instrument, and opportunities frequently occur in the most unexpected manner when photographs can be procured which are of a most interesting character from a public point of view. To take them in a correct manner, however, necessitates some recognition of the facts to which I have endeavoured to attract your attention. Nothing can be more disappointing to an editor of an illustrated paper than to receive a batch of photographs taken of some historical or important event, and to find that they are all useless because they were taken without any thought being given to those considerations which, as before described, are essential when a photographer undertakes to represent such scenes. I have trespassed on your time in the hope that, by bringing the subject before photographers for discussion, I might assist in enabling some of them to give an increased value to their work in this direction. This, I feel, is possible, if I can in any way emphasise the fact that haphazard photography is worse than useless, which at the present time does not appear to be a very prevalent idea. It is more than this, it is a criminal misuse of a marvellously beautiful art science. Destroy such results, or at any rate don't send them to an illustrated journal with the opinion that they are worth reproducing. They should no more be called photographs than a boy's chalk drawing on a wall should be spoken of as art. Photography was not invented to be misused or to supply toys for idiots.

NOTES ON LANDSCAPE.

[A Communication to the North Middlesex Photographic Society.]

The subject we are met here to-night to examine is one that interests us all, from the youngest enthusiast in the full glory of his spotless apparatus to the oldest photographic hand who can tell us all about the mysteries and hard work of the wet plate. And then we all have our own pet ideas on the subject, and, with the facilities at our disposal, what easier than to turn out good landscapes? Should, perchance, a too critical friend dare to hint, however delicately, that this or that in our work might with advantage be altered or left out, we do not in our heart of hearts either think that he knows nothing at all about it or else feels just the least twinge of the old enemy, the green-eyed one. Whether our candid friend be right or not, I desire to bring home to your minds what I sincerely believe to be a real stumbling-block to the elevation of the study of photography. The facility with which our results are obtained will always be baneful so long as the subject is not studied in a more serious manner from its artistic side than seems to prevail, that is, so long as our minds are not tuned to a proper appreciation of the manifold aspects Nature is constantly presenting—I mean, an appreciation quite apart from the usual formulæ which now excite us most, such as "Where's the sun?" "Where's my actinometer?" "How long shall I give for this, wonder?" &c. The truth seems to be, that we are so wrapt up in "eiko" this and "pyro" the other, ounces wet and ounces dry, that we are fain to consider that a sharp image on the screen, and a sharper click of the shutter, is all that the field part of our work requires. It is all part of the love of the automatic penny-in-the-slot business that is fast fixing itself into our every-day life. As it bears upon photography, it is nothing short of a spirit of mischief, which it should be our business to root out. I hold that we have no more right to think we can turn out pictures without thought and study beforehand than to expect an elaborate piece of mechanism will work without steam.

I confess that the bulk of these remarks are, perhaps, not so much directed to the actual practice of photography as you might desire, but I must insist that, unless you are content to study the subject as it would be studied by those with less facile means of portrayal, you must be content to have your work qualified by the greatest drawback to all artistic production, viz., that of mechanical hardness. Now, I cannot but think that the line that divides this from one of the cardinal points of belief of a certain school of workers is an extremely fine one, in fact, almost non-existent, and yet we are taught by them to consider that microscopical sharpness, from edge to edge, is one of the first essentials to be aimed at. Now, in the earnestness, and with the full knowledge of the risk I am running of failing in your esteem, I tell you that this quality is far too much over-rated. That it deserves a certain amount of admiration none will deny; but, encouraged beyond a certain point, it wil never fail to be utterly subversive of all feeling and tenderness by robbing your work of a great deal of its breadth, of which, however, more hereafter.

I should say I am not now referring to photographic work of what might be called the still-life class, because I yield to no one in my admiration of a faithful, well-lighted, and technically perfect work representing in its fulness of detail a complete transcript of any work in actual existence. Such productions have their proper sphere of usefulness, and are of importance in their way, but they do not rank as works of art, from the mere fact of the utter impossibility of impressing them with even a modicum of individuality. For example, one would not wish to deny that the legion of architectural and still-life photographs in existence have a value, but these things are only beautiful in so far as they are truthful, and, being truthful, admit of but one rendering.

Let me ask you to examine the subject with me as in the old days, when one's impedimenta consisted in nothing more formidable than a sketch-block, a few choice pigments, and water from the nearest brook. One of the simplest and grandest rules I learned when sketching from nature, and withal one of the most difficult of application, is the great art of selection; in other words, to discover what may be left out; and, although it may sound paradoxical, I then found that, the more one omitted, the better was the result. Underlying the whole study of the graphic arts, whether applying to painting, portraiture, or photography, I had almost said, and more important than the technics of either study, is this art of selection, or seeing, or whatever other term may best convey to your minds the absolute necessity of not reproducing too much in a given area. It is not too much to say that this is a more neglected study than any other among an average community of photographers. We mostly lack the inclination, being far too busy with our every-day work to bestow much time on such an apparently insignificant idea; this is, no doubt, how the majority will receive this suggestion, yet it is certainly true that the cultivation of this faculty is one of the chiefest aids to the success of some of our best men. Yet, as I have said, its acquirement is by no means so simple as appears at first sight, and for this reason. Professor Max Müller once told a friend of mine that this same hurry and drive of modern life was fast undermining the purity of the language, colloquially speaking. People would not give themselves the time to say "thank you,"—it must be clipped to "thanks," "doncherno" for "do you not know," "'bus" for omnibus, and so on, *ad infinitum;* and so it is with photography. Now it is not even wrong to prescribe a sure method of approaching the study of the art of observation because it holds, so to speak, the genius which finds its outward expression in whatever form of individuality we may impress in our work, for no two persons will be similarly affected by the same scene; one will think this cloud too heavy, another that road too straight, a third that house too tall, and so on. No doubt, some hair-splitter might be able to derive some profit from an examination and comparison of each set of likes and dislikes. I propose no such excursion, not wishing to send you to sleep.

Now, there can be no doubt that individuality is the soul of all art work. If we go to any exhibition of paintings, and have a fairly current knowledge of the works of our leading painters, we shall be able to pick out certain works as coming from certain men because we shall have become acquainted with their several leading characteristics—otherwise, their individuality—and I take the liberty of saying that this should be the keynote of our aim in photography, and I care not how it is arrived at, all ranters about pure photography notwithstanding. If you questioned the methods of men who work in oil or water colours, they would laugh at you for your pains; why, then, should not all means be open to the production of a good sun picture? All roads lead to Rome; let us, then, tread forward to excellence along our own path. Be it admitted, however, once for all, that that path does not offer the same possibilities. Cramped as we are by the exigencies of our method, much may be done, however, by studying the works of one or two celebrated landscapists, and, being guided by the conclusions of such study, we shall find that our work will gradually rise from the commonplace in proportion as our intelligence to bend our methods is adequate. There is no royal road in this, as in other things. As a practical illustration, I would remind you that one of our greatest landscapists built up much of his manner during a certain period of his practice upon the works of a foreign artist. Take any of the less allegorical canvases of Claude, and in the front of the middle distance put a group of Scotch firs or other prominent mass in the landscape, and you have the difference that exists between a Claude and a Turner. I am aware that the practice is not directly applicable to photography; but, if you seize the principle of it, you will find yourself only taking scenes from such points of view as will give you some such prominent feature to qualify your composition, and will thus gain individuality. By this means the planes of your picture will be in better relation the one to the other, and quality not always met with in an average photograph. But you may say: "Granting I have found such a scene, I may have correct exposure, development, and printing, and yet the sought-for individuality may still be wanting." I must say I do not think it should be so; but should you, in the manifold chemical labyrinths with which we are beset, happen to be so far unsuccessful, then, with the view in your mind and your shortcomings before you, apply a few broad washes of very light Indian ink to your negative, and so establish the balance you seek for. I have said it is necessary to exercise a certain

process of selection in order to work out a completely satisfactory composition, but, quite apart from this, there lies a wide field of study for us—a field only rendered possible by the very nature of our craft.

Depend upon it, a very respectable reputation awaits the man with time and inclination to go out with his camera into the fields and, as it were, wait upon Dame Nature. It is no small boon to have at command the means to catch the passing gleams of sunshine as it glides over the landscape, changing in the twinkling of an eye an expanse of dreary grey into a veritable glimpse of fairyland, or again to be able to carry home in his slide that delicious ripple across the stream, with just a suspicion of movement in the trees or on its banks to account for it. These are things worth watching and waiting for, and not, as we are told, to wait until the beastly wind drops. One who will work in some such manner may, and, indeed, will, be scoffed at by the aforesaid school as a careless student, and, perchance, incur the awful risk of being branded as a "Naturalistic;" but what are these things to count against honest endeavours to impart that which is sadly wanting in the majority of photographs, viz., just a touch of the soul within us?

Landscape art may almost claim to be indigenous to these islands, living as we do under climatic changes more singular and recurrent than in almost any other quarters of the globe; in a country affording endless variety of conformation, from the dark purple granite of some parts of the north through the beautiful and romantic lake district, the hill and glades of Derbyshire with the prospect from some broad-crested hill stretching out as far as the eye can see, to the beautiful undulating downs of our southern counties back to the granite again, to be found on the coast of Cornwall. All these make the study of landscape art peculiarly fascinating, and one might almost say pre-eminently English. Think for a moment if this is not so; go back in mind no farther than your last country walk to the vivid recollection of the vast expanse before you in all its many-hued glory of Nature's changing moods, and say if you can pick out from a collection of photographs types which shall express Nature joyous, Nature sorrowful, or Nature terrible. This, then, is what we have to aim at. Not that every stone, every bough, every leaf shall be recognisable, but that our work shall convey a distinct impression of sorrow or of gladness. In a word, this toiling after miniature can never help us to translate the latent beauties of Nature, for however excellently done, these things are but dots and specks in the field of our vision, and in measure as they are prominent only defeat our aim. This leads up to the consideration of that quality we have before referred to and which artists describe by the name of breadth. We need not be ashamed to own that it is one of the most difficult to get into our work, for the want of it has marred many a picture otherwise perfect both in colour and composition.

It is a little difficult at first to appreciate the full meaning of the term, because a broad mass of light or shadow will not give breadth, but spottiness, coarse or fine in proportion as their areas are related to the size of the picture. Speaking generally, therefore, we may say it is the direct negation of spottiness. If you should have more than one point of light, breadth requires that these points shall the one lead up to the other to a point of focus in the whole, and be not in any sense competitive; equal lights or equal darks diminish breadth, as does also abrupt transition from light to dark, or the *vice versâ*. To make the definition still clearer, we should say that a large luminary, such as the sun, affords breadth of light, whereas a lamp or a candle affords breadth of shadow.

Before leaving this branch of our subject we will just examine one notable instance that comes to mind. Rembrandt, in his *Adoration of the Shepherds*, will be found to have employed his customary mass of darks leading up to a group of lights, the form of which is still more emphasised by being contrasted with the dark mass of one of the Shepherds.

We will now pass on to consider some of the elements that go to make up the composition of a picture. We have all read in various treatises of the elaborate division and subdivision of the area of the picture into thirds and fifths in length and breadth. Now, inasmuch as these rules have been advised and enlarged upon by highly respectable authorities, it may be considered improper, not to say audacious, in me to take any other view; but I really think that this is one of the advantages we must be content to allow that the painter, with his greater command of leisure and his more deliberate methods, has over photographers; for it seems to me that those rules are far too cumbersome to put in practice when we are making our selection on the screen, besides which I can conceive nothing more dreary than some one idea or set of subdivisions becoming fashionable among us, suggesting a dull uniformity of effect quite the reverse of pleasing. Rather should we follow our separate instincts, taking that which appeals to the art feeling within us. Mind, I do not wish to infer that these rules are wrong, but only that they should not form the groundwork of the first building-up of our subject, and only being used to resolve any doubts that may arise when the after process of selecting certain portions of our plate for the finished picture. While I think it quite possible to produce indifferent results by fettering ourselves with two elaborate subdivisions, we cannot afford to neglect certain simple first principles which I put in negative form for the sake of greater emphasis. 1st. No prominent line or feature should equally divide the picture, either in height or breadth. This is too obvious to need enlarging upon. 2nd. No continuous line to run parallel to either edge of the picture. This obviously does not apply to architectural work pure and simple, and exceptions may be allowed where a distinct purpose has to be worked out. 3rd. Parallelism in any direction to be avoided, unless much broken up or counter-balanced, as in the view of one of the side canals at Venice by Gaucherel. The exercise of these three simple rules will keep us clear of any glaring errors, and will, I think, be found sufficient to bear in mind when engaged upon the preliminary work of focussing.

The third division to which I wish to draw your attention is that of atmosphere. Painters say a picture is full of air when they wish to express that this quality has been secured. In landscape work it is, of course, indispensable, for it is the one thing needful to qualify the several planes in a picture and give interest to the whole. In this way it may be said to go hand in hand with breadth. A careful study of some contemporary work will explain the *modus operandi* of arriving at effects often exceedingly beautiful. It may even be called the one string that the school of impressionists have established. Whatever of beauty is found in their work, and whether we like their work or not, this much must be allowed, that they have opened up a fresh page of art interpretation at a time when the poetic interpretation of nature seemed an absolute dead letter. I regret exceedingly being unable to instance pictorially the full force of what this means, but a reference to some of the best etchings of Whistler's, Daubigny, and Corot, and, secondarily, some of Van Hier's work, in Regent-street, will sufficiently explain this point. I remember some years ago a very fine picture by Wyllie in the Academy; it was afterwards bought by the trustees of the Chantry bequest. The title was, I think, *Toil, Smoke, and Grime, on a Flowing Tide*, and affords an excellent example of some of the subtler effects of atmosphere. The scene is in the Pool, with the bows and funnel of a steam-tug in the immediate foreground, backed up by that peculiarly dazzling shimmer which moving water has under a strong sun. And note how the inevitable hardness has been escaped; the whole of the outline of the boat against the light background is as restless and uncertain as the water itself.

Now, am I right in saying that ye gentlemen of the sharp definition school should bate a little of your hobby? Yet one more instance before leaving this section of our subject. A cathedral city, with the minster, towers, or spire rising from the roofs in the foreground.

Let us see how Roberts, or Prout, or Turner would treat it. Shall we find the outline sharply defined from summit to springing? Not at all. As the form nears the buildings in the front, it will gradually become less distinct, finally losing itself altogether in the atmosphere that actually divides the planes. Now, both these effects are to be produced on our negatives if the state of the light has not already done it for us by a judicious after treatment with light washes of Indian ink, as before explained. Please note that I refer at this length to this because my experience of photographs tends to the belief that the average operator would not think it worth while to expose unless he could see all sharp on his screen at the time of focussing.

I think I have now taken up enough of your time. I am sensible that I have only touched, as it were, the outworks of this wonderfully interesting branch of study, and will conclude by thanking you for your polite attention, and the hope that I have said sufficient to start what I am sure will prove a fruitful discussion.

F. L. Pither.

THE AUTOMATIC PHOTOGRAPH.

What a Lady Thinks of it.

The shareholders of the Automatic Photograph Company no doubt are delighted to think their machines are at work at the Naval Exhibition. We are afraid the visitors are not of the same opinion, to judge at least by what a lady correspondent says. She writes:—"Beauty is but skin deep, and not that when you have your—well—*caricature* taken by the automatic photograph machine. There are several of these interesting-looking arrangements to be seen in the grounds of the Naval Exhibition, placed in groups of about six in one spot. Attracted by the crowd which surrounded one of these groups, I wandered thither with some friends. Sauntering round, we made the pleasing discovery that three machines out of the six bore the legend 'Closed,' so there was nothing to do but to patiently await our turn at one apparatus that seemed to be in really working order. Here an exciting discussion was going on. A lady, desiring to be photographed with the gentleman who accompanied her, had gracefully posed herself in front of the small mirror into which you are requested to gaze 'until the bell rings.' The gentleman had likewise arranged himself, and fondly imagined that he was gazing over the loved one's shoulder. When the moist and dripping picture came out of the slot it was discovered that another man had been taken with his head remarkably close to that of the fair dame's, and no sign of our first friend was to be seen. Hence the scowl of the defrauded swain. All the pleasure of the day was gone for him, poor fellow!

"Another lady's head appeared in no less than six photographs where it had no business at all! Then arose loud shouts for 'Jem' from the youth superintending the arrangements; for all the machines had an attendant beside them, at least all that *we* saw, anyhow. We all waited for Jem with intense anxiety, and at last he arrived with quarts of solution, which dripped in artistic rivulets down the clothes of those

nearest the machines from the bottle in which it was placed. Then a grand cleaning inside the works went on, and it looked as if the entire contents were being taken to pieces and put back again. After all these preliminaries we mildly inquired if we might have our photographs taken *now*—with an accent on the 'now.' Permission was graciously accorded, and we each in our turn gazed at the mirror with what we hoped was a pleasing expression. But how *could* one look pleasant with about twenty grinning persons looking on and criticising audibly?

"The result was indignation. We all emphatically declared that the inebriated position of our hats and the squinting expression of our eyes were not habitual to us. This was not the only mystery. How was it that my mouth reached from side to side, when during exposure I hadn't the ghost of a smile in my face? After loudly complaining of these libels on our fair countenances, it was scarcely consoling to be told by the assembled multitude, 'Well, now, it isn't at all bad, is it?' 'Disgusting' was the only adequate word we could think of to denote *our* opinion! As for the machines themselves, they seem continually in a state of disrepair, are always being cleaned, and the interior is evidently of so delicate a nature that you are not even allowed to place your own penny in the slot; the attendant does it for you."

—*Financial World.*

Foreign Notes and News.

The last meeting of the Berlin Photographic Society was mainly devoted to rather hostile criticism of the Vienna Exhibition. From Dr. Stölze's account it would appear that nearly all the exhibits—at any rate, nearly all those which received recognition from the jury—were illustrations of the out-of-focus principle. Dr. Stölze fell upon this theory with a very considerable amount of vigour. He held it up and turned it inside out, and made it generally ridiculous in the most approved and trenchant style, and had some rather sharp things to say about the practices to which this school has often had recourse in England. Dr. Stölze is, doubtless, aware that the views he attacks are now universally discredited here also; but still we venture, for the sake of our national credit, to remind him of the fact.

He also submitted the composition of the jury to adverse examination. It appears to have been almost exclusively of artists, the only photographer amongst them being Professor Luckhardt. The result, according to Dr. Stölze, was peculiar, and he gives a rather remarkable instance. A certain exhibitor, Herr Drory, sent twenty-four exhibits, among which was one so much out of focus that he regarded it as a failure; but, nevertheless, sent it in on account of the beauty of the subject. This faulty picture was accepted, the others all rejected!

The *Photographische Mittheilungen* express themselves in similar terms. They point out what a chorus of indignation there would be if a jury of photographers were appointed to adjudicate on a collection of pictures, and very rightly point out that to discharge their functions properly a jury must thoroughly understand the *technique* of their subject, and what *can* be done and what cannot.

We learn from the same journal with regard to the Zeiss objectives that the principle on which the triplet was constructed (the spherical and chromatic correction of the objective by means of the middle lens) was recommended by Dr. Hugo Schroeder as long ago as 1885. The firm of Voigtlander has recently acquired the right of manufacturing and selling the "doublet anastigmate" in the same style of execution and for the same price at Zeiss.

One of the many ways in which the Germans have recently been finding out that their protective tariff is not an unmitigated blessing is the effect it produces on the home manufacture of dry plates. The German glass is, as well known, unsuited to the manufacture of plates, for which purpose glass has to be imported from Belgium and England. The high duty to which this import is subjected heavily handicaps the German dry plate trade.

Several of the foreign journals have recently printed *in extenso* translations of the clever skit about the Indian juggler and the boy climbing up the string with which one of our contemporaries was hoaxed some months ago. The translations have been published in all seriousness, too, and will, doubtless, be quoted with respect by some future authority on magic and occult phenomena.

A flashlight competition, in the reproduction of his noble self, was recently arranged by a local banker with the Hanover Photographic Society, and he himself offered the prize. Unfortunately for the competitors, none of the results were found by the jury to be entitled to receive the award—some for want of adequate execution, and others for want of fulfilment of the prescribed conditions.

We are able to report further experiments on the employment of aluminium as a substitute for magnesium as a source of light. Dr. Miethe tried igniting a mixture of aluminium powder and permanganate of potash by means of a drop of dehydrated glycerine. The mass burnt well, but not with anything like the light or intensity of a similar magnesium mixture. Aluminium bronze-powder, on the other hand, though dearer than magnesium, burnt completely when blown through a Bunsen burner, and gave a very powerful light.

From the many receipts for "matt" varnishes published by Professor Lainer, we learn that addition of dammar or mastic, though not themselves forming matt varnish, to sandarac solution produces a particularly bright varnish. Here are his receipts:—

Sandarac solution 1 : 10	50 parts.
Dammar solution 1 : 10	50 ,,
Benzol	50 ,,
Alcohol	2½ to 3 ,,

or—

Sandarac solution 1 : 10	90 parts.
Mastic solution 1 : 8	10 ,,
Benzol	50 ,,
Ether	20 ,,

M. Vallot has been examining carefully into what mixtures are best suited for illuminating caverns, grottoes, and suchlike places for photographic purposes. He tried:—1. Electric light. 2. Bengal fire. 3. Magnesium ribbon. 4. Magnesium powder and chlorate of potash mixed. 5. Pure magnesium powder. He has found in all cases that the best results were obtained with the last-named.

Our Editorial Table.

Fallowfield's Photographic Annual for 1891.

We quite envy Mr. Jonathan Fallowfield the placidity of soul which much necessarily have ensued when he received from the binders the proof copy of his thirty-fifth *Annual*, which, small at first, has in course of years expanded to the goodly—nay, obese—volume now before us, the paging of which goes some way beyond 500. It is described "in a nutshell" on the title-page as a "Comprehensive Catalogue of Photographic Materials, Chemicals, and Apparatus," and such in truth it is.

He opens the ball with something like thirty-eight pages of lenses, among which are included those by nearly every European manufacturer of reputation. This in itself forms an excellent item for occasional reference. Passing over numerous pages devoted to cameras, stands, outfits, cases, and shutters, which are all profusely illustrated by cuts, we next come to the dry plate and film department, in which all makers are represented. Here a convenient plan is adopted, for immediately following each manufacturer are given full directions as to the treatment of any special "brand," with formulæ. Indeed, these directions are sometimes given with such plainness—as, for example, in the two pages devoted to Wratten & Wainwright's plates—that the veriest tyro might accept them as a manual. The requirements for printing in every style—albumen, bromide, Aristotype, platinotype in its various phases, with styles of mounts, are comprehensively treated. Backgrounds, studio accessories, and chemicals occupy a considerable portion of the book, and numerous designs for the first of these are given.

The work concludes with 156 short hints, some of which are quaint and all useful. But what does Mr. Fallowfield really mean when he says (Hint 149), "Never believe that a lens working at *f*-5 or *f*-6 is necessary; *f*-8 is plenty big enough," &c.? He would never say this if he attempted to make snap shots among the narrow, dimly lighted slums around Drury Lane, which, by the way, are very rich in scenes well worthy of being pictorially perpetuated. For these the quickest acting portrait lens is none too quick. Here is a "hint" (No. 108) which every sensible man will strongly endorse: "When choosing your mounts, don't go in for second-rate ones which look showy. Don't go in for bronze printing; and, above all, don't use stale, musty, and acid paste, and then blame the dealer's paper and mounts if

patches of fading show." It contains six snap-shot illustrations. Price, post free, 1*s*.

The Photographic Reporter.—No 28.

Edited by C. W. Hastings.

The frontispiece to this number is a pretty picture, *Lovers' Walk, Dovedale*, by A. T. Newington, printed by the Woodburytype Company. As might be expected, a considerable amount of space is devoted to the proceedings of the recent Camera Club Conference. The Monthly Photographic Competition comes in for a large share of notice, too—six of the pictures noticed being engraved. The remaining pages are occupied by Mr. P. H. Newman's paper on *Pictorial Composition*, read at the London and Provincial Photographic Association, and by a paper on *Flashlight Photography*, contributed to another Society. A summary of the meetings of the preceding month completes the number. It is well printed and got up. Price 1*s*.

New Metal Dark Slides.

By W. Tylar.

Of the various metallic slides we have seen we incline to give the preference to the new ones now being brought out by Mr. William Tylar, of Birmingham, samples of which he has sent. The slide is formed of thin black metal, and the plate is inserted by drawing out the shutter, stepping it into a recess at the bottom, and then securing it at the top by turning down a hinged narrow flap. The whole is absolutely light-tight, and is thin. It will supersede the other metal slides formerly issued by the same maker, being a great improvement on them.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,101.—"Improved Method of Obtaining Solar Altitudes by the Aid of Instantaneous Photography." J. Joly.—*Dated June* 15, 1891.

No. 10,241.—"Improvements in Portable Photographic Cameras and Camera Fronts." G. Lyons.—*Dated June* 16, 1891.

No. 10,271.—"Improvements in Optical or Magic Lantern Slide Carriers." A. Wrench.—*Dated June* 17, 1891.

No. 10,278.—"Improvements in Photographic and Stereoscopic Apparatus." E. Ricard and J. B. J. Lacroix.—*Dated June* 17, 1891.

No. 10,482.—"Improvements in Means or Apparatus for Producing a Flashlight more especially Applicable to Photography and Stage Effects." J. A. Forret and F. D. Todd.—*Dated June* 20, 1891.

No. 10,506.—"A Hand or Detective Camera and Shutter." E. J. Clifford.—*Dated June* 20, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 9893.—"Photographic, &c., Films." Swan & Leslie.—Price 4*d*.

No. 11,945.—"Photographic, &c., Films." Edwards.—Price 8*d*.

No. 11,959.—"Photographic Prints." Davies.—Price 4*d*.

No. 12,014.—"Photography." Sloper.—Price 8*d*.

PATENTS COMPLETED.

Improvements in Photographic Shutters.

No. 7650.—John Rudolph Gotz, 19, Buckingham-street, Strand, in the City of Westminster.—*May* 16, 1891.

My invention relates to that class of shutters in which the passage for the light is opened or closed by means of pivoted wings (usually four in number) distributed symmetrically around the axis of the lens, each wing having a circular opening, which in the open position of the shutter fits over the corresponding apertures of the other wing.

The object of my improvement is, to render the clear opening variable in size, and to provide better means for regulating the time of exposure.

As usual in this class of shutters, one of the wings is turned on its pivot by means of a coiled spring, and the other wings are connected with the first, or leading wing, by means of pins and slots so as to follow its motion.

On the axle of the spring barrel, or on the face of the latter, is mounted a crank provided with a crank pin which, during the revolution of the crank, comes in contact with a lever mounted on the axle of the leading wing, and thereby turns the latter on its axis more or less, according to the time during which the crank pin remains in contact with the said lever. This time is regulated by turning the lever on its axis (within certain limits) independently of the wing, for which purpose the said lever is loose on its axle and provided with a toothed segment gearing into an endless screw, which is held in a bearing fixed to the face of the leading wing. This regulating screw has a milled head and an index finger, which shows on a graduated scale the aperture of the shutter, which corresponds to that position of the lever. For turning the wing back into its closing position, a second lever or curved horn is fixed on the axle of the wing in such a position that it is turned by the same crank pin at the required time of its revolution.

In order that the clear aperture of the shutter may be nearly circular, whether the aperture is large or small, the aperture of each wing is circular, with the exception of the side, on which the wings cross each other, which is a parabolic or hyperbolic curve forming a tangent to the circle.

The shutter is operated as usual, by means of an air bag and a flexible pipe containing a valve, which controls the position of a disengaging lever, serving to retain the spring barrel or a disc fixed on the axle of the spring, so as to prevent the spring from uncoiling before the required time.

The said valve closes the inlet of an air cylinder, which serves to regulate the speed of the shutter, in the following manner:—

The air cylinder has two or more slots or perforations, and contains a hollow piston, the rod of which is provided with a concave head intended to meet the crank pin mentioned above during its revolution.

By compressing the air bag, the valve is lifted from its seat, compressed air enters the cylinder, and drives the piston forward, so as to place the concave head of the piston rod within reach of the crank pin. After the latter has opened the shutter, which occurs during the first half of its revolution, it continues to turn and meets the head of the piston rod, thereby pushing the piston back into its original position. This motion of the crank pin is retarded by the resistance of the air enclosed in the cylinder, and can be made quicker or slower, according to the size of the perforations, or air outlets, formed in the walls of the cylinder. These outlets may be covered more or less by means of a slide, which can be moved by a rack and pinion. The position of the pinion, and thereby the speed of the shutter, is indicated by means of a pointer fixed on the axle of the pinion and a graduated arc fixed on the base-plate or frame of the shutter.

As mentioned above, the spring, or spring barrel, is retained in its position by means of a two-armed disengaging lever, one extremity of which rests on a pin projecting from the side of the air valve and guided in a slot of the valve casing. The opposite extremity of the disengaging lever is pressed by a spring against a flat segment of a circular cam, or disc, projecting from the face of the spring barrel and concentric with the same. Near the said segment the spring barrel has a detent, or pin, adapted to come in contact with a corresponding hook or catch at the extremity of the disengaging lever during each revolution of the barrel.

If the air valve is lifted, it raises the near extremity of the disengaging lever, thereby disengaging the opposite end of the said lever from the spring barrel and cam mentioned above, and allowing the spring barrel to turn on its axis until, after an entire revolution, the hook of the lever falls in behind the detent or tooth of the spring barrel, and prevents the further motion of the same.

In order to stop the spring barrel, after it has made half a revolution, I employ a second disengaging lever parallel to the first, and a second segmental cam and detent, which can be brought into action, when desired, by turning the second disengaging lever slightly on its axis, and then fixing it to the first disengaging lever. For this purpose one end of the second disengaging lever carries a pin, which projects into a curved slot of the first lever. If the second disengaging lever is turned out of the reach of the detent, the first lever acts alone; otherwise, the two levers act alternately.

The claims are:—1. In photographic wing-shutters, the method of, or means for, varying the travel of the leading wing, and consequently the clear opening of the shutter, substantially as described. 2. In photographic wing-shutters, the shape of the central opening of each wing, in order to render the clear aperture nearly circular, when the shutter is adjusted for less than its maximum aperture, substantially as described. 3. In photographic shutters, the means for varying the speed of the crank, and consequently the time of exposure, substantially as described. 4. In photographic shutters, the means for stopping the main spring, and thereby arresting the shutter, after the same has performed half its usual travel, substantially as described. 5. An adjustable photographic wing-shutter, constructed and adapted to operate substantially as described.

Improvements in the Manufacture of Transparent Flexible Films for Photographic and other Purposes.

No. 9893. Joseph Wilson Swan, Lauriston, Bromley, Kent, and James Leslie, Orrington House, Eglantine Avenue, Belfast, Antrim.—*May* 30, 1891.

Whereas it has hitherto been customary, in forming rollable films of nitro-cellulose or celluloid, to produce them by coating glass or other rigid material with the nitro-cellulose or celluloid solution, and whereas the use of such rigid surface is attended with inconveniences, such as limitation of length, we have invented a means of obviating these inconveniences, and our invention consists in the use of a flexible instead of a rigid support to form the film upon; and in the employment of means to render such a method of manufacture practicable; and, in connexion with films so formed, combining with their formation the subsequent coating of the same with sensitive photographic emulsion.

In carrying out this invention we spread or distribute the nitro-cellulose solution equally by means of a paper-coating machine, such as is used in coating bromide paper, or other suitable device, upon or over a surface of paper, linen, cotton, silk, or any suitable flexible sheet which has been previously prepared with a surface impervious to and unacted upon by the celluloid solution or any of its constituents, and from which it may be stripped after drying.

Such suitable coating may consist, for example, of gelatine or isinglass applied in solution, in a similar manner to that already described; but we do not limit ourselves to the use of these surfacing materials, but may modify them by using other substances, either alone or combined with them.

Previous to being coated with the celluloid solution, the gelatined support, when dry, is passed through rollers or calenders, in order to give it a perfectly smooth surface, and is then polished with talc or other suitable substance to facilitate the subsequent stripping of the film.

When coated with the celluloid solution, the supporting paper or other fabric must be kept level until the film sets, when it may be hung up to dry.

When dry, the film, if intended for photographic purposes, may be coated in the same manner with sensitive collodion or emulsion, before or after being stripped from its support.

A solution of nitro-cellulose of a suitable consistency for distribution by the

before-described method may be prepared by dissolving one part of the nitro-cellulose compound, known as celluloid or xylonite, in six to eight parts of a volatile solvent, such as the methyl, ethyl, or amyl alcohols, acetates, or ketones, or a mixture of either of them; but we do not limit ourselves to the use of these, or any particular solvent, or to the above-stated proportions, all of which may be modified according to requirements and to the means of distribution employed.

The quantity of this solution to be distributed upon the supporting material depends on the thickness of film required, but twenty-four fluid ounces to each square yard of surface produces a film of weight and thickness suitable for roll-holders.

We are aware that flexible photographic films have been prepared by distributing a solution of celluloid on a rigid surface of glass, or other material, and by coating the same with sensitive emulsion.

Also that collodion and gelatine films have been spread on paper and coated with sensitive emulsion, but in this case the paper remains until the picture is developed and fixed.

We are also aware that collodion and gelatine films have been spread upon paper prepared with an indiarubber surface, and coated with emulsion. In this case the gelatine adheres to the celluloid film, is stripped with it from its support, and remains part of the film throughout all subsequent operations.

We make no claim to either of the above-referred to methods of producing photographic films, but what we claim is:—1. The hereinbefore described improvements in the art of making transparent flexible celluloid films for photographic and other purposes, which consists in spreading a solution of nitro-cellulose or celluloid upon a flexible support having a prepared surface, coating the same when dry with sensitive collodion or emulsion if required, and stripping the film so prepared from its support. 2. A flexible celluloid film for photographic and other purposes, made in continuous or long lengths upon a flexible support having a prepared surface, substantially as hereinbefore described.

Improvements in or relating to Photographic Prints.

No. 11,959. George Davies, Cross-street, Dennis Park, near Stourbridge, Staffordshire.—*May* 30, 1891.

This invention relates to the decoration of the background of vignettes or other photographs, and for this purpose I get a plate of coloured or non-actinic glass, or any other suitable material, and get engraved, cut, embossed, etched, or any other suitable method of decoration, any suitable device, wreath, or any combination of ornament, such as crests, monograms, coronets, &c.

I get the prepared plate as explained above and place the plate in the printing frame over a piece of sensitive paper, and print by the sun or daylight, in the usual way, any of the above decorations.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The novelty of printing crests, &c., on same piece of sensitive paper as the vignette or photographs are printed on, in the manner as above described. 2. I do not claim any decoration, &c., with the aid of the camera.

[This patent will, as regards its novelty, probably cause the very numerous photographers to smile who several years ago, especially about the "chromotype" era, used to employ the beautifully made masks manufactured by the firm of J. A. Forrest and others.—Ed.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 1	Coventry and Midland	The Dispensary, Coventry.
,, 1	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 2	Leeds	Leeds Mechanics' Institute.
,, 2	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 3	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 3	Croydon Micro. Clnb (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

June 23.—Technical Meeting.—Mr. W. Bedford in the chair.

The subject announced for the discussion of the evening was *Orthochromatic Photography*, and it was opened by the reading of a paper sent by Mr. Birt Acres. The writer commented upon the general apathy on the subject, which he attributed to the supposed necessity for the employment of a coloured screen. This supposed necessity he termed a "bogey," maintaining that good effects could be got without the screen. He then went on to describe the use of the yellow or orange screen, and asserted that he had found the best to be those supplied by the firm (B. J. Edwards & Co.) with which it was understood he was connected.

Mr. J. Traill Taylor said that yellow and orange screens of worked glass were, he believed, first commercially introduced in England by Mr. Gotz, and not, as he thought would be inferred from the communication they had heard, by the firm in which Mr. Acres was engaged.

Mr. A. Mackie read an extract from a journal of the year 1887, in which Mr. J. B. B. Wellington gave a method of making a screen of the thickness of plate glass coated with coloured collodion, and cemented with Canada balsam, as suggested by Mr. W. E. Debenham. He could not agree with Mr. Acres that the use of orthochromatic plates without yellow screens was generally sufficient.

The Chairman thought that makers of orthochromatic or isochromatic plates were prejudiced in putting forth claims to do so much without a screen. Nothing like a correct rendering could be obtained without a screen. He had hoped that some of the processes of preparing orthochromatic plates would be described. He had specimens of various dyes with which he had experimented before trying erythrosine. Vogel, who was a very important experimentalist in this matter, had said that dyes sensitise for rays that they absorb. Amongst the specimens that he had were methyl violet, cyanine, turmeric, and erythrosine. It was simply necessary to add a small portion of one of these dyes to the emulsion in the course of manufacture, preferably to the bromide solution, before the addition of the silver nitrate. On the whole, he preferred erythrosine, on account of the general sensitiveness of the plate being greater with that dye than with others. Other dyes gave orthochromatic effects much superior, especially for red. Erythrosine was of no value for red, but rather the contrary. One of the best dyes for ordinary work was methyl violet; it sensitised for yellow, red, and green. In using erythrosine added to the emulsion, there was no advantage in using ammonia, and as he had been in the habit of making his emulsion without ammonia, he made it in the same way for orthochromatic work; the statement that it was necessary to use ammonia was a mistake, at all events when the erythrosine was added to the emulsion.

Colonel Waterhouse said that he had generally used ammonia, and thought, on the whole, it was better to do so; but then he sensitised by dipping commercial plates in a sensitising bath, and not by adding the dye to the emulsion. His work was performed in a hot climate, where the making of emulsion was not desirable or easy. He generally used Scolik's erythrosine silver. He had kept plates thus prepared in very trying circumstances as to climate for two months without finding any injury.

The Chairman said that it would be interesting to know why gelatine did not lend itself so well to orthochromatic purposes as collodion.

Mr. G. L. Addenbrooke said that he could quite bear out what had been said about the uselessness of orthochromatic plates without a screen. The yellow did come a little better than on an ordinary plate, but so little as to be almost imperceptible.

The Chairman said that in the preparation of an emulsion one could always tell whether a dye would have an orthochromatising effect or not by observing whether the colour came out by washing, or whether the emulsion was dyed by the substance entering into a combination which did not wash out.

Mr. J. R. Gotz showed specimens of yellow and orange glass, worked and polished for use as colour screens. He used a strip of such a width as to fill the diaphragm slot, and long enough to form two stops. The openings were made by pasting thin opaque paper, with a hole of the proper size, on one side of the coloured glass. As to the use of the screen or not, it was a matter of discretion, according to the subject to be depicted. With flowers and other natural objects the screen was not generally requisite, and, in fact, if used, the yellow and orange became too light—white, or nearly so. Then came water-colour paintings and, last of all, oil paintings, where the screen was generally quite a necessity. In order to judge of the orthochromatic effect of any plate, he photographed a subject containing not merely colour, but some white and black. The latter would show whether the general exposure was excessive, insufficient, or correct. He showed a large number of examples, in some cases with the coloured originals. The plates used were Obernetter's, containing eoside of silver and cyanine.

Colonel Waterhouse had used the colour screens as shown by Mr. Gotz, and found them certainly very good. He showed photographs of subjects taken with one of these screens. For pencil drawings the screen was particularly useful. In one case a pencil drawing and designs in various trying colours had been pasted on to a card, and copied together through one of these screens with very good effect. He also showed screens made of talc coated with yellow varnish composed of benzole and containing turmeric and annotto.

Mr. A. Pringle said that Mr. Birt Acres believed that the reason of the apathy of photographers to orthochromatic photography was to be found in the supposed necessity for the use of a yellow screen. He (Mr. Pringle) did not think that anybody had been deterred from entering into orthochromatic work on that account. He found films made of dyed gelatine very convenient and serviceable as screens. Three years ago he had made a large series of experiments with ordinary plates, commercial orthochromatic or isochromatic plates, and some that he had prepared with alkaline erythrosine B. These experiments were shown at the Camera Club, and the opinion expressed was that when used without the screen there was no difference in the three sets. His own opinion was that there was a very slight difference, a hardly perceptible difference; but he entirely disagreed with the statements of Mr. Birt Acres as to the non-necessity for the use of a screen. He also differed from him as to the reason that orthochromatic photography had not been more generally practiced. It was not the yellow-screen bogey, but the restrictions that had been placed by a patent upon the manufacture of orthochromatic plates. These restrictions had undoubtedly, to a great extent, prevented British investigations. In microscopic work he used screens of various colours, according to the dye with which the subject had been stained.

Mr. Mackie did not think that the apathy to orthochromatic work was due to a yellow-screen bogey, but to the fact that orthochromatic plates in England were only turned out by one factory. Why was this? It had over and over again been shown that there was no necessity for the use of ammonia, which, if the validity of the patent were admitted, was the one point of it.

Mr. Chapman Jones said that for comparative experiments it would be better to have level tones of the various colours to be compared rather than to copy picturas.

Mr. Gotz said that, as to the necessity for the use of a screen, it depended upon the circumstances. Towards evening, when the light was yellowish, orthochromatic plates could be used, when work with ordinary plates was out of the question, and there was then no need for a yellow screen.

The Assistant-Secretary showed a set of tints, each of varying depth, and photographs taken from them, on plates variously sensitised, with and without the use of screens. Cyanine and methyl violet proved particularly effective. Malachite green and erythrosine were also shown, as well as some plates sensitised with a colourless chemical sensitiser.

Colonel Waterhouse then showed some results with the reversal process

which he had recently introduced. The developer principally used consisted of—Eikonogen, one per cent.; sulphite of soda, two per cent.; carbonate of lithium, one per cent.; and an addition of five drops to the ounce of an alcoholic solution of thio-carbamide and ammonium bromide. He found this better than thio-sinamine.

The CHAIRMAN thanked Colonel Waterhouse and the other gentlemen who had contributed to the work of the evening, and the meeting terminated.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 18,—Mr. C. H. Cooke in the chair.

Mr. R. Beckett showed a print made by enlargement in the camera by daylight on alpha paper, toned with sulphocyanide and gold. The exposure was ninety minutes, and the size of the stop was *f*-6. The print had been developed with a mixture of hydroquinone and eikonogen.

Mr. W. E. DEBENHAM said that no doubt the members had seen some propositions concerning photographic perspective just put forth by Messrs. Emerson and Goodall. These propositions he considered to be essentially misleading, and the proofs by which they were supported to be of such a loose and uncertain character as not to be proofs at all. Inexact experiment had been the bane of photography, and had been the cause of statements made by persons not accustomed to the precision required by strict scientific investigation being accepted as facts, and finding their way into the text-books. With regard to the propositions of Messrs. Emerson and Goodall, he thought no time should be lost, and he had intended to read a paper dealing with the matter that evening; but, observing that there was a subject already announced for discussion which might occupy a considerable time, he would defer it till the next meeting night.

The Chairman then called upon Mr. A. MACKIE to open the discussion on *Collodio-Bromide*, and that gentleman said that the great secret of success with the process is to get the right kind of pyroxyline. There was no way of finding whether the cotton was suitable or not, except making up an emulsion with some of it. It was not necessarily high-temperature cotton; some high-temperature cotton was not at all suitable.

The CHAIRMAN said that it was also necessary to get the right kind of bromide; some that he had would give spots.

Mr. S. BOLAS inquired whether the reason for spots had been discovered.

The CHAIRMAN replied that it had not.

Mr. MACKIE continued that, although spots were caused by dust, some emulsions would not show spots where dust had fallen, whilst others would do so badly. There was some state of the emulsion which rendered it sensitive to dust. As to keeping property, he had some emulsion ten or twelve years old, and it was as good now as ever.

The CHAIRMAN had found a mixture of bromides of ammonium and cadmium answer best for sensitising. He had had no trouble with films slipping off since using Mr. Wellington's plan of immersing the glasses in dilute gelatine before coating. On being asked whether with this method the liquid did not leave drops to dry off, he said that sometimes it did and sometimes it dried off quite smoothly. He could not account for the difference.

Mr. G. W. ATKINS used French chalk as a preventive against slipping of the film.

Mr. A. HADDON asked whether, by maintaining collodion emulsion at a high temperature, it would not be possible greatly to increase its sensitiveness? He intended to try it.

Mr. MACKIE had tried a sample of Mr. Wellington's quick emulsion, and had found it about eight times as rapid as that which he prepared himself.

On the question as to whether iodide could advantageously be used in collodion emulsion, Mr. BOLAS said that some years since Wratten sold an emulsion, half of the silver salt in which was in the form of iodide.

Mr. J. S. TEAPE said that with reference to an experiment with caramel backing which he had shown at a previous meeting, when the backed plate, although having had twelve times the exposure of the unbacked, was free from the halation which obliterated the image on the unbacked, it had been suggested that the long exposure might by reversal have been the cause of the absence of halation. He had, therefore, brought a plate which had been backed with caramel and received the same exposure as the unbacked, with the same result as that shown in the former experiment. One advantage of caramel backing was that it was effective with so thin a coating as not at all to obstruct examination of the plate during development.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JUNE 16,—Mr. A. Mackie in the chair.

Mr. Hudson had prepared a demonstration with his new patent continuous flash lamp, "The Kolm." Before commencing the demonstration, Mr. HUDSON described his lamp, taking it to pieces, and showing the internal arrangements, &c., to the members. The lamp was then placed in a large tin casing, the front of which consisted of a sheet of ground glass. The casing being elevated to any height required, a length of indiarubber tubing was attached to the lamp, and at the end of the tubing was a large air ball, into which the operator pumped, by a pneumatic arrangement attached, the amount of air required for any length of flash. By means of a small tap the compressed air passed with a continuous flow through the magnesium powder contained in the lamp, and the powder was thus blown through the centre of an oil or gas Argand burner. After all the arrangements were complete, and Mr. Hudson had explained the whole to the members, he took two very successful negatives of the Chairman and one of the members, and, further to test the capabilities of the lamp, at the request of some of the members, he took an excellent negative of a group of all the members present. The negatives were developed by the Chairman, and turned out to be equal to anything taken by daylight, the exposure, quality of lighting being all that could be desired. Mr. Hudson showed several excellent photographs taken by means of his lamp.

A Member exhibited a number of negatives, his first attempt at hand-camera work, which he had failed to develop properly with the hydroquinone developer, and asked the reason of his failure.

The CHAIRMAN replied that it was always a good plan so to concoct the developer that one was able to say at once what were the relative proportions of the various constituents, instead of simply saying these were developed with hydroquinone or these with pyro and ammonia, &c.; and, in order to make it clear what was meant by ten per cent. solutions, he wrote the following formulæ on the black board:—

Ten per cent. pyro:

Pyro	1 ounce bottle.
Citric acid	60 grains.
Sulphite of soda	3 ounces.
Water to make	9¼ ,,

Dissolve the sulphite in some water, add the citric, then pour it into the pyro, and, when the latter is dissolved, pour the whole into a measure, and fill up to 9¼ ounces exactly.

Ten per cent. bromine:

Bromide of potassium	1 ounce.
Water to make	9¼ ounces.

Ten per cent. ammonium:

Ammonia	1 ounce.
Water to make	10 ounces.

Ten per cent. soda:

Anhydrous carbonate of soda	1 ounce.
Water to make	10 ounces.

For pyro-ammonia developer, take:

Pyro	20 minims.
Bromide	10 ,,
Ammonia	20 ,,
Water	1 ounce.

For pyro and soda developer, take:

Pyro	20 minims.
Soda	120 ,,
Water to make	1 ounce.

The next meeting will be on Tuesday evening, July 7, when, as Mr. Dando cannot give his promised demonstration on *The Collodio-Bromide Process*, the Hon. Secretary will read a paper on *Leaves from my Note-book, and How I Use Them*.

HOLBORN CAMERA CLUB.

JUNE 19,—Mr. E. H. Bayston in the chair.

Mr. FREDERICK J. COBB demonstrated first on silver printing. He gave a short history of the process, which he thought was the most popular among amateurs, although of late years the numerous processes which had been introduced had tended to a certain extent to decrease its popularity. He gave a few hints on keeping the paper, which, he said, would keep for a considerable time. Even after printing, if the print was well washed, it would keep for an indefinite period. He always used the acetate toning bath, which was, in his opinion, the best that could be used. An old bath would work much better than a new one. He toned a few prints with the acetate bath, which worked exceedingly well.

Mr. A. J. GOLDING then demonstrated on gelatino-chloride of silver emulsion paper. The extreme simplicity of the working of this paper recommended itself to all amateurs. He had never met with any great success in ordinary silver printing, but he had obtained, without any trouble, excellent results on this paper. The depth of printing depended to a great extent upon the method of finishing the print. If it was finished with a matt surface it need not be printed so deep as if it was to be enamelled. After printing, the prints should be well washed and placed in a ten per cent. solution of chrome alum to harden the film. The time the print should be left in the bath depended upon the temperature, the warmer the air the more time it should be left in the bath. He used the following toning bath:—Dissolve two and a half drachms of sulphocyanide of ammonium in sixteen ounces of water, and one day before it was intended to use the bath add three drachms of a fifteen-drachm gold solution. He believed in quick toning, because they were dealing with a delicate surface which would not stand much handling. The richness of the tone depended upon the amount of sulphocyanide of ammonium in the bath. The fixing bath was two ounces of hypo to twenty ounces of water, leaving the prints in about ten minutes. He had not noticed any loss of tone while in the fixing bath. With regard to the final washing, he thought two hours would be sufficient. In his opinion the prints did not require so much washing as ordinary silver printing, because the hypo was on the surface and not soaked in the albumen. The print could be finished with a matt surface or enamel by using plate glass for the latter or ground glass for the former. The glass after being thoroughly cleaned was dusted with talc, and the print squeegeed down, and peeled off when dry. Starch was the best mountant. If the print was finished with an enamel surface, mounting was exceedingly difficult. The prints, after being squeegeed down should be backed with the piece of waterproof paper, which came off with the print, and prevented the moisture from the mountant going through the paper and affecting the enamel surface of the paper. He then toned and fixed some prints on Obernetter and Leisegang's Aristotype, together with one which had been printed some twelve months ago on Fallowfield's paper, all turning out splendid. This he followed up by finishing off some prints with a matt surface.

The CHAIRMAN said he had tried both processes. With regard to preserving silver paper, an old piece of sensitised paper placed with the other paper was an excellent preservative. When squeegeeing down an Aristotype print on to glass a great difficulty was to get rid of the air bubbles. He had found that, if a pool of water was left on the glass and the print placed in the pool, no air bubbles would result.

Mr. HERBERT THOMPSON said he could quite concur in Mr. Golding's remarks on the simplicity of the working of the paper over ordinary silver paper. He did not recommend the use of chrome alum, but ordinary alum, as the former was liable to give a green colour to the whites. With regard to washing, he

thought Aristotype prints would require more than ordinary silver prints, as hypo, in his opinion, seemed to cling most tenaciously to gelatine.

Mr. G. LUXTON said the best way of thoroughly cleaning glass plates was to use the following:—Photographic tripoli, methylated spirits, and water. The quantity of each could easily be ascertained.

Mr. GOLDING said with regard to air bubbles, if, after the print had been peeled from the glass, it was found that air bubbles had been present, the print could be washed in water and squeegeed down on the glass again.

RICHMOND CAMERA CLUB.

AN excursion to Shepperton was arranged for the 13th inst., but only three members turned up, who found some excellent subjects in the neighbourhood.

THE ordinary meeting was held on Friday, the 19th, Mr. Davis in the chair, when the subject for discussion was *Tourist Kits.*

THE STEREOSCOPIC CLUB.

MEETING, Monday, June 14, at the Brooklands Hotel, near Manchester. Mr. W. J. Cunliffe (President) in the chair.

Mr. W. I. CHADWICK, referring to a "Monocular" stereoscopic camera exhibited at the previous meeting, said it was quite possible to make stereoscopic pictures by any single-view camera, and that before Dancer, of Manchester, introduced the twin-lens camera all stereoscopic pictures were made by single-lens instruments; thus, first a plate was exposed on a certain subject, next the camera and lens was moved as much as was considered necessary—generally by means of a sliding baseboard—and a second plate exposed; thus two slightly dissimilar negatives were produced, from which the prints were made. Such an arrangement, however, was entirely useless for moving objects, and it would be seen that for such subjects as sea and sky, landscapes with figures or cattle introduced, and even for foliage subjects—except under the most favourable conditions—the single-lens camera was quite out of the question.

In support of what had been said, Mr. Chadwick exhibited a stereoscopic slide, the portrait of a gentleman made by a single lens camera at two exposures. It was seen that under each exposure the sitter had been still enough and was clearly distinct in both pictures; but between the first and second exposure a movement in the position of the head had taken place, and when the slide was viewed by the stereoscope the effect was very grotesque—that of the ghost of a head nearly twice the natural size, with two eyes, two noses, and a mouth of extraordinary length.

The lecturer, continuing, said he did not know of any amateur pursuit that could boast of so many inventors, patentees, writers, and teachers, as were to be found amongst photographers. To some extent it had always been so, and he presumed it would remain so, though modern inventors had not yet begun to assert themselves to any great extent in stereoscopic matters, but were willing to be led by some of the older hands, who were supposed to know more about the subject, and it would be contrary to the objects for which this Club was formed to allow false theories and erroneous practices to pass unchallenged. It has been contended by several writers in recent publications that, as the optic axes naturally converge to some particular spot when viewing natural objects, so the axes of the lenses should converge in like manner; and it has been stated by some of these writers that this alone is the correct theory for making stereoscopic photographs. The illustration, Fig. 1, is reproduced from an article written in support of this con-

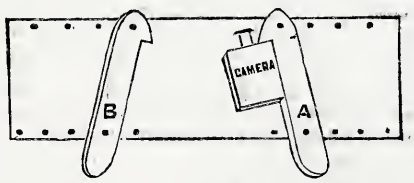

Fig. 1.

vergent theory, and is intended to represent a baseboard, on which are two adjustable bars or guides, A and B. Against one of these the camera and lens is placed, and an exposure made; the camera is then moved to the left-hand guide, and a second exposure made. Thus the axes of the lens converge (the amount of convergence, as the author states, is exaggerated in the drawing).

But this converging-lens theory was, the lecturer said, entirely wrong. Every photographer knows that to photograph the elevation of a building with parallel lines, as at Fig. 2, the sensitive plate must occupy a position parallel

Fig. 2.

to the face of the building, with the axes of the lens at right angles, and if the plate and the axes of the lens be oblique, as at A, Fig. 1, we should produce the face of the building in perspective, as at Fig. 3, and if the camera be moved to B, Fig. 1, the plate again oblique to the face of the building, we should again produce the lines in perspective, but in the opposite direction, as at Fig. 4; and, if two such pictures were mounted for stereoscopic observa-

Fig. 3.

Fig. 4.

tion, they would not coalesce, and, by the stereoscope, only a mass of confusion would be visible, as at Fig. 5, where the lines, as at Figs. 3 and 4, are seen

Fig. 5.

to cross each other, instead of which they ought to be parallel, as at Fig. 2.

Other illustrations and blackboard diagrams were used to show that the stereoscopic camera should be provided with twin lenses, having their axes parallel and the plate at right angles to their axes.

The meeting was brought to a close by an exhibition of members' work taken during the Whitsuntide holidays. Mr. Bowman exhibited a number of transparencies mounted with circular masks, which were very much admired. Mr. Wild brought Derbyshire scenery, in some cases duplicate transparencies from one negative, viz., one on Mawson's and the other on Thomas's plates. The Chairman had contented himself with local scenery, printed on Mawson's plates, which he had packed away for over two years. Messrs. Vos and Whitelegg brought slides of Irish scenery, printed on gelatino-chloride paper. Mr. Roe (a visitor) exhibited some effective sunset slides, whilst Mr. Chadwick showed about thirty transparencies of scenery in the Isle of Wight.

MANCHESTER PHOTOGRAPHIC SOCIETY.

JUNE 11,—The President (Mr. Alan Garnett) in the chair.

Mr. C. Duval was elected a member.

After the general business, Mr. HEYWOOD read an interesting and amusing account of the special out-door meeting at Belle-Vue, on May 16, and a number of members showed photographs taken on that occasion.

Particulars were given and photographs shown of the Liverpool trip on May 30.

The meeting then adjourned to the lower room, where Mr. J. SCHOFIELD gave a practical demonstration of the preparation and working of collodio-bromide for transparency work.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE second out-door meeting of the season was held at Ripon and Studley Park on Thursday, the 18th. With the exception of wind—which at times was rather troublesome—the day was a perfect one. The party, consisting of twenty-three, under the leadership of Mr. M. Auty, after breakfast at Ripon, drove to Studley Park, where a most enjoyable day was spent. Upwards of two hundred plates were exposed, mostly upon the ruins of Fountains Abbey. Dinner at the Black Bull Hotel concluded a pleasant day's outing.

GLENALMOND PHOTOGRAPHIC CLUB.

AT the last meeting of this club (the President in the chair) it was decided that the photographs for the two competitions, which the club has now on hand, should be sent in by July 11.

Mr. CRAIG reviewed the work of the club during the past year.

The President then showed a new travelling lamp, and Mr. Johnstone an Eclipse hand camera.

MR. LAFOSSE'S RETIREMENT FROM BUSINESS.—It may interest Mr. Lafosse's Manchester friends to know that the business, negatives, books of reference &c., have passed into the hands of Mr. Franz Baum, 22, St. Ann's-square, Manchester.

Correspondence.

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

REMOVING DEVELOPMENT STAINS FROM NEGATIVES.

To the EDITOR.

SIR,—As the proceedings of the Photographic Club are not reported, a matter of considerable interest is likely to pass unnoticed unless attention is called to it.

At the last meeting of the club Mr. A. Cowan stated that, not being satisfied with the generally received opinion that the stain usually found on negatives, developed with pyro and ammonia, was due to the development, fixed one in fresh and clean hypo solution, the result being that the negative came out perfectly clean and free from stain, while another, developed under precisely similar conditions, but fixed in a used and discoloured hypo bath, exhibited the characteristic stain in all its fulness and beauty. This result would seem to demonstrate that the evil (if it be an evil) is *not* due to the development, as all the text-books seem to take for granted, but is due to fixing in impure hypo, the deduction being that, by the use of fresh and untainted fixing solution, the stain may be defied and avoided. To this end, would not the use of bisulphite of soda, which is now occasionally recommended for use with the hypo to preserve its clearness, be an advantage?

Mr. Cowan is too careful an experimentalist to give much chance of upsetting his conclusions, but it would be interesting to know if similar results are attained in other hands.—I am, yours, &c., F. H. CARTER.

16, *Edmund-place, Aldersgate-street, London, June* 23, 1891.

A SUGGESTION.

To the EDITOR.

SIR,—Your remarks in the last issue of this JOURNAL anent the advantage or necessity of something new to give a fillip to flagging business suggested the following idea. Of course, it is but a suggestion, and may require trimming up before becoming commercially useful, and would also require the co-operation of manufacturers to make the thing properly presentable. It is this: Let the negatives be printed on celluloid, either by printing-out or development, in the different popular sizes, C.D.V.'s, cabinets, imperials, &c.; but I don't think it would be altogether practicable with very large sizes—the cabinet size would, perhaps, lend itself to the style better than any. Then mount these *transparencies* in cardboard frames of the same size as the usual mounts. To be *viewed* as transparencies, this is the idea. They could either be placed in an album, the page being raised for examination, or kept loosely in the ordinary way. To work this neatly, the manufacturer would have to provide cardboard frames with an adhesive flap on one side, or half split so that the celluloid picture could be easily inserted. I have no doubt some good designs would soon be provided if there was any demand for them. Stereoscopic pictures might be made in the same manner. It will be seen no alteration from the usual every-day routine would be involved—a recommendation in itself; and the finishing would be easy and straightforward. Transparent colouring might be applied with good effect, and I believe an attractive novelty would result. Celluloid suggests itself as the best material, but insoluble gelatine films would answer. Any way, the idea is to have transparencies that can be examined and handled like ordinary paper photographs without requiring frames to hang them up in the window, or anything of that sort.—I am, yours, &c., EDWARD DUNMORE.

PHOTOGRAPHIC PERSPECTIVE.

To the EDITOR.

SIR,—There is one aspect of this question which, I think, has been overlooked, and it is one, I fancy, that will serve to justify both artists and photographers in their statements. Mr. Pennell's chief point, that photographic perspective is distorted and untrue, is, while essentially a true point, yet also quite false—a paradox that needs some explaining. Photographic perspective is absolutely true; it is the human eye that errs. The apparent magnification of near objects by the lens is not distortion, but literal truth, as can be easily explained. Walk along, say, Cannon-street, and look at the turrets of St. Paul's; let the near foreground be occupied by a lamp-post. Now let the eye consciously dwell on this lamp-post, and, though St. Paul's will be visible at the same moment, it will seem absurdly small and far distant, and the lamp-post will appear huge, and filling the field of view disproportionately. But now, without shifting the point of view at all, let the eye dwell consciously on the distant cathedral, and what happens? The apparent size of the lamp-post is at once and curiously diminished, its proportions are now artistic relatively to the cathedral; the latter is the important object, and fills the conscious eye, to the dwindling of the lamp-post to its proper subsidiary proportions. Now, when Mr. Pennell or any other artist sits down at this spot to draw St. Paul's, if he is as true to the scene as the camera would be in including all in the field of view, he includes the lamp-post; but how? Not of the size it would appear to his eye to have if he made it the chief object, but of the far smaller proportions it appears to have when rightly making the cathedral the important object. But, as the actual size of the lamp-post has not really been altered, he therefore deliberately falsifies the relative sizes of the two objects to convey to the mind a truthful impression. The impression the eye should receive from the sketch should be precisely that it would receive from the actual picture, so that to any one looking over the artist's shoulder, as he draws, the impression should be identical from both the actual scene and from the sketch. Artistic truth is, therefore, only to be suggested by deliberate, conscious perversion of the real, actual facts. Matter must give way to spirit; "the letter killeth, the spirit maketh alive."

The lens, being unconscious matter, is, of course, powerless to do this; it is compelled by its very nature to render things with exact relative truth; it limns the lamp-post as faithfully as the cathedral, and as no sane person would look at the cathedral, and fill his eye consciously with the lamp-post as the chief subject, so the photograph conveys an impression of actual falsity through being literally true.

The artist must teach, as, indeed, must all others, by illusion. Pure science can alone afford to deal with naked, unaltered facts. The science of the day is confined to matter alone, and therefore must be always, however hideous, literally true in its delineations; though the day may come when what we thus call truth may turn out to be falsehood, or only partial truth, and what we stigmatise as false turn out to be the true, the *vital* truth being not so much the things seen as the manner in which they are seen.

Why does the artist instinctively, intuitively falsify the real size of the lamp-post? He feels, but knows not how or why, that only by so doing can he satisfy that inexorable something within him that makes him the artist he is. To convey truth he must use illusion, he must be false to actual proportions. In photographic portraiture, the nearer features are often accused of being distorted. This is not so; they are true relatively, but appear false because they are wrongly allowed to fill the eye to the hurt of the more important elements of the picture. The painter would have drawn them smaller to obtain a natural appearance, told an untruth to convey a truthful impression. Everything is apparently magnified the nearer it comes to the eye, though we know the size of the thing itself does not change. The cure, therefore, for photography is to see that there is nothing in the foreground that shall in the finished picture fill the eye to the exclusion or hurt of the more important portions. The artist can do this always, the photographer only occasionally; therefore the camera can never claim to be a reliable means to the highest art, for it is a tool that often masters the user instead of being a perfectly pliable vehicle for expressing its user's ideas. Mr. Pennell need not have been so hard in his way of putting the real truth as to photographic limitations, it is already quite painful enough to the art-worker who is limited to photography for the expression of his art instincts; he showed that even he did not know all, for, though he was right essentially, he was wrong in his expression thereof. Photographic perspective is literally true, and therefore often artistically false; the artist is (or may be) true impressionally, and therefore often compelled to be false literally and relatively in representation of the actual things. In the degree to which he does this, does he show the superiority of mind over matter? The artist eye and hand is a spiritual machine, and gives us spiritual realities—things as they appear to be; the camera is a material machine which refuses to give other than literally true, and therefore often spiritually false, representations of those same things.

Much nonsense is talked of "wide-angle" lenses giving more distortion than "narrow-angle" ones—short-focus than long-focus; the difference is that the long-focus lens takes in less subject, deals only with the important distance and middle distance, and cuts off the objectionable foreground; the short-focus includes a vastly bigger field, and includes an inartistic and undesirable foreground, or other part, and so kills the picture proper. If the long-focus lens had been used on a bigger plate, so as to show the foreground it before excluded, the appearance of distortion would be precisely similar to that given by the short-focus lens. The remedy, then, is to trim down the print till it shows only what is essential and artistic, or use such a lens as will give on the plate just the picture that an artist would desire to draw; whichever of the two is the better plan, each instance must decide for itself.—I am, yours, &c.,

77, *Queen-street, E.C., June* 22, 1891. FRED. H. EVANS.

GLASGOW INTERNATIONAL EXHIBITION.

To the EDITOR.

SIR,—I have pleasure in announcing that the following gentlemen have kindly consented to act as judges at this Exhibition. There are three photographers and two painters, namely, Messrs. Valentine Blanchard, Adam Diston, Richard Keene, Francis Powell, President R. S. W., and William Young, R. S. W. I hope shortly to name two gentlemen with a special knowledge of photo-mechanical work, who will assist the others in that section.

There is a slight error in our prospectus which may lead to some misunderstanding. In the clauses at the head of the list of classes, "Class 24, Scientific, may be," &c., should read, "Class 25, Scientific, may be," &c.

I beg to confirm the arrangement already announced by the Cardiff Executive, whereby pictures entered for both exhibitions can be sent on here, carriage paid.—I am, yours, &c.,

WILLIAM GOODWIN, *Hon. Secretary.*

3, *Lynedoch-street, Glasgow, June* 18, 1891.

CAMERA CLUB EXHIBITION.

To the EDITOR.

SIR,—Will you kindly allow me to state that the exhibition of photographs by the Marquis Dr. Vianna de Luna and the Countess Loredana de Porto Bouin, which was announced to be opened at the Camera Club on Thursday, June 25, is unavoidably postponed.

The exhibition will commence on Thursday, July 16, after which date the pictures will be open to inspection by visitors under the usual conditions, namely, from ten a.m. to four p.m. on production of tickets, which may be obtained from the Hon. Secretary and from members generally.—I am, yours, &c., G. DAVISON, *Hon. Secretary.*

Camera Club, Charing Cross-road, W.C., June 20, 1891.

Exchange Column.

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

Good tone violin, full size, bow and case, in exchange for 10×8 rapid rectilinear. Mutual approval.—Address, W. HARE, Windsor Studio, Sutton, Surrey.

Will exchange Dallmeyer's No. 1 wide-angle landscape lens for pair of Grubb's No. D stereoscopic lenses, or one lens and cash.—Address, W. A., 13, High-street, Wexford, Ireland.

Will exchange good violin, with two bows and mahogany case, value 6*l.*, sent on approval, for full-plate studio camera, with all latest improvements.—Address, J. COUPE, 40, Bank Top, Blackburn.

Will exchange an eighteen carat gold scarf pin, set with pearls and coral, for a Swift or Wray hand-camera lens to cover 5×4 plate, five and a half to six inches focus, and working at *f*-5·6.—Address, H. K. GLAZEBROOK, Melling, near Liverpool.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

C. E. Beach, Fulham, London.—*Photograph of The O'Gorman Mahon.*

G. P. Carlland, Eton.—*Photograph of a design for producing stamp photographs.*

W. A. Meigh, Stoke-on-Trent.—*Photograph of monument in Ilam Church, Dovedale, to the memory of David Pike Watts.*

G. F. WATSON.—Thanks.

D. CAHILL.—Your camera being a tool of trade, you will not have to pay any duty on landing at Boston, U.S.A.

R. STEWART.—An ordinary quick shutter will suffice for seagulls. We do not recommend any makers' plates. See our advertising pages.

SILVER.—1. Remove the roof and front, and glaze. 2. Consult a builder. 3. If by cockling you mean the print leaving the mount, use a stronger paste.

C. T. B. (Clapham) says he sent a number of specimens to a firm at Clacton-on-Sea. According to our custom in such cases we have added their name to our black list.

HISTORICUS.—Neither you nor your friend are right as regards the first application of the iris diaphragm to photographic lenses. The honour belongs to Joseph Nicéphore Niépce, of Chalon-sur-Saône, France.

W. C.—The spots and stains are due to insufficient washing after fixing. It is quite a mistake to imagine that varnish will protect a film that contains hyposulphite of soda. Contact with moist silver paper will always produce stains on an imperfectly washed negative.

C. J. T.—We are unable at this moment to lay our hands upon Mr. Debenham's formula for backing plates with caramel and gelatine, but we do not imagine that nice proportions are of consequence. Shall be glad to see you whenever you make it convenient to call. Kindly apprise us previously of the time.

B. W. FALLENT says he has invented a very superior kind of detective camer for films, and wishes to know how he can ascertain if anything like it has been made before, as he has an idea of taking out a patent for it. The only way to obtain the desired information is to search the records of the Patent Office and the back volumes of the JOURNAL.

R. A.—You ought not to feel offended at our remarks. There are several pictures at the Royal Academy that are, for the greater part, painted from photographs, and some of the exhibitors make no secret of it, though they do not publish the fact. Many artists, we know, take photographs themselves, to obtain subjects for different portions of their paintings.

C. J. S. sends us some carbon pictures developed on glass, and asks the cause of the granular appearance on them, and how it is to be avoided. The defect is what is known as reticulation. It may be avoided by sensitising in a weaker bath, and placing the tissue where it will dry more slowly. Rapid drying is a prolific source of this trouble, particularly during hot weather.

E. S. writes: "I have no occasion for two or three weeks to use the acetate bath; when I come to tone, it gives the red surface tone, as enclosed print will show. I use ready sensitised paper, and have done so for many years. Can you tell me of anything that will remedy the difficulty?"—Probably, from some cause or other, the gold has become reduced. The addition of a further quantity the day before using will, no doubt, make things right.

TYPO says: "I wish to make relief from a negative. Can you advise me what kind of paper to sensitise with bichromate of potash, and what strength to use; also how to make a cast from the raised wet image, and the material to be used for cast."—Coat the paper with a good quality of gelatine and dry. Then sensitise in a three per cent. solution of bichromate of potash. Print, and then soak in water, and take the cast in plaster of Paris. If preferred, the bichromate may be added to the solution of gelatine.

W. E. A. DRINKWATER writes: "THE BRITISH JOURNAL OF PHOTOGRAPHY for 1885, p. 538, recording the proceedings of an American convention, contains a reference by Mr. Croughton to a lime toning bath, as used by Mr. Lacy, of Ryde. Can you manage to give me the formula for said bath?"—The toning bath used by the late Mr. Lacy was the ordinary lime bath, as given in the manuals. Neutralise a solution of chloride of gold with carbonate of lime. Add to each grain of gold a minim of a saturated solution of chloride of lime, dilute with hot water. The bath is ready for use when cold.

H. ROBINSON writes: "Would you kindly inform me the lowest cost, and all particulars, how to take out a photographic patent, and where I must apply for the same? Any information you will kindly give will be greatly esteemed."—The Government fees for a patent for four years is 4*l.*, if you take the patent out for yourself; but, if the patent is likely to be of value, we should advise you to employ a respectable patent agent. Many patents are invalid from the specifications not being properly drawn out. Messrs. Harris & Mills, 23, Southampton-buildings, W.C., are a very respectable firm.

ROYAL CORNWALL POLYTECHNIC SOCIETY.—The fifty-ninth annual exhibition will open at the Polytechnic Hall, Falmouth, on Tuesday, August 25, 1891. Several prizes are, as usual, offered for the best photographs.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 1, *Actinometry and Sensitometry.* July 8, *View Meters and Finders.* Saturday Outing, June 27, The Brent, from Hanwell—train to Hanwell from Paddington at fifty minutes past two.

CLEARANCE SALE.—Messrs. Marion & Co. write: "It may be of interest to your readers to know that on July 6, at Soho-square, we shall have a clearance sale for a week of some job goods and clearance lines, put aside after our annual stock-taking, to be sold at very reduced prices."

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—It is intended on Saturday, July 4, to have a whole-day excursion to Miller's Dale. Cost of excursion tickets, 6*s.* 7*d.* each. Knife and fork tea about five o'clock, at Railway Hotel, Buxton, 2*s.* each. As there are no hotels *en route* from Miller's Dale to Buxton, it is suggested that members provide themselves with sandwiches, &c.

MESSRS. MARION & Co, Soho-square, are introducing two new detective cameras, invented by Dr. Krugener, respectively named the "Normal Simplex" and the "Delta." In both of these the plates are retained in sheaths, but, instead of employing the opaque flexible bag common in many cameras, this is replaced by a light-tight leather bellows. Circulars, giving drawings and particulars, will be sent on application.

DEATH OF MR. LACHLAN MCLACHLAN.—Just before going to press we learn with regret of the death of Mr. McLachlan, of Manchester, whose name at one time was among those best known in the photographic world—at least, of this country. His death, which took place at half-past eleven on Tuesday night, at his residence, Oban House, Chorlton-cum-Hardy, resulted from an attack of influenza. He was in his sixty-seventh year. We shall have something to say of his photographic career next week.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1626. Vol. XXXVIII.—JULY 3, 1891.

UTILISING FOGGED PLATES.

At the present day, when commercial gelatine plates are so cheap as compared with a decade ago, and are, moreover, so uniform and reliable in quality, it seems scarcely worth the trouble of attempting any treatment for the purpose of restoring any chance plates that may prove to be below the usual standard of clearness or that may be accidentally fogged by exposure to light. In the first case, the proper plan to adopt would be to return the plates to the makers, though, possibly, there might be some difficulty in effecting such an arrangement except in the case of a considerable batch obtained direct, and the small consumer, who obtains his supplies through a dealer, would, no doubt, find it somewhat difficult to convince either the manufacturer or the retailer that the fault was other than his own. In the case of plates that have been accidentally "light-struck," the difficulty again arises that, even if a whole packet be so affected, the trouble involved in the process of regeneration would scarcely be compensated for, though the films were restored to perfect condition.

Circumstances may, however, arise, as in our own case, where such treatment may prove useful or desirable, and it is also possible that, under certain conditions, a batch of defective plates may be made to serve a useful purpose as well as those of perfect quality, if only an efficient means were available for the purpose. Thus, for instance, it occasionally happens that for some special purpose a good slow plate is required, and this may be manufactured for the occasion out of one of the ordinary plates in daily use; or, again, we have no doubt that, in spite of patent restrictions, orthochromatic plates are sometimes prepared by what is known as the "bath" process, or, in other words, by the immersion of an ordinary plate in a suitable "colour sensitising" solution, and, in such instances, a foggy or "light-struck" plate may be made to answer in every way as well as a faultless one.

Our own need arose in connexion with a batch of plates numbering several dozen, which, from long keeping in conjunction with their mode of preparation, had deteriorated to such an extent as to be practically useless. The glass was worth something if only it had been clean, but the trouble of cleaning and recoating would scarcely have paid. The emulsion with which the plates had been coated contained a considerable proportion of chloride, and such films, for some unexplained reason, exhibit a strong tendency to the development of fog, commencing from the edges of the plate, and accompanied by a metallic iridescent appearance very frequently visible before exposure. The plates in question suffered from this defect in a very marked degree, though a small area in the centre of the film still retained the original good quality.

Rather than reject the plates altogether, or, in the alternative, clean and recoat them, we resolved to try if they could not be made available by some method of curative treatment; and the method adopted, after an experimental trial, was as follows, the main points of the treatment having been previously described, although not so fully as we now propose.

The action of chromic acid, bichromate of potash, and other oxidising agents in destroying the impress of light upon sensitive films has long been known, and has been practically utilised in the earlier days of gelatine emulsion in restoring foggy emulsions. But we believe it has long since been relinquished on the manufacturing scale, owing to the difficulty in removing the last traces of the restoring agent, and the consequent uncertainty thus caused. Films containing minute traces of unremoved bichromate of potash or insoluble compounds of chromium formed during the process of restoration may, and frequently do, produce perfect negatives if developed very shortly after exposure, and especially when the latter has been for the full time. But in cases of under-exposure, or if the plates are kept any length of time previous to development, the image is invariably found to be wanting in detail, though the high lights and better-exposed portions of the picture may be perfect. Such plates are, in fact, remarkable for the beautiful clearness and transparency of the shadows, accompanied, however, by the fatal absence of finer details.

A number of plates of this kind exposed on a holiday tour some years ago served to impress upon our memory the danger lurking in the careless use of bichromate. Two or three of the films developed as test plates in the early part of our tour gave such admirable results, that we were induced to reserve this particular make for our best subjects, with the unfortunate result, that on development some two or three weeks later we had not a single negative to show from the lot. The peculiarity in their behaviour was that up to the time of fixing nothing could be finer than the appearance of the image; but after leaving the hypo nothing remained but the more strongly lighted objects, the rest of the picture being represented by the merest ghost of an image, sometimes only visible by reflected light. No modification of the development, no amount of intensification had the slightest effect, the deposit, except in the case of brightly lighted objects, being apparently completely *on* the surface of the film.

This result may be explained by supposing that on the first application of the developer the bichromate was rapidly removed from the surface of the film, and thus an image was allowed to commence to form, and, backed up by the dense layer of silver bromide, exhibited a fictitious strength. But, as the developer penetrated into the body of the gelatine, the

bichromate therein contained dissolved and became active, and as it made its way to the surface attacked the finer portions of the image, undoing the work performed by light, and preventing the action of the developer upon the underlying strata of bromide.

We have thus emphasised the danger that may possibly arise from the imperfect removal of the bichromate, in order the more firmly to impress the necessity for thorough washing and careful testing. Having done so, we need only add, that if properly used the bichromate leaves no ill effect behind.

In treating the plates they were immersed in a solution composed of twenty grains of potassium bichromate, and five grains of potassium bromide to each ounce of distilled water. It is necessary to use distilled water in order to guard against the possible formation of insoluble chromium compounds which might occur, especially in the case of tap water. It is probable that such compounds would be chiefly formed in the solution itself, and in a great measure removed by filtration, but the danger would always be present of some portion of them being formed in or introduced into the film. It follows as a matter of course—indeed this is of even greater importance—that the subsequent washing should be performed in the same manner with distilled water, or, at any rate, after the first one or two changes, with boiled rain water, proved to be free from lead or other metallic salts as well as organic matter.

Bichromate of potash alone acts powerfully in destroying the latent image, though it requires a very prolonged action to completely effect the purpose. The chief function of the bromide is to supplement and accelerate the action of the bichromate, which it may be supposed to do by more readily reconverting the bromide acted upon by light. The base of the salt goes to the bichromate, forming, with a portion of it, neutral chromate of potash, hydrobromic acid being liberated, this latter being, as is well known, a powerful destroyer of fog or of the latent image. An additional effect of the presence of bromide in the case of the plates we had to treat would be the conversion of the chloride of silver they contained into bromide.

The time of immersion of the plates may be from five minutes upwards, but it is better to give ten or fifteen, if circumstances will permit. Some films will not bear a long soaking in the bichromate solution, which appears to exert a greater softening action than plain water. This is especially the case in hot weather, and under any circumstances care must be taken to keep the temperature of the bichromate solution, as well as of the washing water, as low as possible, as well as tolerably uniform. It is of little use employing an ice-cold restoring solution if the plates are immediately removed into water that is tepid, or, at least, many degrees higher in temperature; such variation will be almost certain to loosen the film from the glass or to blister it, whereas an equable temperature of the solution and the wash water, though some degrees higher, would have no such effect.

After the films have been treated with bichromate for the requisite time, they should be removed to a dish or vessel of distilled water and allowed to soak for another ten minutes, or, if it be very clear weather, five may do. On pouring this away, the greater portion of the bichromate will be removed, and a fresh quantity of distilled water must be applied. To this second water a very small addition of liquid ammonia may be added with advantage, say about one minim of strong ammonia to each two ounces of water. The effect of this is twofold; it neutralises the acidity of the films at this stage, and, by combining with the bichromate to form a neutral chromate, it brings the powerful colourific properties of the latter into action and enables a better judgment to be formed as to the removal of the chromic salt. The neutral chromates of the alkali, especially of potassium, though of a pale yellow instead of a full orange red colour, are remarkable for the power they possess of imparting their colour to water, the minutest traces giving an appreciable tint. This is clearly shown by dropping a very small quantity of solution of bichromate of potash into water so as barely to tint it, when, if a few drops of ammonia or *liquor potassæ*, be added, a strong yellow tinge is immediately developed. For our present purpose, then, the use of a little ammonia provides a very useful colour test by which to judge of the progress of the removal of the chromate.

The soaking of the film must be continued until the water comes away without the slightest apparent tint. After the first two changes, which should be distilled, boiled and filtered rain water may be used if it is assured that it is free from the impurities named above. The addition of ammonia also should be continued, as, in addition to its use already alluded to, it tends to counteract the loss of sensitiveness arising from the action of the bichromate and bromide solution. But the quantity of alkali employed must not exceed that given above, or it may have a tendency to produce rottenness and solution of the film, as well as to set up a new condition of fog.

When the washing water comes away free from colour, it will be time to apply a chemical test. For this purpose a drop of weak solution of nitrate of silver may be dropped into a little of the wash water, and, if after the lapse of a minute or so no brown or red colouration occurs, the chromate may be supposed to be removed. But a far more delicate teste consists in precipitating a small quantity of carbonate of silver, and, after slightly washing it, draining it closely and adding a small quantity of the last wash water. The presence of the slightest trace of chrome salt will cause the formation of neutral chromate of silver, the dark purple-brown colour of which, even in the minutest proportions, will impart a distinct colour to the silver carbonate. Or a few drops of silver solution may be added to a drachm or two of water in which a crystal of washing soda has been dissolved, and the mixture shaken or stirred until a uniformly milky or opalescent solution is formed. If a small quantity of the wash water be added to this, the presence of any chromate will be shown by the change of colour.

When the films have been thoroughly freed from the last traces of chromium, they may be set up to drain upon blotting-paper in a cool, dry place, and when surface dry transferred to a suitable drying box or cupboard. In this condition they will be very little less sensitive than before treatment, unless of some ultra-rapid description originally, as the use of the alkali in washing goes some way in neutralising the slowing action of the bichromate. But if great rapidly is required, and the plates are to be used at once, the German method of treatment with a feeble solution of silver nitrate may be resorted to; but we do not recommend this, except under the conditions mentioned, owing to its uncertainty and the rapid deterioration that occurs. Of course, if the films are to be "orthochromatised," the necessary treatment must be applied before drying.

In the case of the plates operated upon by ourselves, the result was in every way satisfactory, for, while the fog and iridescence were completely and effectually removed, the sensitiveness was scarcely, if at all, interfered with, and

have the satisfaction of believing that the films now possess better keeping qualities, owing to the conversion of the silver chloride.

ORTHOCHROMATIC PHOTOGRAPHY.

THE discussion at the technical meeting of the Photographic Society of Great Britain last week was a highly instructive, as well as an interesting, one, now that orthochromatic photography is so advantageously used for some purposes. The discussion turned very much upon the question as to whether or not orthochromatic plates possessed any advantage over ordinary ones unless a coloured screen be employed. The discussion was doubly instructive, inasmuch as the majority of those present, who took part in it, were fully qualified, from actual practice, to express definite opinions on the subject.

Orthochromatic photography, it may be mentioned, is not such a modern idea as many appear to imagine. Some fifteen or twenty years ago Colonel Waterhouse and Dr. Vogel demonstrated that, by the addition of some dyes to the bromide of silver film, greater colour and sensitiveness was obtained, eosine then being found one of the most generally pronounced. However, it was not till many years afterwards that the discovery was turned to a practical account, and then first on the Continent. Messrs. Braun & Co., of Dornach, were amongst the first to apply the process commercially. This they did in copying the paintings in the various Continental galleries, and also when reproducing the works in our own National Gallery. The firm made somewhat a secret of their method of working at the time, but it is now generally understood that they work by the wet collodion—bromised collodion—with different coloured screens. However, until Messrs. Dixon & Gray showed, at the Photographic Exhibition a few years back, the value of orthochromatised plates over ordinary ones for copying paintings, and for which they were awarded a medal, the process received little, if any, attention in this country, except, perhaps, of a negative character. Now, however, orthochromatic photography has become general, and there are few, if any, who do not avail themselves of it when reproducing works of art.

The principal point in the discussion the other evening was as to whether there is any gain in the use of orthochromatic plates for translating colours into monochrome unless a colour screen be employed. The general opinion of those who took part in the discussion was that there was little or no advantage to be gained without it, unless under exceptional conditions. These, as was pointed out, are when the light itself is yellow, as it frequently is late in the evening, and too often in the daytime in winter. During a yellow London fog, as we have often mentioned, a material advantage is to be gained by using plates prepared with eosine for ordinary work in the studio. In such a light they may also be used for copying pictures without a screen. So they may if the subject is illuminated by gas or similar light. Although plates orthochromatised with eosine, or erythrosine, when used with the yellow screen, undoubtedly give a more correct rendering of the blues and yellows, the reds are not so well represented as in ordinary plates.

For general purposes Mr. W. Bedford recommends, as an orthochromatiser, methyl violet, because it sensitises for yellow, red, and green. It is found in practice that cyanine is one of the best sensitisers for reds, and this is frequently used in conjunction with erythrosine, and also with methyl violet. We believe it is an open secret that the most successful reproducers of paintings prepare their plates specially for the particular work they have to execute, and then use them with colour screens best suited for the colours in the pictures. They do not rely upon arbitrary plates and screens. Orthochromatic photography must always be used with discretion, as it is quite possible to obtain, if we may use the term, an "over-orthochromatic" effect. For example, the blues may be rendered almost black, and the yellows nearly, or quite, white in the photograph. This was well illustrated by Professor Botthamley at the London meeting of the Photographic Convention a couple of years back.

During the meeting last week a very interesting question was brought forward, and we regret it did not receive the attention it deserved. It was — Why gelatine does not lend itself so well to orthochromatic purposes as collodion? Those who have experimented in orthochromatic photography, with bromide of silver in conjunction with eosine suspended in collodion, know quite well that, without a colour screen, the blues and yellows are more correctly rendered than they are, under similar conditions, with gelatine emulsion. Again, in the ordinary wet collodion process, if eosine be added to the collodion, a better colour-rendering will be obtained without the screen than with an eosine gelatine plate. Why the eosine-bromide of silver should behave so differently in the two vehicles is a very interesting point, and it is one that should receive more attention than it has hitherto done. With collodion as a vehicle, the eosine-bromide of silver plate is much slower than a gelatine one. But that is of little moment in copying paintings if a better colour-rendering can be secured.

KALLITYPE.

IT is just two and a half years since the publication of the editorial ALMANAC article on *Iron Printing*, in which we shortly described a number of printing processes that are entirely pivoted, so to say, on the well-known behaviour of the ferric salts under the influence of light, and we have been pleased to find that the subject has interested a great many photographers, who were already more or less acquainted with it, and also that it has attracted the attention of numerous others who were hitherto not fully aware of the excellent opportunities it revealed for the pursuit of comparatively new lines of experimental and, indeed, of practical work. The many recent references to the subject in our columns, and the frequency with which some system of iron printing forms the theme of papers and discussions at the societies, assures us that general interest in this beautiful and fascinating branch of photography has not sensibly slackened, and we do not hesitate, therefore, to express the belief, as well as the hope, that great permanent benefits are thereby likely, in the long run, to accrue to photography in general, and to photographic printing in particular.

The kallitype process is one which, had it been in existence at the time when we were writing our article at the end of the year 1888, we should have included among the methods of iron printing then dealt with, inasmuch as it falls within the category of processes depending, in the first place, upon the reduction by light of certain iron persalts; but it was not until March 29, 1889, or some three months after the appearance of our article, that Dr. W. W. J. Nicol applied for a patent (completed in due course) for "an improved method of photographic

printing," which is the kallitype process now so deservedly popular. Whether Dr. Nicol was induced to institute his experiments by a perusal of our article we do not know, and, were it so, the fact would not in the least deprive him of the credit which is his due for working out what is in many respects as elegant a method of photographic printing as any other now practised, and one, moreover, which is based upon thoroughly sound chemical principles and a perfect grasp and understanding of all the reactions involved.

The history of iron printing, it is hardly an exaggeration to say, is the history of photography itself, for the value of the iron salts in positive printing was known and understood almost, if not quite, as soon as the Daguerreotype and the calotype were perfected and practised. It is a fine tribute to the early investigators of the photographic properties of the iron salts that their application to printing purposes should at the present time be so extensive and so successful, and that, notwithstanding all the "discoveries" and "improvements" that have been made during the last half-century both in negative and positive silver processes, the simple principles of iron printing as originally established should remain as valuable, and, indeed, as necessary, as ever. We are, perhaps, as a body, rather too prone in these days to forget how deeply we are indebted to dead and gone workers for much that we not only derive benefit from, but also frequently take credit for ourselves, with no show of justice or reason. Photographic patentees are bad enough, in all conscience, under this head, but there are plenty of others, who do not protect their own or anybody else's ideas, to bear them company in their ingratitude and dishonesty.

Kallitype is possibly the first perfected form of iron printing in which the final image consists of reduced silver. We make the reservation advisedly, because we believe that the late Sir John Herschel, to whom we are indebted for a great deal of our knowledge of the properties of the iron compounds, produced in the course of his experiments positive pictures by a process which we may reasonably regard as the precursor of kallitype. This process consisted of exposing paper coated with ammonio-citrate of iron, and "developing" with a solution of silver. Unlike most of the author's processes, however, this was never brought to perfection, although it undoubtedly contained the germs of a practicable printing method, as we may now see from what Dr. Nicol has recently achieved.

The reason that no process of printing pictures in silver by means of the reducing action of the iron proto-salts—a process, in fact, analogous, in its leading features, to the cold-bath platinotype method—has never been practicable without a compulsory resort to fixation with hypo is, of course, obvious, as was stated in our columns rather more than a year ago by Dr. Nicol. All the former processes of this kind, he remarked, involved the use of the ferric salts of acids, the silver salts of which are insoluble in water, thus necessitating the use of some fixing agent, and he went on to point out that, even were ferric salts of acids used which do not form insoluble silver salts—as a matter of fact, we believe there are no such substances known to chemical science—fixing could only be avoided by using distilled water, which would be fatally expensive. In the process now under notice the use of hypo as a fixing agent is entirely dispensed with, and thus kallitype, among modern silver printing methods, occupies a unique position, which cannot fail to tell advantageously for it in the war of processes which is at present going on in photography.

We should surmise that the kallitype process was the outcome of a considerable number of experiments on the part of Dr. Nicol, since, in regard to the iron salts with which the paper is coated, he seems to have a very wide choice, and evidently holds himself ready to employ various combinations of them. These iron salts, as our readers well know, form a numerous body, and the value of the command obtained over them in selecting the sensitive mixture for kallitype printing will be understood from the *rationale* of the process. This supposes paper to be coated with a ferric salt of an organic acid, such as ferric ammonium citrate, which prevents the precipitation of iron by ammonia, or with a haloid salt, such as ferric chloride, for example, to which a salt of the organic acids, such as potassium oxalate, is added, the latter being either mixed with the sensitive body or used in the developing and washing solution. Whichever way it is used, the object is the same, namely, the prevention of the precipitation of the iron of the picture by the ammonia used in the solutions. The "development" of the ferrous image formed by exposure is effected by a solution containing silver nitrate or other salt of silver dissolved in ammonia, and a solvent of ferrous oxalate, the reaction that now takes place being practically the same as that which occurs in the cold-bath platinotype process, namely, the reduction of silver by the dissolved ferrous oxalate, and its precipitation in the form of a black image upon those parts of the picture acted on by light. The precipitation of iron by the ammonia is obviated by the solvent of ferrous oxalate, and the tone of the picture, as well as the rapidity of development, are also influenced by other constituents of the "developer." The print is then treated with a solution containing a salt of an organic acid (citrate of sodium) and ammonia, which acts chiefly as a fixing agent, and is then finally washed to complete.

It will be observed from this that Dr. Nicol has devised a process which, although it depends to a great extent upon some old and familiar reactions for success, nevertheless possesses some highly valuable features of its own, which could only have been reached after a great deal of experiment, and, above all, that he has entirely dispensed with the use of hypo as a fixing agent, which in itself is no small gain. We believe that, as worked now, the process differs in some material respects from the form in which it was originally introduced, and that the alterations in procedure have been found improvements in practice. The process, both in its original and in its amended state, however, exhibits a most ingenious utilisation of deep chemical knowledge; and, although some carping has been indulged in at the expense of the patentee's claims, we should say there is little, if any, doubt as to the perfect propriety of them, either morally or legally.

It remains to be seen whether kallitype would lend itself to adaptation as a direct printing-out process; we should be disposed to consider it would, but very many experiments would, of course, be necessary to thoroughly establish its practicability. For the present, we will close our remarks on the subject, as we intend returning to it in our next issue, when we shall deal with the process in practice.

A MEMBER of the Convention directs our attention to the fact that whereas at the first—the Derby—meeting, it was stated that it would be the endeavour of the Council to provide for their meetings a series of short papers on topics of every-day interest to the practical photographer, this implied promise has been gradually more and more ignored until this year, when the practical papers have dwindled down to three lectures—one of them likely to prove specially interesting only to the possessor of an astronomical telescope, costing anywhere

between 500*l.* and 1000*l.* Good member! you lose sight of the further fact that although a number—quite a variety—of papers on every-day topics were provided, up to and including the Birmingham meeting, the members latterly did not seem much to care for them, but preferred the more strictly social element, which, after all, was also one of the recognised features of the Convention. Address your complaints to the Council, through the Secretary, and, if backed with good arguments, they will doubtless receive attention; or, reconsider your decision and "go to Bath," and there ventilate your grievances.

We recorded last week the death of Mr. Lachlan M'Lachlan, of Manchester. Mr. M'Lachlan's first appearance before a greater public than that of Manchester was in the summer of 1864, in consequence of a patent which he obtained for the application of venetian blinds or louvre boards to keeping undesired light out of the portrait studio. From July to October of that year our pages formed the tilt-yard in which blows—for and against—were given with no lack of force between Mr. M'Lachlan and his patent on the one hand, and Mr. A. Brothers, with numerous supporters, on the other. The patent, whether good or bad, need not now be discussed as it has long since expired, and photographers are now at perfect liberty to employ louvre boards to exclude the sun, should his rays prove troublesome in the studio.

In the days of yore it was considered *en règle* for the collodion negative silver bath to possess a slightly acid reaction. But in the course of 1868 Mr. M'Lachlan came to London to attend a meeting of the Photographic Society and try to establish doctrines in relation to the conditions and alleged harmonious working together of collodion silver bath and developing salts, which were not previously, nor have they since been, received. He worked with alkaline materials, both the bath and the developer having been rendered in that condition with caustic potash; and in many of the deductions, or, more correctly, assertions made, he did not find any one quite of his way of thinking, but, on the contrary, the consensus of photographic opinion was hostile to his claims. It is fair to his memory to state that a large number of pictures shown by him in proof of the superiority of his system of working possessed great merit. His greatest work was a group of the *Queen and Royal Family*, executed in carbon on a large scale.

Apropos, while M'Lachlan sought to obtain sensitiveness conjoined with other good properties by having his chemicals in an alkaline condition, J. W. Black, a photographer of eminence in Boston, Mass., was astounding the world by his discovery that an exalted degree of sensitiveness was to be obtained by making the silver bath abnormally acid.

Incidentally we learn of the death of Mr. James Syrus Tulley, a well-known professional photographer in Balls Pond, London. He had a business in Division-street, Sheffield, about thirty years ago, when he came before the world as the apostle of rectifying a disordered negative bath by treating it with cyanide of potassium. This he did during 1861. Mr. Tulley subsequently opened an establishment in London, in which he did a good business, under the style of Napoleon Syrus. He was a man of versatile and good attainments—who had played many parts in the drama of life. His death took place about two months since. He formerly contributed occasionally to our pages and those of the Almanac.

From a report by Mr. F. C. Beach, on the New York Exhibition, on another page, it is gratifying to perceive that, out of twenty medals awarded for superior merit, no fewer than nine have come to this country.

The convention of the Photographers' Association of America opens in Buffalo, N.Y., on the 14th inst., terminating on the 17th. They are to have papers on Posing and Lighting, Backgrounds and Accessories, Art Photography, Orthochromatic Photography, Developing, Retouching, Bromide Printing, and Flashlight Photography. In addition to this there is to be an excursion to Niagara Falls, which are situated within a few miles of Buffalo. The Convention this year is under the presidency of Mr. George H. Hastings.

HYPOBROMITE OF SODA AS A PREVENTIVE OF FOG IN PLATINOTYPE PRINTS.

Although a series of experiments that I was making in connexion with the use of platinotype paper that had become useless, if developed in the usual way, through long keeping, was not finished, I sent a communication describing some of the results to The British Journal of Photography some little time ago, because I had left the capital, and did not know when I should be able to finish the experiments. I have now finished them, and write a word or two about the results.

When I wrote last I had tried hypochlorite of potassium in a cold carbonate of soda developer, with the result that I got excellent prints on platinotype paper that gave hopeless fog with a hot oxalate of potash bath. It had been suggested to me by Dr. E. Divers, F.R.S., that bromine would probably do as well as a hypochlorite, as, added to the soda solution, hypobromite of soda would be produced, the action of which is very similar to that of hypochlorite of potassium.

To test this, some platinotype paper was left in a very damp room for twenty-four hours. At the end of that time it was found that it gave strong fog with the usual oxalate of potash bath, even using it cold; a slight, but quite perceptible fog with a cold five per cent. solution of carbonate of soda.

I may say at once that the action of the bromine seemed to be exactly the same as that of the hypochlorite of potassium. In writing about hypochlorite of potassium, I gave no quantities, as the solution was of unknown strength, and as hypochlorite of potassium is a very instable salt at the best. It is different with bromine, however. The bromine was used in the form of a saturated solution in water, that is to say, of a solution of a strength of about three per cent. by weight.

It was found that the addition of five parts of this bromine water to 1000 parts of a five per cent. solution of carbonate of soda was enough to prevent the appearance of fog on the paper that had been exposed to damp for twenty-four hours. It was found that twenty parts in 1000 was enough to prevent fog in the same paper, even if it had been exposed to light so as to show a faint tint.

Taking into account that the bromine water is a solution of a strength of only about three per cent., it will be seen that the very small amount of somewhat less than one part in 6000 of actual bromine is enough to prevent fogging in paper that gives strong fog by the usual method of working.

In my last communication I expressed the opinion that it might be convenient, at times, and especially where any combination printing had to be done, to use the cold soda bath, with the addition of either a hydrochlorite or a hypobromite, instead of the hot oxalate bath, as, with the former, it was possible to print till all detail became visible. At the same time I expressed a fear that, using fresh paper, there would probably be harshness in the high lights by working in this way. I find now that my fears were well founded. From ordinary negatives, the result of using fresh, or unfogged paper, and developing with a soda bath to which hypobromite has been added, there result prints with very chalky high lights. The developer is, however, particularly well suited for printing thin negatives. A soda bath alone, without the addition of hypobromite, does not give this harshness; but then it is not allowable with this to print till all the detail is visible, although the printing may be carried on till it is very nearly all out. The development with a soda solution, without further addition, is very rapid, and there is not, therefore, the command over the process that there is using the solution with the addition of a hypochlorite or a hypobromite.

One thing more whilst I am on the subject of developing platinotype prints with a solution of washing soda. Extended experiments show me that there is a liability to occasional granularity of image with this developer. Why this should be I cannot imagine—that is to say, why the granularity should be occasional only; why, for example,

several dozen prints should be developed without showing a trace of it, and then two or three in succession should be so granular as to be useless. There must, of course, be some reason—probably it has something to do with the preparation of the paper—but I have not yet been able to discover it. The fact that granularity occurs only occasionally shows that it could be prevented altogether did we know the cause of it, but, until the cause is discovered, the occasional occurrence of granularity of image must be set down as a drawback to the soda developing bath for platinotype prints.

Imperial University, Japan. W. K. BURTON.

PHOTOGRAPHIC PERSPECTIVE:

CHIEFLY IN REPLY TO MESSRS. EMERSON AND GOODALL.

[A Communication to the London and Provincial Association.]

UNDER the title of *Notes on Perspective Drawing and Vision*, Dr. P. H. Emerson and Mr. T. F. Goodall have just published a series of "propositions, experiments, proofs, and deductions," by which they claim to show that, for "scientific reasons," the accepted rules of monocular perspective are likely to mislead, and to prove the fallacy of photographic and all mechanical methods of measurement.

When it is attempted to be shown that accepted rules are wrong for "scientific reasons," we have a right to ask that the proofs by which it is claimed that the overthrow of these rules is accomplished shall be of as exact and definite a character as the circumstances permit. I think it may be shown that the so-called proofs submitted are of so loose and indefinite a character as not to constitute proofs at all.

The first part of Proposition A sets out with a statement, which they do not support by any anatomical reasons, that objects seen below (which are here assumed to be foreground objects) are seen on a smaller scale than those which are above, and are assumed to be distant. That is (say the authors), "a perspective drawing surprises us by making the foreground objects look larger in proportion to the distance." It is added that we see a larger arc with the lower half of the eye than with the upper.

The second proposition, as to width of included angle, has nothing to do with the first, as to the relative sizes of upper to lower objects, and it is confusing to have the two placed in one proposition. The second one may, however, be disposed of at once by the fact that it has no bearing on perspective, or, generally speaking, even upon the amount of field included in a photographic view. The angle of view seen by the eye is considerably in excess of 45°, both above and below a horizontal axial line. I mention this angle because it represents the view on a photographic plate which is twice the height of the focal length of lens. It is evident that, so long as the boundary of the field of vision is greater than that included on the photographic plate, any greater extension of the boundary in one or other direction has nothing to do with the photographic representation. What occurs within the limits of the photographic view is not affected in position by a variation in the limit of vision outside the area.

The "proof" is said to be "completed when we stand with our legs apart, and, standing with our back to the landscape, bend down and look between our legs. Here the fields are inverted, and consequently the distance appears small and far off," &c.

The effect on the disposition of foreground obtained by choosing a lower point of sight, as by lowering the camera, is well known, and this, together with the confusion arising from seeing things in an unusual position, and perhaps from the rush of blood to the head, seems to afford a more rational explanation of real or fancied differences of aspect than the assumption of different proportions being rendered by the upper and lower halves of the retina.

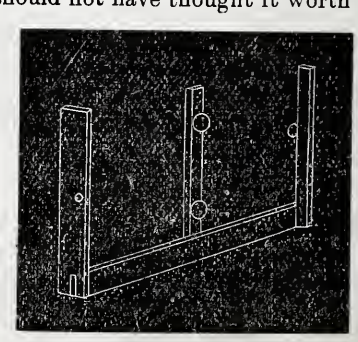
Proposition B, assuming Proposition A to be established, attributes the result to the naturally selective action of the retinal nerves, and suggests that special functions have been developed by natural selection for the purpose of drawing distant objects nearer. Further on, in Proof 3, we gather that the amount of difference of size, as seen at an angle of 26° 26′ above and below the axial line respectively, is estimated at one-sixteenth of the total. Objects at these distances from the axis are considerably removed from the region of really distinct vision, and it is only objects much nearer to the axis that can be minutely examined; and, consequently, if any difference of scale were proved or admitted, the proportionate difference at such smaller angle would be much less than that at the larger one. Taking the estimate, however, at the angle given, the difference between fifteen and sixteen is so little that there are few, if any, occasions where an object distinguishable on the one scale would be noticeably less so on the other.

The deduction, "that mathematical perspective gives quite a false impression of what we see when using either one of our eyes, or both," is supported by "proofs" of the same loose and inexact character as those given under Proposition A. The first three deal with a statement that objects having vertical sides appear wider at the top than the bottom. Proof 2 is that which is most easily tried, and, according to this, if we "look at the middle of a doorway or door, it will be felt that the door or doorway is wider at the top than at the bottom." Now, to an observer standing, the middle of an ordinary door is considerably below the height of the eye, and the line of vision will be directed downwards. The top of the door will, therefore, with regard to the axis of the eye, be in a plane in advance of the lower part, and will, consequently, appear to be larger. If the observer is seated at such a height as for the eye to be level with the centre of the door, and then that is looked at so that the line of vision is at a right angle to its surface, the top no longer appears broader than the bottom; at least, it does not to me, or to any one else with whom I have compared notes.

Proof 3 directs us to cut two slips of paper 8 inches long, one 2 inches wide at each end, and the other slightly tapering, *i.e.*, from 2 inches to $1\frac{7}{8}$ inches. It is asserted that if both are held at a distance of 8 inches from the centre of the eye, and looked at directly, the parallel piece will appear to be wider at top than bottom, and the tapering piece, if held with narrow end uppermost, will appear parallel. This is the sort of experiment with which any one may easily deceive himself. A strip of paper does not readily maintain a strictly vertical position, or remain in one true plane. For the experiment to have any value, the material should be capable of being maintained in one unchanging position, and means, not indicated by the authors, taken for truly fixing its height and the position of the eye. Even then the indistinctness of vision over all but a small area near the axis of the eye is so great that if, as required by the proposition, the direction of the eye is not moved up or down, the extremities of the paper will be so much blurred that a little difference of width could probably not be distinguished at all, but a person having an expectancy of seeing either equality or difference could easily imagine that he did so see it.

According to Proof 4, a penny is to be placed "upright on a table, and a halfpenny eighteen inches behind it, and a little to the right or left of the penny. The eye must look over the penny, and at the halfpenny, so that the penny is a foreground object, and the halfpenny a distant object. If the observer now looks steadily at the halfpenny, at the same time seeing the penny, he will find the impression given is that the halfpenny looks nearly as large as the penny."

This "proof," like the others, is exceedingly loose and inexact. We are not told at what distance the eye is to be placed, or at what height above the level of the table. As a matter of fact, if the position of the eye is such that the coins come near together in the field of vision, there is no doubt about it, their relative proportions are seen, and the smaller coin does not appear relatively larger than it really is. When the level of the eye is much raised, so that the penny is not near enough for comparison, and when it comes far from the limit of distinct vision, it is easy to assume disproportionateness. If, now, the first and leading proposition of Messrs. Emerson and Goodall is a true one, the object seen on the upper part of the retina (the lower half of the eye they call it) appears smaller in scale than those projected on the lower half, and the penny on this account seems smaller than it really is. Then, if the image of the penny is made to fall on the lower half of the retina by making it a *raised* foreground object, it should appear as much larger in the second case as it did smaller in the first. It seems strange that the authors of the paper under discussion should not have thought it worth while to make this



experiment, which is simply the complement of the other. I have here an appliance with which it can be done. There is a horizontal bar lying on the table, fitted with three vertical arms. From the vertical arm at one end of the horizontal bar a halfpenny projects. At a distance of eighteen inches in front is a second vertical arm, with

niches in which pennies are fitted above and below the height of the halfpenny. Eighteen inches again in front of this is the third vertical arm, in which an eye-hole is bored, level with the halfpenny. A large sheet of white card is placed behind, so that we are not confused by seeing different backgrounds to the different coins. If the halfpenny is looked at direct, I cannot find that the one penny appears to differ from the other in size, nor has any one to whom I have shown it found such to be the case.

It may seem to some to be a waste of time to fit up even such an appliance, and it certainly might rather be expected that Messrs. Emerson and Goodall would have done it themselves before announcing their propositions; but, when it is remembered how many people were mystified by the quasi-scientific theories put forward not long since on the subject of definition or focussing, it may not be wasted time after all.

It is remarkable that Messrs. Emerson and Goodall deal with near objects only as below, and distant objects as above. The experiment with the two pennies shows the near object both as above and below. If their proposition is true, that the lower half of the eye sees things on a smaller scale than the upper, and for this reason a perspective drawing surprises us by making the foreground objects look large, then such foreground objects as are above the distance should surprise us by appearing too small in the perspective drawing or photograph. Perhaps one of the most familiar instances of a near object above the central distance is that of a chandelier depending from a ceiling when the interior of a room is photographed. It may be enough simply to ask the question whether such an object really does surprise us by appearing too small in the picture.

A point, however, that it seems very strange should have escaped the notice of the writers is, that we see the photograph or perspective drawing with the same eyes that we see the objects of nature. If, therefore, it were a fact that a natural object, when at the bottom of the scene, appears smaller to our eye than it comes in mathematical perspective, then the same object in the lower part of the drawing falling on the same diminishing part of the eye as the original object would, suffers a like reduction also, and the true effect will still be produced. The lines from the various points in a drawing in mathematical perspective, or in a photograph, seen at a proper distance, fall upon the same parts of the eye as the lines from points in the natural scene would do, and both would suffer alike from the want of equality of vision assumed by the authors. The case is very similar to that of the supposed necessity for the lens to simulate the defects of the eye, which was for some time maintained by Dr. Emerson and a few followers.

Is there any difference between photographic and true mathematical perspective and perspective as used by painters? Sometimes there is. Painters allow themselves licence. If an interior has to be represented, a photographer must photograph it from a distance limited by that to which he can remove his camera. A painter will often represent the interior as far as the leading lines are concerned, as it would appear if the observer were so far removed as to give what is called less violent perspective. There is no difficulty in doing this to any one acquainted with the rules of perspective. If, however, the drawing is to be true throughout to what would be seen at the selected distance, care must be taken to obliterate such objects—as, for instance, a side window—which at a greater distance would be hidden by a pillar, and, in some cases, to show objects covered in the near view, but which would be exposed to view farther off.

Again, in painting figures, they will generally be represented as they would appear (with regard to comparative size of advancing the retiring portions) at such a distance as not to make these differences of size conspicuous. Sometimes, indeed, they are painted rather with the knowledge of the equality of the retiring and advancing portions of a figure than with the effect which perspective has in enlarging or diminishing them. Are these things passing conventions, and will photography cause any change in them as it has done with other conventions? Time will show. W. E. Debenham.

THE CONVENTION EXCURSION TO TINTERN AND CHEPSTOW.

The approaching visits of the Photographic Convention to Bath, and of the British Association to Cardiff, will be enlivened by excursions to Chepstow and Tintern Abbey; so perhaps a few words about these places, from a photographic point of view, may be of interest. They are both on the borders of Monmouthshire, formerly a Welsh county, but united to England by Henry VIII. The Convention excursionists from Bath will pass by train through the outskirts of Bristol, thence to the Severn, which is here an arm of the sea two or three miles wide. The Severn is crossed by means of the new railway tunnel, and the opposite bank is reached at Portskewitt, in Welsh times spelt Portscwitt; thence it is but a few miles by rail to Chepstow, and the line passes near the junction of the rivers Wye and Severn; thence to Chepstow it runs near the west bank of the latter river. Chepstow station stands high; near it is a tubular bridge over the Wye, built by Stephenson; the tubes are high in air, and the railway is suspended to them by lattice girders. This is a remarkable specimen of engineering work, but not elegant in appearance. About Chepstow and Chepstow Castle will be found plenty of picturesque subjects for the camera, and some good general views of both can be obtained from the other side of the Wye. The scenery between Chepstow and the Wyndcliff by the river is far more picturesque than the scenery between the Wyndcliff and Tintern. At the latter place the Abbey is the great attraction to the photographer; the wooded hills around are picturesque to the eye, but will not yield such striking photographs as the more precipitous scenery nearer Chepstow. In dealing with the latter lenses of abnormally long focus will occasionally be found useful, because sometimes from one side of the river wooded precipices can be seen stretching away for a mile or more on the other, and these precipices would appear dwarfed if taken with lenses of a narrow angle.

The road from Chepstow to Tintern, which passes near the west end of Chepstow Castle, is totally destitute of interest for two or three miles, the Wye scenery being hidden by the intermediate private park of Piercefield. In that park, near the river, is some romantic scenery. About three miles from Chepstow by road a splendid view of the Wye bursts on the sight, from the foot of the Wyndcliff. The latter is a precipitous cliff, which may here be climbed by means of a tortuous path through a wood; at the top is a resting-place, guarded by a parapet, and from this point the finest stretch of scenery yielded by the Wye is visible. In the far distance the Severn can be seen. From the Wyndcliff to Tintern, a mile or two farther on, the scenery grows more tame.

On the opposite side of the Wye, near the village of Tidenham, not far from Chepstow, two paths run, or ran, one on the top of Lancaut Cliffs, and the other at the bottom thereof. The views from the path at the bottom of the cliffs are particularly beautiful; the comparatively new railway to Tintern and Monmouth runs close at hand, but whether the old footpath has been abolished since the construction of the line I do not know.

Chepstow is a sleepy place, likely to be seen by the excursionists baking in a summer's sun. In some streets the houses are plastered over with a dark-coloured cement, studded with little white stones. Suitable photographic subjects are more plentiful in and near Chepstow and Chepstow Castle than anywhere else in the line of route; farther on, the subjects are less numerous, but striking. A mile or two west of Chepstow is the valley of Mounton, running parallel to the valley of the Wye; the scenery, though pretty, is not precipitous, and, with the short time at command, I do not think it would repay the excursionists to visit the Mounton valley.

Tintern Abbey was founded in 1131, for Cistercian monks, by Walter de Clare; the building of the church was commenced by Roger de Bigod, earl of Norfolk, and the Abbot and monks first celebrated mass within it in 1268. When the pious Henry VIII. confiscated the property of monastical bodies he granted Tintern to Henry, second earl of Worcester, and it now belongs to the Duke of Beaufort. Some years back, in some excavations near the Abbey the remains of the Hospitium were discovered, in which the monks were wont to entertain strangers and travellers. Over such buildings not uncommonly were the words "God encompasses us" inscribed, and some sage antiquaries state the inscription was the remote origin of the public-house sign, "Goat and Compasses." The style of Tintern Abbey is a transition from Early English to Decorated, and is remarkable for its beauty and delicacy.

There is another celebrated monastery in Monmouthshire—namely, Llanthony Abbey, in a secluded and beautiful valley up in the Black Mountains. A few miles farther on is a new Llanthony Abbey, built by Father Ignatius and his monks. I visited them once, but to give details would lead me away from my present subject.

Chepstow Castle was called by the Saxons Chepstowe, and by the Normans Estrighoiel, or Striguil; in Domesday Book it is called "Castellum de Estrighoiel." One end of it is on the brow of a precipice by the side of the Wye; the rest was protected by a moat, now dry, from the side of which rise its massive walls and towers. The best general views of the exterior of the Castle are obtainable near the river. The general character of the Castle seems to be Norman, and from Domesday Book it appears that it was built by William FitzOsborn, lord of Breteuil in Normandy, who distinguished himself at the Battle of Hastings, and later on was killed in warfare in 1070. The Castle is therefore about eight hundred years old; it is a fine specimen of a feudal fortress. The finest specimen of a feudal fortress in existence is probably that of Angers, in France; we have nothing in this country approaching it in massive grandeur.

Chepstow Castle next came into the possession of the third son of its builder, Roger de Britolio, who rebelled against the king, was defeated and imprisoned for life, and his estates and Castle transferred to the Clare family; in the time of Henry I. it was in the possession of Strongbow, earl of Pembroke, and brother of Richard, earl of Clare. In 1148 his son, Richard de Clare, also surnamed Strongbow, succeeded him; Richard is described as a man "neither dismaied with adversitie nor puffed up with prosperitie," so was a person of superior character. He died in 1176, and Isabella, his daughter and heiress, conveyed the Castle to her husband, William, marshal of England. Afterwards, by marriage, the Castle came into the possession of Bigod, earl of Norfolk, who died in 1225.

Omitting a series of dry historical details, we come down to 1645, when a number of Republicans, under Colonel Morgan, captured Chepstow Castle. Partly by surprise from without, and partly by treachery from within, Colonel Fitzmorris recaptured it, upon which Oliver Cromwell marched against it in person, and attacked it without success; he, however, left a number of men to prosecute the siege, and they finally took it by assault. The Castle was then confiscated, and settled by Parliament on Cromwell. On the accession of Charles II. it was restored to the Marquis of Worcester, and has since remained in the possession of his descendants. It now belongs to the Duke of Beaufort.

One of the towers of Chepstow Castle is that in which Henry Marten was confined. Marten's father was a doctor of civil laws, a judge of the Admiralty, and a man of great influence; the son was educated at Oxford, and took up the law as a profession; in 1640 his political career began, and he took up a position adverse to the Court. He once said to a friend, "I do not think one man wise enough to govern us all." It is asserted that in 1642, by authority of Parliament, he forced open a great iron chest at Westminster, and took therefrom the crown and robes belonging anciently to Edward the Confessor; not content with this, he invested a bony old Puritan, George Wither, with the robes, who "did first march about the room with a stately garb, and afterwards, with a thousand apish and ridiculous actions, exposed those sacred ornaments to contempt and laughter." Marten was immensely popular, and a short imprisonment he had for some violent political utterances made him more so. His sayings and doings did much to strengthen Cromwell's party. He was one of those who signed the warrant for the execution of Charles I. On the restoration of the monarchy, Marten was tried, condemned, and imprisoned in what is now called "Marten's Tower" in Chepstow Castle. He died at the age of seventy-eight, and was buried in the chancel of Chepstow Church. Over his remains was a stone with an inscription, but later on a new vicar had the stone removed from near the altar into the body of the church.

The Wye itself, in those parts about to be visited, is narrow and deep; the tides in it sometimes rise and fall more than fifty feet. This makes it an ugly river at low tide, with soft mud-banks sloping down to it as steeply as the roof of a house; it grows somewhat better near Tintern, but as a general rule its waters will be unapproachable from the shore over the length to be visited by the Convention, unless it should be near the time of high water.

W. H. Harrison.

THE NEW YORK MAY EXHIBITION.

It will doubtless interest those of your readers who kindly sent examples of their work to the exhibition, held under the auspices of the Society of Amateur Photographers, New York, that the English photographers took the lead in winning medals, nine out of twenty going to them. The Judges, Thos. Moran, Will H. Low, and Edward Bierstadt, awarded silver medals for artistic and technical excellence to F. P. Cembrano, H. P. Robinson, J. Pattison Gibson, Martin J. Harding, Adam Distord, Frank M. Sutcliffe, C. Court Cole, Richard Keene; and Americans, W. H. Jackson, of Denver, Colorado; Alfred Clements, of Philadelphia; Robert S. Redfield, of Philadelphia; George A. Nelson, of Lowell, Mass.; Edwin H. Lincoln, of Cambridgeport, Mass.; Chas. I. Berg, Alfred Stieglitz, James L. Bruse, and John H. Tarbell, all of New York. Three medals were awarded for excellence in lantern slides as follows:—Miss Catherine Ward Barnes, Albany, N.Y.; Dr. Charles L. Mitchell, of Philadelphia, Penn.; and Geo. W. Wilson, Aberdeen, N.B. Three medals were also awarded for apparatus to Hetherington & Hibben, of Indianopolis, Indiana, for a unique magazine hand camera; to Chas. Beseler, of New York, for excellence in optical lanterns; and to the Clark Electric Company, of New York, for excellence in electric optical lanterns. Both lanterns were used in showing the slides, and each appeared to have special advantages. Exhibitions of lantern slides were held nearly every evening, and the exhibition itself, receiving so much commendation, was extended for an extra week beyond June 6, closing June 13. It was largely attended, and its size, and the superior quality of the work displayed, caused surprise and admiration in all who saw it. The pictures were hung in groups, each exhibitor's work being by itself. There was ample room, and all were well lighted and easily seen. The artistic quality of the English exhibits attracted great attention, and were a surprise to many, particularly in regard to the improvement shown in platinotype printing.

The other foreign exhibitors who sent good work which was much liked were Edgar G. Lee, lantern slides, received too late; Leydell Sawyer, whose *Boat Builder* was admired—his exhibits also came too late; Colonel R. W. Stewarts, 13, Westminster Abbey, platinotypes, received too late; S. F. Clarke; Mr. and Mrs. W. J. Anckorn, of Arbroath, Scotland; Thomas Mansell; L. B. Beard; Werner & Son, Dublin, Ireland, life-sized platinotype prints; Louis Meldon, Dublin, Ireland, good instantaneous work; Geo. E. Bethune, of Toronto, Canada; David Hedges & Sons, excellent animal studies; Horatio Nelson King, fine architectural enlargements; A. G. Tagliaferro, Malta, Mediterranean; W. H. Douglass Pym, large direct heads; Miss F. A. Hardman; A. R. Dresser, very good bromide enlargements; J. H. Harvey, Victoria, Australia; Harry Symonds; Harry Tolley, *The Last Load* and *Bantry Bay*, large and beautiful platinotypes; and Joseph Elliott, Jubbulpore, India. Altogether there were thirty foreign exhibitors, larger than in any previous exhibit. As to how the exhibition was regarded by the Press, I enclose an extract from the *New York Sun*, which explains emphatically the public appreciation. The Amsterdam Amateur Photographic Society of Holland sent a separate exhibit of seventy-five photographs, many of which were very creditable.

The Committee of Arrangements desires to express its thanks to many English photographers who contributed so largely towards making the exhibition an artistic success, hoping in future to have more of such. The high character of the work is sure to exert an excellent stimulus in the future, and make each exhibition superior to the previous one. The members of the Philadelphia Society displayed excellent platinotype work, and were ahead so far as Americans are concerned.

F. C. Beach,
Chairman Committee of Arrangements.

113, *West Thirty-eighth-street, N.Y., June* 19, 1891.

THE AMATEUR PHOTOGRAPHERS.

In the comfortable lodging-house of art, which is situated between the Manhattan Club and the New York Club in Fifth Avenue, there has just been held a picture show of peculiar interest. The New York Society of Amateur Photographers, the Photographic Society of Philadelphia, and the Boston Camera Club join in a public exhibition occurring annually in rotation among the three cities. The exhibit this year comprised the best products of the cameras and printing frames of many of the most progressive, enthusiastic, and successful amateur photographers in America; and side by side with these were hung representative specimens of the skill of such English artists as F. P. Cembrano and H. P. Robinson, Harry Symonds and Richard Keene.

The proportion of foreign exhibits this year has been surprisingly large. About one quarter of all the exhibitors were British or Continental photographers, and out of the twelve or thirteen hundred prints shown at least one sixth came from across the water. This circumstance has enabled every visitor to the Fifth Avenue Galleries during the past fortnight to judge for himself of the comparative excellence achieved by the American and English schools; for in spirit and in method, in artistic temperament and in technical execution, the two groups, on the whole, are quite distinct.

The marked but not easily described distinction between the best landscape photography of the English amateurs and the equivalent performances of our own experts sometimes has been attributed to the difference in the conditions of the sunlight and atmospheric moisture. It would be interesting to inquire how far results are effected in that way, but the climate does not account for all. The American amateur photographing in England, Scotland, or Wales, is likely to be an American still in the quality of the pictures he produces; and the converse is true, we suppose, of the Englishman in the valley of the Juniata, in the Yosemite, or in the Garden of the Gods.

The explanation probably is that, while the Americans and the English have been working out progress in photographic art on the same general lines, the respective results have been influenced by race characteristics, independent theories and traditions of treatment and manipulation, local preferences as to process, both in the development of the negative and the printing, and differences in the manufactured implements and material employed, much more potently than by the meteorological conditions which confront the camera. It is natural to expect that the divergence will increase in the future, and that the American standard will depart still further from the English, instead of striving to approach and imitate it. It is better that it should be so in this department of æsthetic endeavour, just as in any other.

The discussion of amateur photography as if it belonged to the fine arts, and as if the taking of a picture were not merely a mechanical pursuit in which due care and attention to details produced invariable results under given conditions, will possibly cause amusement in the minds of some readers who associate the word photograph with the Coney Island tintype, or the twelve-for-a-dollar output of the East Side studio. We are sure that no person who visited and critically observed the recent exhibit in the Fifth Avenue Galleries will take this view of the subject. Even the sluggard or very busy man who presses the button, intending to let somebody else do the rest, has an opportunity to prove himself an artist. There is hardly a greater margin for artistic success or failure before the translator of nature who takes in hand the pencil or the etching needle than invites him who goes forth with his camera, prepared to exercise, from the first step in the complicated process to the last, his individuality not less than his acquired skill.

The meritorious pictures exhibited last week—and the poor pictures and conventional stuff, whether by Americans or Englishmen, were not in the majority—afford good-enough evidence that photography is an art. They also prove what is already known to everybody at all familiar with recent photographic progress, namely, that in the cultivation of this interesting art the most intelligent and expert of our amateurs need fear no comparison with the highest standard set by professional skill, American or foreign. We congratulate the New York Society of Amateur Photographers upon the success of its exhibition.

—*New York Sun.*

COLOUR PHOTOGRAPHY.

An Important Communication to the Franklin Institute by Frederic E. Ives.

Mr. Frederic E. Ives made an important communication at the stated meeting of the Franklin Institute last evening upon the subject of his process of colour photography, in the course of which he explained and illustrated some recent improvements he had made in the means of operating the process, by which it is rendered comparatively simple and reliable, and capable of immediately profitable commercial operation for lantern illustration. When Mr. Ives first published his process, several years ago, the three negatives requisite were made in one camera, from one and the same point of view, but last night he showed that, by an improvement on his helio-chromic camera, the three negatives, representing the effect of the object photographed upon the three fundamental colour-sensations, are now not only made from one point of view, by simultaneous and equal exposure, as they were three years ago, but also upon a single sensitive plate, so that the helio-chromic negative is obtained with no more trouble than an ordinary one, and any number can be made in which the relation of one element to the others is exactly the same. The colour prints, also, can be made from these negatives by a single exposure in transparent gelatine, and separated only when ready to dip into the dye solutions representing the respective colour-sensations. Mr. Ives showed, however, that it is not necessary to go to the trouble of making the colour prints when only lantern illustrations are required. Lantern positives, made from the helio-chromic negatives with no more trouble than ordinary lantern slides, were projected on the screen in the natural colours in the ordinary lantern, by means of a special front of Mr. Ives's own devising, and which was substituted for the ordinary projecting lens in about one second, so that an exhibition of ordinary lantern slides can be interspersed with projections in natural colours without causing any delay in changing from one to the other.

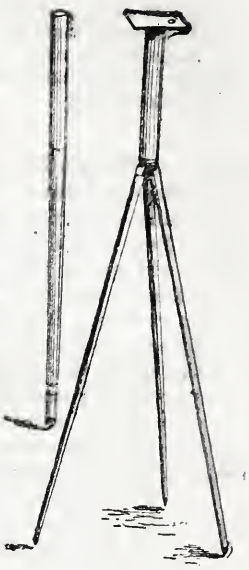
Several such projections were shown, including some admirable views in the park, and they were received with prolonged applause. The approximation to the colours of nature was marvellously accurate. The positives were about one-third smaller than the ordinary projections, but were as sharply defined, and in as bright and true colours as those produced two years ago with the more elaborate and troublesome lantern. The lantern front used for these new projections consisted of three prisms, converging light from a single condenser and radiant to three small projecting lenses, the necessary colour screens being located just behind the objectives. Mr. Ives also showed one of two cameras which he has devised to produce the helio-chromic negatives, in which three negatives are made on a single plate, the image-forming rays being transmitted to the single gelatine dry plate through three reflecting prisms, and from points of view so close together (less than half an inch apart) as to make perfect registration easy of accomplishment. By the other camera the three negatives will be made from the same point of view. Mr. Ives also announced that he was at work on a scientific novelty in the form of an optical device for the table, in which these positives could be seen in the natural colours as readily as stereoscopic views are seen in relief in the stereoscope.

Mr. John Carbutt said that he considered Mr. Ives's latest work by f a the most important and valuable contribution to the difficult subject of photography in the colours of nature which had yet been made. He moved a vote of thanks to Mr. Ives, which was agreed to.

—*Public Ledger, June* 18.

Our Editorial Table.

Tourists' Walking Stick Stand.



Mr. W. R. Baker, Wallington, Surrey, has brought out a camera stand that will prove very handy for those who have light cameras which they desire should, in the case of instantaneous views, not be dependent for the stability of their support upon the immobility of the person holding it. The three elements forming the tripod are so constructed as when folded together to form a round stick, like the time-honoured one belonging to the jumelle, of Geymet & Alker, of Paris. It, however, differs from the latter in being shorter—not longer, indeed, than a walking-stick, and in having its length eked out by a tube which, fitting over the tripod when it is folded, is eventually screwed on the top of the jointed head, and confers the requisite degree of altitude upon the stand. It is then surmounted by a little table, on which the camera is placed, and which when not in use may be carried in the pocket. The whole affair is handy, and cannot fail to prove useful.

A Camera Finder.

By Taylor, Taylor, & Hobson, Leicester.

There is a serious grievance in connexion with the use of the usual finder on hand or even on stand cameras—we mean those which have a small mirror, placed diagonally to throw the image upon a ground glass lying on the surface or near the top of the camera. For this implies that the eye must be several inches, say ten or twelve, higher than the top of the camera in order to see correctly the image on the ground glass. But there are some who do not like to photograph from such a low point of sight as that implied in the arrangement mentioned, but who like to have the camera from five to six feet above the ground. To meet these, Messrs. Taylor, Taylor, & Hobson have introduced an exceedingly pretty little direct finder, which, carried in the pocket when not in use, can be immediately applied to the top of the camera under such conditions as to show accurately what is to appear in the negative. A little flat plate, with a taper dovetail, is screwed upon the camera top, and in this the finder is slidden by a corresponding dovetail piece upon it. There is a shield above to keep light away from the ground glass. It is both neat and highly effective. By having a number of flat plates one finder can serve for many cameras.

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

Visitors to Glasgow, who frequently visit the large photographic warehouse of Messrs. George Mason & Co., in Sauchiehall-street, will, in future, miss a well-known face in the form of Mr. Robert Cunningham, or, as he was better known, plain Bob Cunningham. Mr. Cunningham has been carried away almost in the prime of life by a severe attack of an old malady, which has from time to time laid him prostrate. To say that Bob will be missed by a very large circle of friends in Glasgow and elsewhere is easily comprehended by those who had the good fortune of knowing his many good qualities. From a boy he had been connected with the large firm of which, in later years, he became manager, and if at times his style was brusque to those who were not intimate with him, still he leaves behind a very great number of those who can recall many kind and courteous acts, for under a stern crust Bob had truly a kind heart, and it can be with truth asserted that he never refused to do a good turn or render a kindness when the same was consistent with his duties. Truly, his death has caused a void not easily filled up.

Already the great attractions of Norway as a photographic centre and holiday resort are attracting this season again numerous well-known amateurs from the west of Scotland, and, before the close of the season, quite an army of workers will visit the Fiords. The favourite route seems to be to proceed direct to Bergen, and then, by ordinary steamers, to proceed northwards.

Mr. Ralph Elder has just returned from a lengthy tour on the Continent, his tour reaching as far as Milan. Before long the photographic public will have the benefit of this trip in the shape of another of those

delightful limelight lectures which, every season, follows Mr. Elder's holiday.

The exhibition arrangements are going on in a most gratifying manner, and, from what is already known to the executive, it will be a *gigantic success*. All the various committees are working with might and main to bring out every novelty, and in the way of catalogues quite a feature will be made in the shape of illustrations. Another very important feature will be the prominence of the photo-mechanical exhibits. Firms interested should note this. Limelight entertainments will be given nightly, and before long a very attractive programme will be issued. This will include personal tours by a good many well-known workers, among whom will be found the names of Mr. T. N. Armstrong, with his caravan tour through the Highlands, and Mr. Elder, with his tour through Switzerland and the Continent.

AMERICAN CONFERENCE EXHIBITION NOTICE.

The undersigned having been appointed a Committee to arrange for the first annual exhibition of the American Photographic Conference to be held in New York in May, 1892, desire to give early notice, and request that as widespread publicity as possible be given the same. It is proposed to make this exhibition the largest and most complete one ever held in this country. The foreign correspondents of the Conference have already been notified to secure, if possible, exhibits from all the foreign societies, and it is especially desired that every society in the Conference be represented by examples of their best work.

This notice is simply a preliminary one, to be followed by circulars containing full particulars. The secretaries of the different photographic societies and clubs are requested to read the above at their meetings.

T. J. Burton (Society of Amateur Photographers of New York).
Dr. George L. Parmele (President, Camera Club of Hartford).
W. H. Drew (President, Lynn Camera Club).
Miss Frances B. Johnston (Washington Camera Club).
H. S. Fowler (Brooklyn Academy of Photography).

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,662.—"Improvements in Lifters for Photographic Plates." L. Hughes.—*Dated June* 23, 1891.

No. 10,665.—"Improvements in Photographic Folding Plate Drainers." W. Tylar.—*Dated June* 23, 1891.

No. 10,798.—"Improvements in Shutters for Photographic Cameras." J. Kershaw.—*Dated June* 25, 1891.

PATENTS COMPLETED.

Improvements in Photographic Cameras.

No. 7489. Charles Cheetham Vevers, 12, Market-street, Briggate, Leeds, Yorkshire.—*May* 14, 1891.

This invention relates to the swing back and hinged supports of a photographic camera, by means of which the body or back is attached to the baseboard of the camera, the body being maintained in a rigid position when erected in any part of the baseboard, while the back or body of the camera can be swung in either (or both) a vertical or horizontal direction when fixed at any part of the baseboard, the axis of the vertical swing being midway between the top and bottom of the camera body, thus obtaining what is known as a "central swing."

The claims are: 1. In a photographic camera, an improved sliding plate, having the pierced or cut shoulders, slotted upright and clamping screw. 2. In a photographic camera, an improved strut or swing plate, pivoted midway between the top and bottom of the camera body, the said strut being provided with a slot and clamping screws, and projecting pins, feet or foot.

Improvements in Photographic Cameras and Parts thereof.

No. 11,293. John Edward Thornton, 3, New Lorne-street, Moss Side, Manchester, Lancashire.—*May* 23, 1891.

The improvements forming the subject of this invention relate to photographic cameras and parts thereof, and particularly to that class in which the various parts—such as the lenses, shutters, finders, and sensitive-surface carriers—are all combined to form what is generally styled a "hand camera." The object of this invention is to make such apparatus compact, portable, and light, and, by means of improved construction and arrangement of the parts, to make it equally useful as a hand or field camera, and so that it may be quickly adapted to any requirements.

A camera constructed according to my invention combines many of the advantages of both the ordinary hand cameras and the larger field cameras also. It may be used in the hand, or upon any suitable stand, either for instantaneous or prolonged exposures, and with lenses of various foci, and is therefore suitable for various kinds of work. The shutter is self-capping, so that the sensitive surface does not need covering whilst the shutter is being set. The finder shows the picture of the same size that will appear on the negative, and the picture is projected upon the finder-screen by the same lens that projects it upon the sensitive surface, and may therefore be focussed accurately without the need of graduated scales or guesswork.

The sensitive surface may be easily and quickly changed, and may be placed vertical and parallel with the vertical lines of the object to be photographed, whenever it is found necessary to tilt the camera.

In constructing a camera according to this invention I use a rectangular box or case, at one end of which I place the optical system, and at the other end the sensitive surfaces. The latter may be contained in the ordinary plate-holders or in a suitable magazine as preferred, or a sensitive web may be used in connexion with a system of rollers as in the ordinary roller slide; but in any case the sensitive surface after exposure may be changed for a fresh one without opening the case.

The frame or carrier which holds the sensitive surface may be pivoted centrally like an ordinary central swing back, and for the same purpose. An index outside the case and moving with the carrier serves to show the position of the carrier and sensitive surface inside, and has suitable means (which may be a screw rack and pinion, or other arrangement) for moving and clamping the carrier when desired. A swinging plumb or pointer outside the case serves to show whether the interior carrier is perpendicular or not.

One end of the box or case is capable of extension to various distances by means of an inner or outer sliding case, framework, rods, wings, or other devices, and suitable clamping arrangements.

The kind of lens I prefer to use is one of the doublet or rapid rectilinear class, and of short focus (say, four or five inches for quarter-plate pictures), with a large working aperture. I mount one of the combinations of the lens (either the front or back one, but preferably the front) on a movable plate (either sliding, swivelling, or revolving) so that the aforesaid lens combination may be moved out of the path of the light rays which pass through the lens; thus the other combination would produce a single lens of longer focus.

If desired, two or more lenses may be mounted upon a movable plate in a similar manner; or two sets of single lenses carried by two movable plates, one in front of the other, may be used to produce doublet lenses of various foci; or several single lenses may be used with a corrector to prevent distortion of the marginal lines of the picture.

The diaphragms may be of the well-known "Iris" form, or simply holes formed in a movable plate. The ratio of the stop in use to the focus of the lens is indicated on a scale outside the camera; this scale is made movable, and is automatically shifted whenever the lens is changed for one of different focus, and the ratio of the same stop to the other lens is indicated. Thus one set of stops only is required. Instead of a movable scale I may use a fixed one with a movable perforated cover to answer the same purpose.

When the extension part is drawn out, a lock or catch engages with it to hold it in position, and I prefer to arrange this lock so that the part cannot be extended until the lens has been changed for a longer one, or *vice versâ*.

For focussing purposes the whole optical system may be mounted within the box upon a travelling carriage operated in any suitable manner, or it may he rigidly fixed therein, and the necessary focussing adjustment obtained by the extension arrangement.

The focussing devices may be provided with the usual graduated scale and index of distances, but I prefer to use the finder for the purpose of obtaining a correct and sharp focus, in addition to using it for composing the picture and finding the principal objects to be photographed.

The finder consists essentially of a mirror placed in front of the sensitive surface at a suitable angle to project the picture upon a screen in the top or side of the camera, which is done by the same lens that is used to take the picture. The two images are, therefore, identical. When the picture has been focussed the screen aperture is covered so as to make the camera light-tight, and the mirror moved from before the sensitive surface ready for exposure.

The mirror has hitherto been made of silvered glass, and in some cameras the sudden movement of the heavy mirror immediately before the exposure causes a vibration of the whole apparatus and consequent blurring of the picture. To obviate this defect I use transparent silver celluloid, mica, or other suitable light material, which may be mounted in the usual way.

By preference I employ a flexible reflector or mirror of the above material, which may be wound upon a spring, or other form of roller, so as to be drawn down in front of the sensitive surface when required, and afterwards rolled up again before exposure. I may also use semi-transparent celluloid or mica upon which to project the image instead of the usual ground-glass screen, or it may be received direct upon the reflector instead. By suitable connexions either the mirror or finder-screen can be inclined from their normal position whenever the sensitive surface is inclined so that both work in unison.

The shutter is made self-capping so that there is no necessity for covering the lens by a separate movement when resetting the shutter for another exposure, and may be constructed in several ways to effect this purpose. The form I prefer to use is that of the roller blind.

It may consist of an endless flexible blind placed to work either before or behind the lens, or between the combinations thereof, or in front of the sensitive surface. It may be passed round two or more flanged guiding rollers, and prevented from slipping by spikes or points thereon which pierce the blind at its edges, or by additional rollers revolving in frictional contact or both in combination. The blind may be driven by attaching springs or rubber bands thereto so as to pull it forward the requisite distance; but I prefer to drive it by turning one or more of the rollers by springs, or other suitable means. The end of one or more rollers is provided with stops engaging with a suitable detent or release, so arranged that it may stop the blind when it has travelled far enough to open and close the lens instantaneously, or detain the blind so that the lens-aperture may remain uncovered for any desired period of time. If the roller has to make more than one revolution for the requisite travel of the blind, the stops may be placed upon a wheel gearing into a pinion on the end of roller (as described in a patent granted to me, and numbered 12,238, September 26, 1886) or upon a rack gearing into the said pinion; or upon an endless chain or chord turning with the roller; or upon a sliding nut or lever arranged to travel laterally by a worm on the end of said roller; or by stops

fixed to blind itself; or in any other convenient manner which shall effect the stopping of the blind in the proper place.

A blind operated in the manner hereinbefore described may be placed so as to pass behind and in front of the lens and completely round it; or in front of or behind the sensitive surface, and in front of or behind the lens; or it may be connected to, or form a part of, the blind which covers the finder-screen, or a part of the flexible reflector, or of both combined.

By another system, instead of using an endless blind to avoid the necessity of covering the sensitive surface each time the shutter is set, I employ a single roller blind shutter, somewhat after the usual well-known form, but add an auxiliary one, which I call the capping blind. This is arranged so that it shall connect to, and wind up with, the main shutter blind whilst it is being set, and immediately afterwards disconnect itself and spring back, leaving the lens covered by the shutter blind ready for exposure.

Another system consists of two separate spring blinds in close proximity, both winding on to separate sets of rollers, like two single blind shutters placed face to face. Each blind has an aperture cut therein at one end, whilst the other part is solid. After being wound up ready for exposure, one blind is released to uncover the lens aperture, after which the other is released to close it. The winding up of the blinds may be done by turning the projecting ends of each roller, or by pulling endless cords passing over or around same, or by cords which wind on to loose pulleys on the roller shafts, and are provided with running click and rachets to turn the rollers when the cords are drawn off, and with or without springs to rewind the cords on to the pulleys after winding up the blinds. The winding roller of each blind is provided with a suitable catch or click to hold the blind against the stress of its driving spring.

The blinds are released separately at any desired interval of time either by means of an oscillating lever or pallet, operated by a cord, push, pneumatic, or other suitable device, or one blind may be arranged to release the other after a certain interval. The release of the blinds may be effected by a separate "time" device, which may consist of a cam or lifter, operated by a spring or spring-driven train of clockwork. The speed of movement of the lifter controls the interval of time between the release of each blind; this speed may be altered by adjusting the tension of the spring, or by means of a brake. Or, instead, two lifters or cams may be used which can be adjusted to release the blinds at different times. The lifters, or time device, can also be provided with detents to stop same in their movement, and so keep the shutter open; or for stopping and starting same at will after being set to operate in a limited period of time. In addition to the hereinbefore described means for controlling the time of exposure by the two blinds, the tension of the driving spring of each blind may be adjusted for the same purpose. A shutter of the form last hereinbefore described is particularly suited to operate immediately in front of the sensitive surface, but may also be used in any other desired position.

The complete shutter mechanism may be arranged to travel with the lens or optical system, or remain in a fixed position within the camera according to which modification of the shutter is adopted.

The frame or carrier for the sensitive surface may be constructed to revolve, so as to readily change the longest side of the picture to either vertical or horizontal, as required, and may at the same time shift a mask on the finder-screen, so that the picture visible thereon may be of identical shape and position.

Improvements relating to the Manufacture of Flexible Films for Photographic and other Purposes, and to Apparatus for Use in such Manufacture.

No. 11,945. Benjamin Joseph Edwards, The Grove, Hackney, Middlesex. —*May* 30, 1891.

My invention relates to flexible films for photographic and other purposes, and to apparatus for use in the manufacture of such films; and my said invention is chiefly designed to provide for the more rapid and perfect drying of the moist films, and for the recovery, during the drying process, of the solvent or solvents used in the previous stage or stages of the manufacture of the said films.

My said invention relates chiefly to flexible films designed to be covered or coated with a suitable emulsion, so as to form a sensitised service for photographic purposes; and my improvements are very advantageous in the case of films which are produced by dissolving suitable materials, such as pyroxyline, soluble cotton, camphor, and castor oil in the solvents usually employed for the purpose, such as acetate of amyl, ether, alcohol, wood naphtha, or a mixture of these solvents.

In the manufacture of such films, the material is usually spread upon a plate of glass or other suitable flat surface, in a fluid or semi-fluid condition, and it has heretofore been customary to allow the vapourised solvent or solvents to escape into the atmosphere. As these solvents, and especially the amyl acetate, are expensive, considerable loss is involved in the escape of the same. Moreover, when amyl acetate is used, by reason of the powerful odour of this solvent, its escape into the atmosphere is very objectionable to residents and passengers in the vicinity of the factory where the films are produced.

By my present invention, however, I am enabled to obviate this objection, and to recover the solvent or solvents in such a manner that the same can be repeatedly used in the manufacture of the films; and I can carry on the manufacture of the films without vitiating the atmosphere or impregnating the same with the vapourised solvents.

In carrying my said invention into practice, I use plates of glass, or other suitable material, of any required dimensions and of sufficient length for the films; and I cause these plates to travel horizontally upon a level table, or upon a travelling band, or rollers so adjusted that the upper surface of the plate shall be as nearly as possible level, and I make the plates to travel under a distributor, preferably of one of the forms described by me in my Specifications No. 8643, of 1884, or No. 8917, of 1885, the said distributor being connected with a reservoir containing the fluid material which is to form the films, and with which the plates are by these means coated.

Instead of allowing the moist films to dry in the manner heretofore practised, I pass the plates carrying the semi-fluid films directly into a suitable closed drying chamber, which is heated by a current of warm air or by other convenient means. The volatile solvent or solvents are conducted into a suitable receiver provided with a refrigerator or condenser, whereby they are condensed. The condensed solvents are collected in a suitable vessel, and are again used in the manufacture of flexible films, thus effecting great economy in the production of such films. When heated air is used, it is either forced into or drawn through the drying chamber or box by means of suitable apparatus, such as a blower or an exhaust fan. Or the vapourised solvents are drawn from the drying chamber by means of one or more suitable pumps, whereby they are compressed; they are then cooled while in a state of compression, and are subsequently condensed by the reduction of temperature, which takes place when they are allowed to expand. Or I condense the vapourised solvents in any other convenient manner.

The claims are:—1. The improved method of manufacturing flexible films, consisting in depositing a solution or liquid material upon plates, strips, or beds of glass, or other suitable material, inserting the said plates, strips, or beds in a closed chamber, exhausting the vapours from the said chamber, and passing the same through a condenser to recover the solvent of the solution, for the purposes specified. 2. In an apparatus for the manufacture of flexible films, a drying rack so constructed as to contain a number of horizontally superposed plates in a perfectly level position and out of contact with each other, the said rack being arranged to move vertically, for the purpose herein described. 3. In an apparatus for the manufacture of flexible films, a closed receptacle or chamber provided with a plate-drying rack, so arranged as to be capable of vertical movement therein, substantially as above described and illustrated in the drawings, for the purpose above set forth. 4. In an apparatus for the manufacture of flexible films, the combination of the closed drying chamber with the exhausting device and the condenser, for the purpose above set forth. 5. In an apparatus for the manufacture of flexible films, the combination of the coating apparatus, the closed drying chamber, the vertically movable rack, the exhausting device, and the condenser, for the purpose herein described. 6. In an apparatus for the manufacture of flexible films, the table or tables having practically frictionless beds for feeding and receiving the plates successively into the vertically movable drying rack, in combination with the said rack, for the purpose herein set forth. 7. The improved apparatus for the manufacture of flexible films, constructed substantially as above described with reference to accompanying drawings.

Improvements in Apparatus applicable for Use in Photography.

No. 12014. Thomas Beavan Sloper, 14 & 15, Brittox, Devizes, Wilts.—*May* 30, 1891.

This invention relates to improvements in appliances used in developing and preparing photographic plates, films, and prints, and more particularly to holders for holding the plates, &c., and to the dishes and other apparatus in connexion therewith.

There are many processes used in photography where a plate-holder is an advantage, but particularly in the process of developing in which the exposed plate is placed in a shallow dish containing the developing solutions.

It frequently happens that the solutions require to be altered, in which case the plate should be instantly removed, which can be readily done by means of my invention; moreover, the chemicals used in developing, &c., are very liable to stain the fingers, but with my invention the fingers need not be wetted during the whole process.

The holder may be made in a great variety of forms and materials, a few of which I will describe. One form I make entirely of wire, but at certain parts, *i.e.*, where it comes in contact with the solutions, I use a kind of wire such as silver or nickel that will not affect or be affected by the chemicals used in the solutions.

I prefer to make the holder of such a shape that it forms a handle over the plate when it is in the developing dish, and I secure the holder to the plate by means of loops, hooks, or clips of wire, which are sometimes an extension of the handle.

I prefer to let the handle cross the plate diagonally, or from opposite corners, and the loops or clips press against the edge, and may, if desired, pass more or less underneath the plate, but it is advisable that the loops or clips should not touch the top of the plate where the film or paper being prepared should be.

The wire forming the handle may act as a spring, drawing the clips or loops together, and thus securing the plate; or a ring, spring, or equivalent device, may be used for such purpose.

This arrangement is capable of considerable modification: for instance, a single wire may form the handle, and the clips, loops, or arches, formed of vulcanite, or other suitable material, may be secured to such handle.

The clips, loops, or jaws may be formed like a hinge or pair of pincers, or two such devices may be so made, the handle forming a connexion between them, this arrangement being most convenient for large plates.

To hold papers or films I sometimes place them flat on a sheet of glass, but I prefer to use a special holder and frame for these which I make of a sheet of ebonite or other suitable material, either plain or perforated, with holes secured at one or more sides to a suitable frame or handle; or wires, threads, tapes, rubber, or other suitable material strained by a frame on which I place and secure the paper or other matter.

I sometimes use several frames, one over the other, or hinged together, to keep the prints or other matter separate during washing.

The holders may be made to take various-sized plates, but I prefer to make a separate holder to take each size. The holders may be made of any suitable materials, such, for example, as ebonite or wood, or any combination of materials.

Another part of my invention relates to the trays or dishes used as baths for the plates. These I prefer to make with wells or recesses in the bottom or sides to correspond with the holders, thus allowing the plate to rest on the bottom of the dish, which enables a smaller quantity of solution to cover the plate.

One or more hooks or equivalent devices may be fixed to or near the water-tap in the dark room to hang the holders upon while washing the plates. By

this arrangement the plates are held horizontally under the tap, and I sometimes place a dish or tray perforated with holes between the tap and the plate for the purpose of distributing the water evenly over the plate.

A great advantage in my invention is that the plate can be readily manipulated with one hand, leaving the other free.

As such a small part of the holder gets in contact with the solutions, it can readily be washed with the plate and passed through the successive baths without using a separate holder for each bath.

Improvements in Photographic Sensitised Films or Cards.

No. 6921. Henry Kuhn, City of Springfield, State of Missouri, United States of America.—*June* 6, 1891.

My invention relates to photographic mounts, and consists in the new article of manufacture and the method or process of making same hereinafter specified and claimed.

In the improved process of preparing my improved articles, I first take a sheet of cardboard preferably of such size as will make a considerable number of mounts, and first render it waterproof by dipping it into a solution of insoluble soap, such, for instance, as ordinary Castile soap, having a quantity of alum incorporated therewith, and then I dry the sheet by exposure to heat or otherwise, and thereby form a shell upon its outer surfaces which will be substantially waterproof.

The sheet is now treated in a bath composed of celluloid varnish, or other suitable compound which will impart an acid-proof coating to the sheet.

It is evident that the coating of celluloid varnish may be applied to but one side of the sheet if so desired.

After the coating last named has been suitably dried, it is evident that the sheet will be encased in a perfect waterproof and acid-proof film, which, however, will be found to have a comparatively rough or raw external surface, and as this would show in the finished photograph, I place upon the coating of celluloid varnish upon one side of the sheet a comparatively thick and smooth coating of barium sulphate and gelatine, or a series of such coatings, one superposed upon another, and of any suitable colour or colours; or this coating or these coatings may be composed of any other harmless material, such as chalk, which will make a very smooth and polished surface.

The sheet is now passed between polishing rollers, and is then ready to receive the sensitising solution or sensitive coating, which preferably consists of a collodion or gelatine emulsion of suitable nature, and this is spread or coated evenly over the smooth surface last mentioned.

Three or more colours, either distinct or blended, may be brought out by coating the cards with different coloured superposed coatings of aniline emulsions, and one colour being applied after the first has dried.

To be more explicit, I first prepare a suitable aniline emulsion, or a number of them of different colours, which may be composed of equal parts of alcohol, ether, pyroxyline, and chloride of strontium, or chloride of lithium, and the necessary quantity of colouring matter (aniline) and nitrate of silver.

The colours will be held, as I have found, by the emulsions, and the whole will form a very thin sensitive film on the cards when spread on them.

In placing different coloured emulsions upon the cards, an initial coating should be first flowed over them, or applied by suitable machinery (not shown or specified), and this coating should be dried and another coating of different colour applied over the first.

Cards so treated present a very peculiar and pleasing appearance, as one colour melts away in the other.

For landscape work, three or more colours may be employed, according to taste, or as the subject may require.

After drying, by heat or otherwise, the cardboard sheet will be ready for the cutting or stamping machine, whereby it may be cut or stamped into "cabinet, panel, &c., sizes," and during this stamping operation the cards may or may not be provided with the usual bevelled edges. Then, after cutting up a large sheet into small cards, it will be evident that the edges thereof will not be waterproof, and must be made so, unless the waterproofing solution penetrated through the thickness of the sheet.

These raw edges are waterproofed by handling the cut cards what I may term *en bloc*, that is, one hundred or so are clamped in a single package by suitable clamps, and their edges are impregnated by a thoroughly warm mixture of rosin, paraffin and white wax, and olive oil, which may be applied to them with a brush, and dried by heat, whereby the mixture will penetrate and saturate the edge of each card, and form thereon a waterproof shell.

The card mounts so prepared may now be worked through the different processes by the photographer, viz., toning, fixing, and final washing, and the water and chemical solution will not penetrate their edges or any portion of them, as will be readily seen.

It will thus be seen that I provide sensitised waterproof cards ready to print upon, and the pictures being developed directly thereon, without the intervention of the usual sensitised paper.

The sensitised cards, as prepared, should be preserved in suitable envelopes, and after being printed they are passed through the usual different manipulations well known to the photographer's art, and they can either be bodily drawn through a washringer, or otherwise dried, and are then ready to be burnished, as no cutting of paper or mounting is necessary.

In some cases, instead of treating the sheets by the waterproofing process above set forth, I may treat the paper pulp in the paper mill, before it is rolled into sheets, with the waterproofing material, then roll such pulp into sheets, and afterwards, as before specified, and the effect will be about the same in either case.

The cardboard may be provided with a peripheral depression on the face thereof, thus dispensing with the waterproofed material, as above described, to that portion of the card. This is accomplished by means of a machine provided with a suitable die for the purpose.

The card, pressed as above described, possesses the following features, and the manufacture thereof may be carried out in preference :—

1. By pressing the edges adjacent to the face the fibre of the material is packed solid, thereby making it waterproof to the bath for a certain length of time.

2. By forming a compressed border around the card it stiffens the same, preventing it from warping and getting out of shape.

3. The depressed or packed portion, viz., the entire edge thereof, can be printed in any colour without disturbing the raised portion during the process of pressing the same, or afterwards, as may be desired.

4. The raised portions of the card, or portions not depressed, can be very easily sensitised, independent of the pressed border, by passing the entire card through suitable rollers prepared for that purpose, without sensitising the depressed portions or edges of the card.

5. The raised portion of the card has the appearance of a print, or independent piece of sensitised paper mounted thereon, which is very desirable.

6. The name of the photographer, or any other words, can be printed or pressed into the card simultaneously with forming the peripheral depression.

The peripheral depression may also be formed by passing the card through suitable rollers, instead of using the die as above described.

The novelty and advantages possessed by my improved article and process over the ordinary process of photographic printing are obvious.

1. No albumenised paper is used, as such necessitates subsequent mounting upon a card.

2. The surface of my improved card mount is hard, and produces what I may term a "crystal" gloss upon simple burnishing, which an ordinary paper does not.

3. The thickness of the card prevents all curling when placed in the solutions, which is evidently not the case with ordinary thin paper, and therefore the card mount is not liable to possess a broken or cracked surface, as it is of itself held in a flattened condition, and there is no stretching of the paper and consequent distortion of the image, and a perfect copy is obtained.

4. It will be observed that the sensitising solution is coated upon a hard and waterproof surface, which, as I have found, necessitates but about fifteen minutes' washing to make a perfect print, as it is evident the chemicals cannot penetrate the waterproofed card—only the outer coating or coatings of film being penetrated by them, and they are consequently quickly and easily washed out, whereas if ordinary paper had been used from four to six hours' washing would be necessary.

5. Ordinary mounting—mounting an ordinary print—is entirely done away with, and the consequent saving of perhaps twenty-five per cent. of the work is accomplished.

6. A general saving in chemicals is accomplished, as nothing is to be treated but the film or films, there being no paper to absorb the chemicals.

7. These card mounts form an article of commerce, and are always ready for use, as they may be preserved for any length of time if properly packed.

8. The articles may be completely submerged for any desired length of time.

I also print any suitable matter in the form of lettering or pictures on the surface of the card mounts, before the coating or coatings of sensitised material have been applied.

These letters or designs may be printed in gold, as gold is ordinarily used, and then the sensitive coating may be applied, as before stated, and such will produce a very attractive and pleasing effect.

I do not specify any particular thickness of cardboard, as it is evident I may use different thicknesses of same.

I also apply, in some cases, an additional coat of celluloid varnish over the coat or coatings of surfacing material before mentioned, whereby said material will be made waterproof.

It will be observed that the colour originally possessed by the cardboard will in no wise be impaired.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is :—1. A ready-prepared waterproofed sensitised photographic card mount of cardboard, and cut to printing size, substantially as specified and set forth. 2. A waterproofed sensitised photographic mount in the form of a paper card, and means whereby the edges of the same are made waterproof, substantially as set forth. 3. A photographic mount having a series of differently coloured layers, or coatings, of surfacing material applied to its surface, substantially as set forth. 4. A waterproof card coated with differently coloured sensitised emulsion, substantially as set forth. 5. A waterproof card, of paper, having characters or designs printed thereon, and a sensitive coating applied over the characters or designs so printed, substantially as set forth. 6. The method herein described of making sensitised photographic cards, which consists in first waterproofing a paper card or sheet, then applying to one side of said card or sheet a coating of surfacing material, and then applying to the coating of surfacing material a sensitive coating, substantially as set forth. 7. A photographic card mount having a peripheral depression formed or pressed therein, substantially as set forth.

New or Improved Toy Photographic Camera.

No. 15,460. James Gage, 8 and 10, Pembroke-place, Liverpool, Lancashire.—*June* 6, 1891.

The invention has for its object a photographic camera of very simple and inexpensive construction, and adapted to be used more especially as a toy, or by young persons for the purpose of experiment or amusement.

In carrying out the invention I form the camera of any suitable shape. In the front is provided a hollow sleeve or the like, in which the focussing slide is mounted. This slide is composed of a tube of cardboard or the like in which the lens is placed, one end of the tube having a collar or washer of similar material, and the other a movable cap.

When placed in the sleeve aforesaid, with the collar on the inside and the cap placed on the tube, the light is prevented from penetrating into the camera and acting on the sensitised surface of the plate or paper. In the top of the camera is a slot adapted to receive the focussing screen and the dark slide. It is padded or provided with a piece of black fabric on the side, whereby light is prevented from penetrating when the screen or slide are in place.

The focussing screen in my model apparatus is composed of a piece of wood

or cardboard, having a hole in the centre, covered with a screen of thin paper, such as tracing or tissue paper. The dark slide is of similar substance, and is made of two parts glued or otherwise fastened together in such a manner that the shutter can move vertically between them. One of said parts has an opening to receive the sensitised plate or paper, the other one is without any opening. The shutter is provided with stops to regulate the opening and closing, so that it cannot be pushed home or drawn out too far. When the slide is drawn out, it is so arranged that the plate can be just inserted, the extreme edge of the shutter engaging the edge of the plate and preventing the plate accidentally falling out.

The model apparatus above described is composed of wood and cardboard, but it will be understood that, for cameras of better quality, metal or other material may be employed, and various slight alterations in construction may be introduced without departing from the nature of the invention.

The mode of action of my model apparatus is as follows :—

The object to be photographed is focussed on the focussing screen, by sliding the lens tube by the fingers until the image comes out quite sharp on the screen. The cap is then put on the tube, the focussing screen is replaced by the dark slide containing a sensitised plate or piece of sensitised paper, the shutter is drawn up, and the plate exposed in the usual way by removing the cap.

The claims are :—1. The new or improved toy photographic camera formed with a hollowed sleeve (B) and a slot (G), the latter provided with a piece of black fabric suitably slit to form a flap, all substantially as and for the purposes hereinbefore described, and as shown on the accompanying sheet of drawings. 2. A toy photographic camera having its focussing slide formed of cardboard or other suitable and similar material, constructed and arranged substantially as hereinbefore described and shown. 3. The new or improved toy photographic camera taken as a whole, consisting of the body proper of the camera arranged with a focussing screen and dark slide, the former consisting of a frame containing a screen of thin paper and the latter of a frame of two parts (for holding the sensitised plate or paper, and allowing of its exposure) between which a shutter can slide, all arranged substantially as hereinbefore described and shown. 4. A new or improved toy photographic camera constructed, formed, and arranged substantially as hereinbefore described and shown.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 7	North London	Wellington Hall, Islington, N.
,, 7	Holmfirth	
,, 7	Sutton	Sutton Scientific Society's Rooms.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 9	Birkenhead	Association Rooms, Price-street.
,, 9	Manchester Photo. Society	36, George-street, Manchester.
,, 9	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 25.—Annual Meeting.—Mr. W. E. Debenham in the chair.

A communication from the Photographic Convention of Great Brita in was received, inviting the appointment of delegates, and Messrs. A. Hadd on and R. P. Drage were appointed.

The SECRETARY then read the annual report :—

The Committee, in presenting the Ninth Annual Report, have pleasure in congratulating the members on the work done by the Association during the past year. The meetings have been well attended, and numerous lectures have been given and papers read, among which may be mentioned :—*Printing under Coloured Glass*, by Mr. Scholzig; *Pictorial Definition*, by Mr. Everitt; *The Carbon Process*, by Mr. W. E. Debenham; *The Powder Process*, by Mr. Alexander Cowan; *Testing and Keeping Sulphite of Soda*, by Mr. J. S. Belcher, M.S.C.I.; *Is there any advantage in the use of a large Objective in the Optical Lantern?* by Mr. T. E. Freshwater; *Stereoscopic Photography*, by Mr. G. W. Atkins; *The Unnaturalness of Naturalistic Focussing*, by Mr. W. E. Debenham, and *Is Fuzziness Desirable?* by the same gentleman; *The Primuline Process*, by Messrs. Green, Cross, and Bevan; *A new form of Collotype Printing by Bichromatised Parchment*, by Mr. Leon Warnerke; *Photo-micrography*, by Dr. Charters White; *Pictorial Composition*, by Mr. P. H. Newman; *Alpha Paper*, by Mr. J. Howson; *High-Speed Shutters*, by Mr. A. S. Newman; *Gelatino-Chloride Emulsion Paper*, by Mr. J. R. Gotz; *Colour*, by Mr. W. E. Debenham; *The Polarisation of Light*, by Mr. J. J. Briginshaw; *Toning Bromide Paper*, by Mr. J. Weir Brown; *The Theory of Ordinary and Polarised Light*, by Mr. A. Haddon. Many of the lectures and papers were largely attended, and the proceedings published in the principal photographic journals of this country as well as those of the Continent and America.

The lantern and musical entertainment on March 3, in St. George's Hall, Champion Hotel, was very largely attended by the friends of members, and a pleasant evening spent.

The lantern evenings have been fully attended, and the lantern slide competitions have occasioned much interest.

The monthly outdoor meetings have been resumed this year, and have been well attended.

The Committee again take the opportunity of acknowledging the presentation of a handsome bookcase to the Association by Mr. E. W. Parfitt (a member), and numerous parcels of books and photographic magazines have been received from members and friends, which are gratefully acknowledged, and the Committee hope that the members will do their utmost to add to the library, and so increase the usefulness of the Association. Mr. F. W. Pask, the appointed Librarian, will always be happy to receive parcels of books or single volumes.

The removal from the Masons' Hall Tavern to the present more convenient quarters at the Champion Hotel has occasioned much satisfaction.

There have been four resignations during the year from various causes, and twenty-two new members have joined, and the Committee desire to urge all to continue their efforts to increase the number of members, and so add to the prosperity of the Association.

Lastly, the financial condition of the Association is satisfactory; all liabilities have been paid, and accounts settled, up to June 18 of this year, and there is a balance in hand in increase of that of the last financial year.

The CHAIRMAN, in proposing a vote of thanks to the Secretary, expressed the gratification that he felt in publicly speaking of the great services that the Secretary has so cheerfully and consistently rendered to the Association. This vote having been passed, and one to the other officers, the elections were proceeded with, and the annual meeting was adjourned for a week, to consider certain proposed alterations of the rules.

The meeting then became an ordinary one, and Mr. A. Haddon took the chair, to enable Mr. DEBENHAM to read his paper on *Photographic Perspective: chiefly in reply to Messrs. Emerson and Goodall* [see page 422]. At the conclusion of the paper the members inspected the arrangement of coins described, and were agreed that the upper and lower pennies did not appear to differ from each other in size.

Mr. P. EVERITT thought that Mr. Debenham's experiment with the coins was not at all the same as that described by Dr. Emerson. In the latter case the halfpenny was not raised, but was on the same level as the penny, both on the table. With this arrangement, although when the eye was low each coin appeared of its proper size, yet, when the head was raised, there was a certain position in which the penny seems to lose its magnitude, as stated by Dr. Emerson.

The CHAIRMAN said that, making the experiment in that way, the eye, whilst only getting slightly further from the penny, was largely increasing its distance from the penny, and that might account for its appearing to lose its proportional size.

Mr. DEBENHAM replied that whether the coins were separated in angular distance by the rear one being raised, or by the eye being raised, and its axis directed downwards to the coin, had nothing to do with the demonstration of the apparent equality of the two pennies, one above and one below, when both were equally distant from the eye and from the line of sight. According to Messrs. Emerson and Goodall's proposition, the same reason that diminished the apparent magnitude of the penny, the image of which entered the eye at the lower part, would enlarge the image of the upper penny, and yet both appeared alike. He now, however, placed the halfpenny on the same level as the lower penny on the horizontal base, and, by slightly inclining the middle vertical bar so that it stood in a plane at right angles to the line of sight when looking at the halfpenny, the second penny was placed where it stood angularly as much over the halfpenny as the first penny did below it, and both equidistant from the eye, the members could see for themselves that the effect was just the same, there was no apparent difference in the size of the two pennies.

HACKNEY PHOTOGRAPHIC SOCIETY.

JUNE 25,—Mr. J. A. Sinclair in the chair.

Dr. ROLAND SMITH gave an account of the Dorking outing, which was an enjoyable one.

Mr. Chidley was nominated a member.

Mr. J. O. Grant presented the Society with a set of dishes.

From the question-box : How to get density in rapid plates?

Mr. HUBERT said it was necessary to modify development.

Mr. GRANT advised starting with soda and finishing with hydroquinone.

Another question was put as follows : How to guide oneself in photographing interiors?

Dr. ROLAND SMITH gave a rule as follows :—Divide area of room in cubic yards by area of window in square feet. This gives results in minutes as a standard, varying the stop according to light.

Mr. HUBERT showed the difference in development a plate makes by varying the bath. One was developed with pyro and ammonia. The other was cut into two, and one half was developed with excess of pyro, another with excess of ammonia. The results showed apparently, though equally exposed, correct under and over-exposure.

Dr. ROLAND SMITH then gave a demonstration of development, using pyro-ammonia, pyro-soda, hydroquinone and eikonogen mixed, &c.

RICHMOND CAMERA CLUB.

JUNE 26,—Mr. Cembrano in the chair.

The Development Competition, in which each competitor was required to develop two negatives of unknown exposure (one being under and the other over-exposed), was decided. Mr. Cembrano acted as judge, and awarded the first place to Mr. Ennis for the under-exposed, and to Mr. Hunter for the over-exposed plate. A discussion on the *modus operandi* of the competitors followed.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JUNE 25,—Dr. A. H. Carter in the chair.

Messrs. Charles Barwell and L. Neal were elected members.

The HON. SECRETARY reported that the Excursion Committee had resolved on instituting a record book for each leader of excursions to write his detailed report for future reference, &c.

Dr. W. W. J. NICOL read a paper on *Silver Printing with the aid of Iron Salts*. He fully described the process of No. 1 and No. 2 kallitype processes, which he invented himself, and which at the present time he is still improving, going through the chemical technicalities with great detail, and finishing with practically demonstrating the development of the prints, which showed very fine depth of tone, &c.

The CHAIRMAN said, looking from the standpoints of "Scientific and High Art," Dr. Nicol had certainly given a most able demonstration equal to the aspiration of the most exacting, not only in the chemical formula, but had made all to understand clearly the working of this beautiful process. It is always important in photographic societies, we should understand the "why and wherefore." Chemistry can tell us the "why and wherefore;" but, as in

the old saying "it takes two to make a quarrel," so in those photographic processes we should know both methods. These Dr. Nicol had given us most thoroughly and lucidly, and, although the Society's rules did not allow votes of thanks to be given to lecturers who are members, he was sure the members present would join with him in doing so without putting it to the meeting.

During the discussion which followed, Dr. Nicol, in answer to questions, said: In printing from thin negatives, always double the quantity of bichromate in the development. Sepia tones can be obtained by the addition of borax in the developer. Printing by artificial light takes too long a time, even with oxyhydrogen or electric light. Printing is very slow.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS OF GREAT BRITAIN AND IRELAND.

A MEETING was held at the Colonnade Hotel, New-street, Birmingham, to form a district branch of the above Association. The attendance was not large, but was enthusiastic. Mr. H. J. Whitlock (Birmingham), President of the Association, was in the chair, and he explained the objects of the Association, and heartily welcomed those present, expressing his pleasure at meeting the members of the profession, and his belief that much might be done to advance their interests by friendly conference and interchange of opinion on various matters.

After further remarks by Mr. John Lewis, Herr Kawly, Mr. Harold Baker, and Mr. Roland White (all of Birmingham), and others, a committee and officers were appointed, and the next meeting fixed for the 15th of July next.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

JUNE 25,—Mr. Paul Lange in the chair.

Mr. John Jarvis was elected a member.

The balance-sheet of the Liverpool International Photographic Exhibition was brought up for discussion, and was, on the motion of Colonel Ellison, and seconded by Mr. Glazebrook, unanimously "passed and approved."

The thanks of the Society were then tendered to Mr. T. S. Mayne, the Exhibition Hon. Secretary, to whose prolonged and arduous exertions the Exhibition was carried through. The Society also asked Mr. Mayne to accept the sum of 50*l.* as a mark of their appreciation of his efforts.

Attention was drawn to the arrangements made for the holding of the Photographic Convention at Bath in July.

The PRESIDENT stated that the Mersey Yacht Club regatta would be held the following Wednesday, when members intending to photograph the yachts would have special facilities by booking their places on the steamer *America*, which had been engaged to follow the yachts. He showed some prints of submarine explosions, taken by him recently outside the River Mersey during experiments of the submarine miners' division for the defences of the port of Liverpool. The principal picture taken illustrates an explosion of a 100-lb. gun-cotton charge, the column of water forced up rising to over one hundred feet.

Mr. W. A. BROWN read a paper illustrated with experiments on the *Chemistry of Photography*.

KIMBERLEY CAMERA CLUB.

AT the second annual meeting of the Kimberley Camera Club, held in the Council Chambers on Wednesday, the 3rd inst., the following gentlemen were elected office-bearers for the ensuing year, viz.:—*President:* Rev. Father Ogle.—*Vice-President:* Mr. F. Skead, B.A.—*Committee:* Messrs. C. A. Chappell, J. Hervey, G. D. Preser, F. Titmas.—*Hon. Secretary and Treasurer:* Mr. M. Macfarlane.

Correspondence.

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

THE YELLOW SCREEN IN ORTHOCHROMATIC PHOTOGRAPHY.

To the EDITOR.

SIR,—Presuming that the report in your last issue of the discussion at the meeting of the Photographic Society of Great Britain is correct, I must ask you to allow me to make some explanations and corrections. In the first place, I resigned my appointment with Messrs. Edwards some months ago, and I have no longer the smallest possible interest in the patent referred to, either directly or indirectly; so that I now have a free hand to investigate for myself without having it thrown in my teeth by writers (some of whom are interested in rival undertakings) that, as I was engaged by the manufacturers of isochromatic plates, my opinions on the subject was not worth a rush. Now, as this explanation puts me at least on level ground with my critics, permit me to correct the misapprehension that your report will probably produce as to what I actually wrote and thought.

I did not in any way infer that optically worked glass screens were first introduced by Messrs. B. J. Edwards—I did not even mention their name in connexion with optically worked glass; what I did write was that the best screens that I had seen, *so far as colour was concerned*, were those made in the form of a diaphragm, supplied by Messrs. Edwards.

With all due deference, I claim to have had a wide experience of practical workers, and therefore I still hold the opinion that the "yellow screen bogie" has had a good deal to do with the apathy of photographers to the advantages of using colour-sensitive plates. Another reason doubtless lies in the fact that those who have to earn their living by photographing have little time, and still less inclination, for investigation.

I have never said that the yellow screen is unnecessary *in all cases*, and I should feel obliged to any one who will have the goodness to point out to me how, when, and where I said it. I have, however, frequently stated that the indiscriminate use of the yellow screen is to be avoided; and I am absolutely certain that in many cases a yellow screen is a positive disadvantage, and in this opinion I was supported by Mr. Gotz during the discussion at the Photographic Society of Great Britain on the 23rd inst. A reference to my short paper read before the Society will show that I wrote, 'The yellow screen, far from being a terror, is a valuable tool, which, when better understood and judiciously used, will enable photographers to reproduce the colours of nature in monochromatic values, which some painters might sneer at but could never excel,' or words to that effect, as I did not keep a copy of the paper referred to.

There are some other points in the discussion which I should like to comment on, but the foregoing is quite sufficient to show that my paper was not prompted by commercial interest, and that I am not opposed to the judicious use of compensating screens.

Apologising for the length of this communication,—I am, yours, &c.,
Clifton Villa, Ilfracombe. BIRT ACRES.

MARKINGS ON NEGATIVES.

To the EDITOR.

SIR,—Lately I have been very much troubled with markings appearing on my negatives, for which I cannot account, as it is a new experience for me. The markings resemble comets, as they are dark spots with short tails to them. Strange to say, when I put up my negatives at night to dry I cannot see anything of them, but when I take them from the rack in the morning I notice them for the first time.

At first I attributed the cause to some kind of dust settling on the plates in course of drying, but I have proved that is not the cause of the trouble. A party suggested to me that these marks were caused through fixing in a flat dish, but I have no faith in this theory, although I am of opinion that the fixing bath is in some way or other responsible for the nuisance.

I think it is just possible that you may have had similar complaints of late. If you can give me any remedy for the foregoing I will feel greatly indebted, as I have failed to get at the cause of the trouble. The tails to the spots run up the plates, that is, the opposite way to which you would expect if they were caused through dust falling on in course of drying. I use the alum bath before fixing, always.—I am, yours, &c.,

ROBERT BRUCE.

13, *St. Mary-street, Moss-side, Manchester, June* 30, 1891.

[We have never had a similar experience, and cannot, from the data given, indicate the cause. Perhaps some reader who has been troubled in a similar way will give his experience.—ED.]

CONTINUOUS FLASH LAMPS.

To the EDITOR.

SIR,—I have read with interest your notice of Mr. Hudson's new flash lamp, the "Kolm." Will you allow me to describe a little apparatus I devised last November, and the cause of my doing so, as I think it may possibly give a "wrinkle" whereby the efficiency of this lamp may be increased.

I was anxious to take an interior with several figures, and learnt by that best of all experience—failure—that however large I made a single flash I could not light up the distant corners of the room; and further, when the quantity of the magnesium was much increased, it was not all consumed. I next tried Mr. Slingsby's mode of having several lights some distance apart, and that gave me all I desired so far as the lighting of the figures and corners of the room was concerned; but there was a new and serious difficulty, the various articles of furniture did not cast true shadows, each article gave as many shadows as there were lights. I came to the resolve, therefore, to obtain a time exposure.

Having a Hofman's combustion furnace for ultimate organic analysis (which, for the uninitiated, I may explain is nothing more than a single row of Bunsen's burners having upright, not rose, flames), I attached to this a quarter-inch brass tube ten inches long, in the same plane as the flames, but at right angles to them, so that a current of air passing through this tube would pass along the top of the flame-tubes, but an inch and a quarter above them. In the upper side of this horizontal brass tube I cut a suitable hole, three inches from the end nearest the first flame, and attached to it perpendicularly over the hole a *glass* tube of half-inch bore, six inches long. Taking a cork to close this tube, I made a small hole through it lengthwise, and fitted in a bit of one-eighth tube, and made another small hole in the horizontal brass tube four inches distant from the first hole, fitting to it also a bit of one-eighth tube, and connected these together with a flexible pipe. Filling the glass tube with magnesium powder, and inserting the cork, it will be at once perceived that any current of air passing through the brass tube will affect

with equal pressure (or nearly so) the top and bottom of the column of magnesium powder, and it will pass in a steady flow down into the horizontal tube and out into the air; without this top connection to equalise the pressure, the powder is apt to stick. Having turned on and lighted the gas, I reduced the supply of air to the Bunsens till all the brilliant emerald green and lively crackling, so dear to the eye and ear of the habitual user of these burners, had given place to the dull purple and noiseless flame of the average commercial Bunsen, and then connected the horizontal tube, by means of flexible tubing, with *a cylinder of compressed oxygen* (taking care that the flexible tube was full of oxygen, not atmospheric air). Upon gently opening the regulator oxygen and magnesium passed together through the flame, and produced a steady, brilliant light so long as a grain of magnesium remained.

The object of having the upright tube of glass is that the consumption of magnesium may be seen, and the supply replenished when necessary. I have not yet had the opportunity of actually testing photometrically whether the use of oxygen increases the brilliancy of the light; but, as far as I could judge photographically, it certainly did, and the heat of the flame was sufficient to ignite thick iron wire, which, by the way, burns with a scintillating flame of most extraordinary brilliancy. Though my furnace had a row of eighteen burners, I came to the conclusion four would suffice to catch and consume all the magnesium; and I am not sure that plain (not Bunsen) burners might not answer better, for one may have too much of even a good thing, and, paradoxical as it may seem, a hot gas-flame may be actually *cooled* by the addition of the heat-producer, oxygen.

I mentioned my oxyhydrogen magnesium lamp to a friend and fellow worker, but I have not seen the idea made public before.—I am, yours, &c.,

EDWARD J. SMITH,

Park Royd, Halifax, June 29, 1891.

WHY PEOPLE DO NOT BUY PHOTOGRAPHS.

To the EDITOR.

SIR,—I noticed recently in your JOURNAL sundry complaints of bad business among photographers—in other words, that the public are ceasing to buy their productions. I have nothing to do with the photographic trade, but am merely one of the public, having been all my life a buyer of photographs whenever I have seen any to please me.

The complaints attracted my attention, because it occurred to me that I also had of late years, in a measure, ceased to be a buyer without well knowing why. On casting about for the reason, I reflected, "Well, you have six cumbrous albums of *cartes-de-visite* and cabinets that nobody looks at; as many ponderous scrap-books, with leaves cockled and untidy; all these full of photographs, yellowed and fading, and really there is not room in the house for more.

Now, if these photographs had been permanent, printed on thick paper, with a decent white or toned margin, requiring no mounting, and, above all, made so as not to curl up, the whole might be kept in a handy portfolio, when it would be a pleasure to turn them over, pass them from hand to hand with friends, and easy to weed them out, exchange them, and add to their number, without filling the house with albums.

When we get photographs as lasting, as easy to store away and to handle, as engravings, they will be welcome again to—Yours, &c.,

June 29, 1891. E. J. W.

A DARK-ROOM WINDOW.

To the EDITOR.

SIR,—I have learnt so much from your Annual that I would fain repay in part some of the debt I owe you. I am about, with your permission, to describe my dark-room window, in the belief that the principle involved in its construction may have escaped the notice of many of your readers.

The window measures two feet by eighteen inches, and faces the sun. It consists of an outer pane of yellow glass, and an inner sliding frame carrying glass covered with two thicknesses of bookbinder's ruby on the sides remote from the sink. So far nothing unusual. But on the outside of the building a wooden flap fits into the frame containing the window, having hinges at the top. From the bottom of this flap a cord passes upwards and outwards through a hole in the wall above the window. On the edge of the shelf is a little holdfast, through which the cord passes, and is so constructed as to allow me to pull the cord towards me, while arresting it on its return.

When the door is down the room is in perfect darkness; when it is pulled right up, the large size of the window provides an extremely brilliant light. Any degree of light between these two extremes is at my instant disposal. A pull at the string, or a touch at the releasing knob of the holdfast, effects any desired change, and a good safe light is available on any day, be it dull or bright. The door is always down when the room is not in use, thus preventing the sun from bleaching the ruby cloth.

And now may I growl? My peculiar weakness has been shutters, and I have imported a goodly number. They nearly all reach me without any instructions. To gain speed you must turn a milled head, as a rule. But how many turns the thing will stand you have no means of ascertaining. The manufacturer expects you to turn until the spring breaks or the concussion smashes something else. Then you can buy another. And, again, I once imported a whole-plate roller-blind shutter. The aperture, both in the woodwork and the blind, was unnecessarily large, and, of course, the size of the latter diminished the speed. So I sent for a quarter-plate; in this the size of the aperture in the woodwork was so far reduced that it fits my two-inch lens—thirteen-inch focus rapid rectilinear, commonly called whole plate—like a glove, but the aperture in the blind is the same size as in the whole plate. Then, again, I have recently imported a photometer; this contains a few inches of specially prepared paper, of which more can be had from somebody somewhere. No mention of this fact was made in the advertisement which induced me to buy the thing. However, we colonial amateurs disseminate among ourselves all available information on points like these, and the game only works about once.—I am, yours, &c.,

CHARLES LEWIS.

Christchurch, New Zealand, May 20, 1891.

CANADA AS A FIELD FOR PHOTOGRAPHERS.

To the EDITOR.

SIR,—At this rather late date four numbers of your JOURNAL, May 1, 8, 15, 22, with the prospectus of the Practical Photographers' Federation, have been handed to me. Solely in the interests of intending shareholders, I beg leave to make a few remarks on the contents of the same, and as presiding officer of the Photographic Association of Canada during the years 1887-8, and having had many years' experience in the practice of my profession, my remarks may have some weight.

First, a brief review of the prospectus, which to those unacquainted with the present state of photography in Canada has rather a seductive look about it, but a careful perusal of the contents of the letters bearing on the other side of the question will rob it of its attractiveness.

That part headed "The Prospects" is calculated to mislead the unwary. This is the first we have heard of the "immense returns," and, as Executive of the P. A. of C., we considered ourselves pretty well posted. That the proposed field of labour is "virgin soil" is perfectly true, but the population will have to increase rapidly for some time to come to make it worth while to run twelve branch tents within a radius of two or three hundred miles from the centre, and although shanty men and mining prospectors willl occasionally, when indulging in "wild dissipation," or as they say here, "with a jag on," spend what is left, which as a rule isn't much, on photographic luxuries, still it is not a remarkably profitable or pleasant *clientèle* to work on.

As to the "older and more civilised parts," they are, to my certain knowledge, worked to death. Cut rates are the rule, and nine studios out of ten do not afford the proprietors a decent living.

Mr. Henry has quite forgotten to say anything about the long, hard winter—November to March, both inclusive—during which time tent-work is an impossibility. Perhaps the thirty-six Branch men imagine that the "immense returns" will keep them in salt pork and biscuit for the winter months; if so, they will get badly left. They must remember that at the best the season this year will only consist of sixteen or seventeen weeks, and, deducting from this the time lost in moving about and striking barren ground (for this must be expected), will make the season a short one; little could be accomplished, the profits will be eaten up in expenses, and the capital will probably vanish like the baseless fabric of a dream.

In the application-blank may be seen the words "Present employment." Does this question imply that the applicant need not of necessity be a good all-round man, *or even a photographer?* Perhaps the possession of 50*l.* is qualification enough.

Again: "Specimens of work should" (not *must*) "be submitted." This doesn't look well. Possibly in these days of culture at high pressure the "suggestions and instructions to the members" on the way out would fit them for a discharge of their duties. I fail to see it. The "only real difficulty" is unfortunately the least of very many.

I now desire to corroborate every statement made by Messrs. Oakley, Ramsey, &c., and manager of the Canadian Photographic Company. They are facts, and sufficient to meet the case. Let all intending photographic emigrants read them carefully, and take Mr. Ramsey's very sensible advice and hold on to their money. A word on the very important subject of prices.

The Photographic Association of Canada was formed for the purpose of keeping them up. What is the result? In spite of the most strenuous efforts, they have been dropping, till they are now at rock bottom. The average price for cabinets is $2·50 per dozen, and in spite of Ubique's statement to the contrary have been for a long time, and are still, made for $1·00 per dozen. Employees' salaries have reached rock bottom too, and my advice to those contemplating the practice of photography for a living in Canada is, Keep out of it. The labour market is overstocked. Those who hold fairly good positions in England should think twice before throwing them up, even for such a bonanza as is promised in the prospectus.

Mr. Henry shows his wisdom in keeping dark as to the location of his centre, for the knowledge of its whereabouts might deter many from investing good money in his wild-cat scheme. If the prospects were so alluring, why did not Mr. Henry endeavour to float his company in Canada or the States, and get men in it who were accustomed to the

ways of the country and able to rough it a little? He ought not to go back on home talent in this fashion.—I am, yours, &c., A. T. BARRAUD.
17, *Park-place, Morristown, New Jersey, U.S.A.*

GLASGOW INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I have pleasure in sending you a plan of the galleries of the Institute of the Fine Arts, where our International Photographic Exhibition is to be held in September. This will give you some idea of the large amount of wall space which we have at our disposal. The rooms are all beautifully lighted from the top, and are centrally situated in Sauchiehall-street. The arrangements for exhibition are making rapid progress, and, from the large number of exhibitors we have already heard from both at home and abroad, we feel sure the success of the Exhibition is certain.—I am, yours, &c., (For the Committee) JOHN MORISON, JUN.
Glasgow, June 29, 1891.

Exchange Column.

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

I will exchangs interior background—boat, oar, and waterpiece—for interior background or paper ditto.—Address, FRED. C. D. HURD, Shepton Mallet.

Wanted, half-plate, whole-plate, or larger photographic apparatus, in exchange for Humber tricycle.—Address, F. G. POTTER, 7, Dereham-road, Norwich.

Optimus euryscope, 9×7, a splendid instrument, as new, exchange for a 3B portrait, Burr's or optimus preferred.—Address, W. HARE, Windsor Studio, Sutton, Surrey.

Coventry tricycle for two riders, tangent wheels, two-track, cost 24*l*. Exchange for whole-plate or 10×8 landscape camera and lens by good maker.—Address, WRIGHT, Photographer, Northampton.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

C. B.—We advise you to discontinue the use of the alum bath. The gelatine will be sufficiently hard without it.

LENS.—The lens you mention will answer your purpose quite well, and will prove a very serviceable instrument.

ROBINSON BROS.—No preparation is necessary to make good printing ink stand heat. When dry it will bear the hot press without altering.

JUVENIS.—To save your fingers from the bichromate solution, use either rubber gloves or finger-stalls. These may be obtained from any large dealer in photographers' requisites.

H. J.—It is not the mountant but the black facing of the mounts to which the stains seem to be owing. Coat the mounts with some waterproof material before attaching the prints.

C. W. CLARKE.—An article on the subject of dealing with photographic wastes appears on page 553 of our ALMANAC for 1889. There is no work devoted to the subject published in this country.

VERITAS.—The arranging of the group is entirely a matter of taste. Let the bride and bridegroom occupy a prominent position, and let the guests be subordinate to the parents and bridesmaids.

A. W. BENCE.—There is no patent for producing photographs by the carbon process on xylonite or celluloid. Any of the Autotype Company's tissue can be used for the purpose. It is quite a matter of taste which colour is used.

PRINTER.—1. For a sensitising bath dissolve nitrate of silver in distilled water in the proportion of fifty grains to the ounce. 2. For toning you cannot do better than try the No. 1 formula given on page 756 of our ALMANAC for current year.

G. FREUDENTHAL.—Indiarubber, when pure, is soluble in chloroform, sulphide of carbon, and a mixture of the latter with alcohol. It is also soluble, under certain conditions, in benzole, rectified mineral naphtha, and oil of turpentine; but none of the latter solvents would serve your purpose.

F. G. PAGE.—It is certainly possible, and also easy, to take a portrait or any other subject by a lens formed of rock crystal or of topaz, and we have taken many such; but these are invariably inferior, as regards sharpness, to what can be obtained by properly constructed photographic lenses. The fact of rock crystal or topaz having a low dispersive power cannot be allowed to weigh against the other fact that in the photographic lens the visual and chemical rays are brought together to a focus on the plate.

N. R.—Purple tones do not depend entirely upon the toning agent employed, but also upon the nature of the paper. Probably as good a toning bath as any other for purple tones consists of chloride of gold, one grain; phosphate of soda, twenty grains; water, eight ounces. It must be used soon after preparation.

R. TAYLOR.—If the photo-lithographic paper will not give up the ink on the unexposed portion when treated with water and sponge, it would indicate that the coating has become insoluble either from long keeping or the action of light. Possibly the negatives are too thin, so that light passes through the opaque parts.

SILVER.—The defects are due entirely to carelessness in the sensitising of the paper. The streaky marks seem to be due either to foreign matter in contact with the paper at the time of floating, or on the surface of the solution. One piece of the paper shows that the bath had a thick scum upon it at the time the paper was sensitised.

T. EDGE.—The strong fuming of the paper after sensitising is conducive to black tones. Sensitising the paper in an ammonia-nitrate bath does so also. Add ammonia slowly or drop by drop to nitrate of silver solution, shaking after each addition, and discontinuing such addition just before the precipitate at first formed becomes re-dissolved.

BEACH.—Seeing that the Ryde firm admit they received the picture, it will be the easiest matter in the world for you to recover it or its value. Sue them for the amount at which you care to value it, and also add thereto the money you have paid and your loss in consequence of their having made such blunders as those to which they confess. Carefully preserve the letters of the firm, as they afford all the evidence you require.

ENAMEL writes: "I have been trying lately to enamel some cabinets. I have followed instructions given in a work by Piquepé. At first I had some success, but the last two attempts have been dismal failures through inability to strip the prints off the glasses. Can you tell me the cause of this, also if patent plate glass is absolutely necessary?"—Patent plate is desirable but not necessary. Let the glass be made quite clean, and then rub it thoroughly well over with powdered French chalk. With these precautions the prints will strip with certainty.

GEO. BROOKS writes: "A friend has advised me to coat my prints with collodion. He says this will ensure immunity from fading. Is this so, and how is the collodion to be applied?"—Your friend has not had experience in the use of this once vaunted protective, else would he not have given you such advice. In all such trials as we have made or seen made, the collodion, speaking negatively, did not act as a preservative, while speaking positively, it was found to hasten their destruction. But if you wish to try for yourself, pour the collodion over the print, and drain off at one corner.

ALEX. JOHNSON.—This correspondent sends us two portraits of a lady in which the eyes are imperfect owing to reflections from the spectacles worn by the sitter. He asks by what means this defect is to be remedied.—It cannot be remedied in this case, but it can be avoided in future by the adoption of an expedient we have often recommended—viz., when photographing an individual who wears spectacles, either first remove the glasses, or by preference keep a few unglazed spectacle-frames ready for such occasions, and select one that in colour and weight matches those worn by the sitter. Every professional photographer ought to keep a few of these. They can be had quite cheaply from dealers in such goods.

RECEIVED.—Several catalogues and price lists. These in our next.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.—Meeting at Bath, Monday, July 6.

LIVERPOOL CAMERA CLUB.—The ordinary meeting will be held on Wednesday, the 8th inst. Business: Paper on *Photographic Chemistry*, by Mr. Davies.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 8, *View Meters and Finders.* July 15, *Meteorological Subjects.* Outing, Saturday next (July 4), Claygate and Claremont. Train from Waterloo at twenty-seven minutes past two; meet at Claygate at three o'clock.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, July 9, *Orthochromatic Photography*, Mr. C. H. Cooke. July 16, *Means for Obtaining Gradation, whether in Negative or in Printing*, Mr. W. E. Debenham. July 18, Outing to Limehouse; leader, Mr. C. H. Cooke. July 23, Report of Convention Delegates, Messrs. Haddon and Drage. July 30, Ordinary meeting.

ERRATUM.—Page 393, first column, fourteenth line from bottom, *for*, "but in the so-called Chinese manner the sun will not work;" *read*, "but in the Chinese manner this is impossible." Page 394, first column, fifteenth line from bottom, *for*, "fine lady's portrait in profile, by Mrs. Susan Hodgson, and the portrait of Arthur Chevalier de Burchelt;" *read*, "fine portrait of a lady by Mrs. Susan Hodgson, and the portrait of a knight by Arthur Burchett."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1627. Vol. XXXVIII.—JULY 10, 1891.

OPTICS IN CONNEXION WITH COLOUR PHOTOGRAPHY.

Having received the important communication on *Colour Photography*, published in our last issue, and having noticed in our patent intelligence in the early part of the year some applications for Projections of Photographic Images in Natural Colours by Mr. T. R. Dallmeyer, we had the pleasure of an interview with him last week, having heard that he had been working on what may turn out to be similar lines to those of Mr. Ives.

On meeting Mr. Dallmeyer he expressed to us his interest and admiration for Mr. Ives' investigations in the production, not only of colour photographs, but also of his spectral analysis for producing upon the screen, by the use of colour screens, the effects of photographs in their natural colours. Mr. Dallmeyer showed us the result of his investigations since last autumn in the production of optical apparatus to combine perfectly, by means of the optical lantern, two or more images, to guarantee a perfect register in their coincidence. The methods employed by Mr. Ives, in the article contained in our last issue, are not fully described; but we are in a position now to account for work already accomplished in this direction.

Mr. Dallmeyer's attention has been confined solely to the optical side of the question. Last autumn he conceived the notion of taking separate images of a view on one plate, the various lenses acting independently and simultaneously with their coloured screens; but for the time he gave up the notion of combining them, from the fact that they were not, in the first place, similarly disposed, and also, as we know, could not be made to overlap, in the true optical sense, when thrown simultaneously upon the screen.

In our columns early in the year, we published a communication from Mr. Albert Scott, the results of whose works were promised at a public meeting. Subsequently the *Optical Magic Lantern Journal* gave a detailed description of Mr. Scott's apparatus, and therein expressed that there was not a perfect or adequate optical coincidence of the various images. Mr. Dallmeyer had taken the subject in hand in order to attain this, and applied to the Patent Office for provisional protection. His process consists in taking the requisite number (three or four as the case may be) of identical images upon one plate, projecting them through four lenses (not necessarily with which they were taken) upon the screen, the axes of each lens then being parallel lines. These multiple images are then brought into coincidence by one of two methods: the first, by placing an achromatic combination of lenses that covers the front combination of the three or four separate projecting lenses, of a focus equal to about that of the distance of the screen; the second, by applying three or four achromatic prisms of very small convergence in front of the said lenses. By this means a perfect coincidence of the separate images is attained. Another, and pretty, method is the application of prisms to a multiple diaphragm.

If a diaphragm with a number of apertures be inserted in a lens, and the focus of the lens taken, only one image, of course, is formed. Mr. Dallmeyer's invention consists in not permitting the various cones of rays from the multiple diaphragm to meet at one focus, by inserting in each aperture a prism which throws three or more distinct images of the object focussed for upon the one plate. This, of course, necessitates the employment of the lens with which they were taken as the projector; but, as the correction for an optical lantern lens and a photographic lens is one of theoretical more than practical importance, it carries but little weight. Object and image being interchangeable in a single optical system, we have here a method for optical coincidence of the images that is indisputable.

Whatever Mr. Ives' work has been in the optical arrangement of his projecting system, Mr. Dallmeyer and ourselves will be only too ready to welcome and give credit for; but, knowing that in this country we have workers in the optical direction, we take the opportunity of saying so.

KALLITYPE.—II.

It sometimes happens that the earliest public experience of new processes soon leads to the introduction of modified, if not improved, methods of working, notwithstanding the fact that, before they were made available for general use, the utmost pains had been taken to render them reasonably perfect under all ordinary circumstances. The patentee of a photographic printing method may produce good results himself by adhering to the formulæ which he has selected as the best and most suitable for the purpose; while, on the other hand, and despite the most scrupulous care in following the directions given, many, perhaps most, of those who make trial of the method fail, to a greater or less extent, to do likewise. Upon most things, indeed, we can satisfy ourselves much more easily than other people, particularly if we happen to be inventors or patentees; but, in cases such as we have referred to, and where money is at stake, we can understand without the least effort that an imperfect process has not been launched deliberately. Now and then, in addition to the one already quoted, there is another reason for the failure of a new process, and that is, the slight experimental data upon which it has been constructed. Photography supplies many illustrations of

this propensity of inventors to make capital of ideas that have perhaps never been proved to have anything more than a theory value; while, on the other hand, there are several holders of photographic patents who have good reason to be glad that public experiments have enabled them to obviate the defects contained in their processes when originally introduced.

The kallitype process, as it is worked now, is an improvement, we believe, in some respects upon the process first brought into use, the higher quality of picture, combined with greater regularity of results now obtainable, being due to the altered method of development adopted. We are not, of course, in the secrets of the manufacturers, and therefore cannot say with any degree of preciseness how the paper is prepared, but for all practical purposes the following outline may be assumed to be fairly near the mark. A suitable paper, which may or may not have received a preliminary treatment with a weak solution of gelatine, arrowroot, or gum arabic, is rendered sensitive by means of a solution of ferric oxalate, or one of the double ferric salts referred to in our last, probably the former. If the paper is not first of all treated with the sizing or thickening mixture, the latter may conceivably be added to the sensitiser; or, as a matter of fact, it may be omitted altogether, which is possibly the case here. In all platinum processes, however, its employment is recommended, and, we believe, adopted, as, without appreciably interfering with the matt effects sought after, it certainly destroys any tendency of the image to acquire a "sunken" appearance, which is a characteristic of pictures "developed" in this way unless means be taken to prevent it.

The length of exposure for paper coated with a sensitive ferric salt is, when compared with albumen silver paper, very considerably abbreviated; theoretically, as we have pointed out before, the one substance requires but a third of the time of the other to produce a fully exposed picture, and it is quite safe to take the theory as proved and exercise a corresponding amount of care in protecting the unexposed paper from light. Indeed, for our own part, we always prefer to treat these sensitive iron papers, when they are not in the frame, with hardly less care than we bestow upon unexposed gelatine plates; the heightened brilliancy of the resultant pictures and their complete freedom from "haze" or "veil" in the lights fully compensates for the extra precautions taken, of the value of which we believe that a few experiments would remove any scepticism. A tolerably reliable guide as to the correctness of the exposure is the detail appearing in the ferrous image; when this is vigorously rendered in the shadows as well as the lights, the exposure may be considered correct.

The developing solution originally recommended consisted of

Silver nitrate	50 grains.
Sodium citrate	800 ,,
Potassium bichromate	1–2 ,,
Water	10 ounces.

The silver and the citrate and bichromate being separately dissolved, the precipitate dissolved by strong ammonia, and, after filtration, a small quantity of nitric acid being added. This solution, however, was abandoned at an early stage; the quantity of sodium citrate certainly appears excessive, while the precise function of the nitric acid in the mixture is not obvious, according to the rationale of the process. The developing solution, as amended, has the quantity of sodium citrate reduced to one ounce, and the nitric acid omitted altogether.

Development is best conducted by flotation of the print upon the bath. The reducing action is a rapid one, ferrous oxalate throwing silver down from its solution very energetically. If the picture has been rightly timed, development will proceed quickly and evenly, and will be completed in less than a minute. The heaviness of shadows of developed bromide prints are seldom if ever apparent in kallitype, while the half-tones and details seem to us to be rendered with a delicacy and tenderness not easily excelled. The normal tone of the pictures is not of the pronounced dead black of developed bromide or platinum prints, it has a purplish character of its own, such as we think we could easily distinguish from that of the other processes.

One feature of iron printing has always struck us as being peculiarly valuable, and that is, that over or under-exposure should be just as easily prevented as over or under-printing in the albumen-silver process. Where the character of the negative employed is perfectly understood, and the opportunity of scanning the progress of the picture in the frame exists, we submit that over or under-exposure—or rather printing—in the platinum and kallitype processes should not occur, except accidentally, and that therefore remedies for those defects are needless, nay, superfluous. Still, that correct exposure is not given so frequently as it might be is obvious from the circumstance that remedies for both errors are thought necessary. In these for kallitype we confess we have no confidence. An under-exposed impression in ferrous oxalate may in some hands, by prolonged development, build up a strong, harmonious, well-detailed picture; but we have our doubts of the general efficacy of the remedy, inasmuch as some experiments we made to put it to the test hardly confirmed it so fully as we could have wished, the shadows, it is true, reaching a fair depth, while the middle tones and details remained weak and ill-expressed. As for the suggested remedy for over-exposure—namely, the employment of a larger quantity of the oxidising agent, potassium bichromate, in the developing solution, the end it is charged to serve being, we suppose, analogous to that of restraining bromide in a negative-developing solution—we found by experiment that it was of little or no use, unless at the same time the developer was very considerably diluted or, what amounts to the same thing, the quantity of silver in the normal developing solution was largely reduced; and even then the results secured were poor and flat. On the whole, we are disposed to regard serious under or over-exposure in iron printing as practically irremediable. Positive pictures, unlike negatives, are primarily made to be looked out; and this fact is, we think, forgotten by those who talk so freely of rectifying errors in positive printing, which is not at all parallel to negative work in these respects. Under or over-exposure in negative development can be largely remedied, and if the resultant negatives are thin or dense they may be intensified or reduced; but we have not yet reached a point in positive work where the same ends can be secured with the same relative certainty. In iron printing—or, indeed, in any printing-out process—we repeat, there is no excuse for under or over-exposure, except accident or gross incompetency; and, therefore, remedies for these defects are superfluous, and if they were not they are not much use.

Since the developer contains silver, it is advisable not to finger the prints in the earlier stages, but to use forceps when moving them. When development is finished the pictures are passed directly into a stock solution consisting of $\frac{1}{2}$ oz. of the developing solution and 2 oz. of sodium citrate in 20 ounces of

water, to remove the iron salts, where they should remain for ten minutes or so, and are next passed through two baths of sodium citrate, 1 drachm, and ammonia ·880, 2 drachms, in a quart of water, to dissolve out any silver salt that may remain in the picture, being finally washed and dried in the usual manner. The developer may be used as a stock solution, and can, as directed, be restored when occasion demands.

We have been much charmed with pictures produced by the kallitype process, a clear outline of which we have endeavoured to lay before our readers, and we have very little doubt that it has a future before it. But, in paying full tribute to its undoubted excellence and novelty, we cannot withhold the remark that it still leaves room for improvement, not, we hasten to say, in the quality of pictures it yields—which, indeed, are comparable to the finest of other processes, but as regards the development and completion of the image, which involves the use of four separate baths. These, however necessary, are numerous enough to prejudice the process in the eyes of those making a trial of it. We should be pleased to hear that experiment had simplified the washing and fixing operations. At present a platinum print, or even one in developed bromide, is ready for the final wash water long before a kallitype, which is a drawback that we hope soon to chronicle with the things that were.

VENTILATION OF THE DARK ROOM.

The ventilation of the dark room, always a matter of some moment, is likely at this time of the year to assume a still greater degree of importance; indeed, during the past month, although we have experienced no excessive temperature, we have had occasional spells of hot enough weather to render the confined atmosphere of the average dark room unpleasantly oppressive. There is, perhaps, less immediate necessity at the present time for the adoption of elaborate methods of ventilation than existed a few years back, when the employment of ammonia development was all but universal; for, with the substitution pretty generally of carbonate of soda for the volatile alkali, much of the downright unhealthiness of the developing room has disappeared, and, given a moderately capacious chamber, it is only in very hot weather that any pressing need arises for special ventilation.

But how many of the dark rooms in daily use can claim the title of "capacious," even when applied in a comparative sense only? Too many of them, even in professional establishments of some pretensions, are scarcely deserving of being ranked in any higher category than "cupboards;" we have, indeed, seen more than one compared with which a portable travelling tent would appear luxuriously roomy, and yet in such dens the unfortunate operator has to spend the best part of his time in the hottest and busiest part of the season. In the case of amateurs, the dark-room accommodation is frequently even worse still, but the discomfort is less, by reason of the briefer periods and the rare occasions of use; still, even here, the inconvenience must be more or less felt, whereas a very little trouble would altogether obviate it.

Under ordinary circumstances and with properly arranged dark rooms of fair dimensions, especially of height, no great need exists for the adoption of any but the most ordinary precaution, unless indeed ammonia be used constantly and perhaps by several operators. With a room of moderate height one of the ordinary ventilators let into the wall and conveying the heated and vitiated atmosphere either out into the "open" or else into a chimney will answer every purpose, though, where ammonia is used, it is sadly prone to hang about in the form of vapour in close proximity to the operator instead of rising to the ventilator as it ought to. Some few years ago, in describing a visit to the establishment of Messrs. Valentine & Sons, of Dundee, we spoke of the admirable system of ventilation adopted in their developing rooms, which, though extensive and roomy, are in constant use by a number of operators for many hours a day, and at the time we visited them ammonia was alone employed.

Under such conditions it is obvious that, unless some special and efficient means were adopted the atmosphere would become, not only slowly injurious or inconveniently "pungent," but absolutely unbearable; and Messrs. Valentine's method consisted in setting up an induced current of air at each bench or sink in such a direction that the fumes of ammonia were wafted right away from the operator as soon as liberated, and, in spite of the quantities of the vapour constantly being given off, its presence was scarcely noticeable even on first entering the rooms. We forget the precise details of working, but, so far as we recollect, the air current proceeded from somewhere in the front portion of the sink itself in a direction upwards and forwards from the operator, sweeping in its course over the developing dish and carrying off instantly the noxious fumes.

It is not, of course, possible, nor is it necessary in every establishment, to resort to the elaborate arrangement referred to; but in every dark room, when constant work is going on, comfort, if not common sense, and a regard for the health of the *employés*, would suggest that some precautions should be adopted proportionate to the needs or individual circumstances. Fortunately, on a small or comparatively small scale, these need not be elaborate or costly, while, on a large scale, the circumstances are such as to justify the necessary expenditure.

Wherever a window is available, that is to say, wherever a window exists that is not hermetically closed in shutting out the light, a very small amount of management will convert it into an efficient ventilator without in any way detracting from the utility of the dark room as such. All that is necessary is to apply a "cut-off" valve to the upper portion, so as to allow, when the window is slightly opened, the vitiated air to escape without permitting the ingress of light. In the absence of the necessary facilities for utilising the window, there is nothing for it but to open a special communication with the open air, but the total cost of this, including a suitable ventilator and "light trap," need not exceed a few shillings.

But a really efficient system of ventilation, capable of doing extra duty when required, as in specially hot weather, demands the employment of an artificially induced current of air. Very many of our readers in past years have given themselves up to the manufacture of dry plates, if only on an experimental scale; and such will, no doubt, have studied the various methods of ventilating the drying box or cupboard, and will be familiar with the principal ways of setting up a constant and gentle current of fresh air into the chamber, or of drawing off the moist or vitiated atmosphere. The same arrangements available for the drying cupboard are equally suitable, on a larger scale perhaps, for the dark room.

The simplest form of induced current formerly employed for the purpose named consists of a lamp or gas jet burning in a metal chimney communicating at the lower end with the chamber to be ventilated, and at its upper with the open air, or with a chimney flue. Of this plan it need only be said that,

except when artificial light is regularly employed, it necessitates the constant expense of the lamp or gas, and this for a very moderate return in the shape of ventilating duty. Practically, therefore, and especially for periods of emergency, this plan is scarcely to be recommended for dark-room purposes.

The next plan that suggests itself is the mechanical smoke-cowl, or ventilator, so generally employed in our domestic establishments for the cure of smoky chimneys as well as for ventilation simply. This consists usually of an archimedean screw of quick "pitch" running inside a metal flue or tube communicating with the chamber to be ventilated, and set in motion by a series of vanes actuated by the wind outside. We gave a description of some of these arrangements in connexion with the Smoke Abatement Exhibition of 1881, since which time we have seen several successfully adapted to various photographic purposes. They are constructed in various convenient sizes for use on the large or small scale, but are rather expensive, the smallest size, suitable only for a drying box, or very diminutive developing room, costing nearly a couple of pounds.

The fact seems to be that the construction of the archimedean screw in metal is a rather difficult job to an ordinary workman, and those who are able to make them set a correspondingly high value on their productions. But our readers need not be disheartened at this, for a very serviceable substitute for the metal arrangement can be made for a few pence by the method described in our last ALMANAC (p. 541) by Mr. F. W. Munro. The plan consists, briefly, in drawing a spiral of the desired pitch round a cylinder of wood, pivoted to run on centres; and, after boring a series of holes at regular intervals along the spiral line, into which stout wires are inserted, a skeleton is formed, upon which three or four, or more, thicknesses of brown paper are pasted or glued to form a perfect archimedean screw. The method is a capital one, and, if the built-up screw is made of a sufficient number of layers of paper, say half a dozen, and finished off with a coat or two of waterproof varnish or enamel, as serviceable and nearly as durable a tool will be the result as if constructed in zinc or sheet iron. Either of the latter materials may be used if the operator be skilful enough in the manipulation of sheet metal to cut and bend the pieces to the proper shapes.

The chief fault of this mode of ventilation lies in the fact that its action is entirely dependent upon the existence of sufficient wind outside, and also on the possibility of so placing the driving vanes that they will catch the wind at all times. It is an unfortunate fact that at the very times and on the special occasions when extra ventilation is most needed, the outside atmosphere is at its stillest; that, in fact, just when the apparatus is most needed the motive power to work it is conspicuous by its absence. Add to this the fact that it is very difficult indeed to find a position in which the vanes shall catch the wind from whatever direction it may come, and we are brought face to face with the conviction that some means of artificial driving are absolutely necessary if the thing is to be of any real use.

This is not very difficult to supply if a little ingenuity be brought to bear upon the matter. The simplest plan, and one we have seen in actual work, is to rig up underneath the sink or work-bench a light driving wheel and treadle, such as may be obtained for two or three shillings from most dealers in old sewing machines. This is connected by means of a cord with a pulley on the shaft of the ventilator, and it requires very little exertion to set the affair in motion when required, or even to work it continuously and simultaneously with development. Any one who is accustomed to working the lathe, and most cyclists we should imagine, would thus work the ventilator almost instinctively after once starting it.

If, however, the treadling be objected to, a falling weight with a train of multiplying wheels—the works of an old clock can easily be utilised—will supply the needful power, and require but occasional attention to keep it "wound up" and in working. If the drum or pulley from which the weight is suspended be fitted with an extra pulley ratchet, similar in every way to the winding arrangement of a Dutch clock, an occasional pull at the winding cord will keep the ventilator in motion as long as may be required, even with a short train of wheels and very short drop.

The archimedean screw is inferior from a mechanical point of view to the arrangement known as the "fan," a series of revolving vanes resembling the paddle-wheel of a steamer, which revolve in a closed chamber of special shape. The screw possesses comparatively little "grip" upon the atmosphere, and much of the power expended in driving it is wasted. Moreover, nothing is gained by increasing its speed beyond a certain point, as it then simply slips through the air without performing any additional work. Theoretically, the volume of air removed by the screw should be represented by a column similar in section to the diameter of the screw, and travelling at the rate of the latter; but the actual work done is very far below this.

The fan, on the other hand, which may be worked in the same manner as the screw, is far more powerful, and comparatively little of the force expended in working it is wasted. Its duty depends upon the speed at which it is driven, and this is only limited by the power at command and the strength of the fan itself, and may be readily calculated in the same manner as with the screw, namely, by multiplying the area of the delivery tube by the speed of the fan, when the result will be the volume of air moved in a given time.

It is not a difficult matter to construct a fan, but they can be purchased ready for use. We have one, that cost sixpence on a second-hand stall, which is large enough to ventilate a moderate-sized room.

THE recent exhibition of chromo-photographs at the rooms of the Photographic Society of Great Britain, where the majority of the work shown was of foreign production, has acted as a stimulant to English experimentalists by showing what can be accomplished in that direction. Great Britain has always been behind the Continent in photo-mechanical processes, though the inception of the majority of them must be credited to this country. The process of photo-engraving —intaglio—most generally followed on the Continent at the present time is practically the same as that introduced by Fox Talbot between thirty and forty years ago, though it received but little attention at the time. The exhibition did good, for we understand that several photo-mechanical printers are now devoting their attention to colour work.

ANENT the subject of lack of business amongst photographers, the letter of our correspondent, "E. J. W.," in our last issue does not apply to portraiture. It is this part of the profession that is suffering the most. However, we are pleased to learn from several quarters that "trade is looking up," particularly in the provinces.

IN connexion with the American Copyright Act, President Harrison, last week, issued a proclamation which provides for granting copyright in the United States to citizens of Great Britain, France,

Belgium, and Switzerland. It was provided in the new Act, that when any foreign state or nation is a party to an international agreement which provides for reciprocity in the granting of copyright, the United States may, at their pleasure, become a party to such agreement. Satisfactory official assurance having been given by the abovementioned countries that their law allows citizens of America the same benefit of copyright as they do their own citizens, the United States now accord them similar privileges. It is satisfactory to learn that we can now secure copyright in our works in the United States on the same terms as the Americans themselves.

Some of the most unpleasant work that a photographer has to undertake is *post-mortem* photography. Not only is it unpleasant, but it is very frequently unsatisfactory, inasmuch as the friends of the deceased too often expect the portrait to be a likeness of the person when living. The difficulty of taking the photograph of a corpse is generally great, owing to the position in which it is placed as regards illumination, and the objection to any alteration, and often even to the window-blinds being raised. However, these difficulties are now easily overcome, or rather avoided, by the employment of the flash-light. We were recently shown some very satisfactory results—of their kind—obtained by this means.

The general experience of professional photographers is, that if the portrait of a deceased person be submitted at once, it is usually approved of; but if the proofs are not shown till some time afterwards, they are seldom liked. One gentleman told us that, when he had work of this kind to do, he made it a rule, when possible, to show proofs the same day, and execute the order and obtain payment before the funeral, because, after that had taken place, the portraits were almost sure not to be liked. We have heard the same opinion expressed before.

One would almost have thought, after all that has been written on the subject of the expansion of paper when wetted, that it was tolerably well understood that the paper distends more in one direction than it does in the other. This, however, is not the case with some persons, even though professionally engaged in photography. We were recently shown as a curiosity (?) two prints from the same negative, in one of which the face, from point to point, was nearly three-sixteenths of an inch longer than in the other. Although our friend was a professional photographer, he could not account for the discrepancy, yet he knew that paper expanded on being wetted. But he was not aware that the expansion is greatest in the width of the paper. By width is meant the width of the web or roll from which it is cut. If the sheet, lengthwise, were taken transversely from the web, its expansion would then, of course, appear greatest in its length. But all the photographic papers are cut longitudinally, hence the length and width of the sheet corresponds with that of the web.

The expansion of the paper by itself was not sufficient to account for the great discrepancy between the two portraits just referred to, but it was much exaggerated by the paper, in the one instance, being considerably stretched in the mounting. We have often called attention to the fact that far more distortion in prints is caused by straining the picture while mounting than is due to the mere expansion of the paper *per se*.

It has always been a vexed question as to whether paper prepared with putrid albumen yields such permanent prints as that coated with fresh white of egg. A short time ago we were asked by a dealer in albumenised paper if it were probable that photographers would pay a higher price for a paper prepared with fresh albumen, with the idea of securing more permanent pictures. Our opinion was that some few possibly might, but the majority would not. It is by no means an established fact that malodorous paper is conducive to fading, though theory might indicate that it was. Amongst our collection of old photographs are many made on paper prepared with decomposed albumen, but they have not changed more than have others which are on paper when the albumen used was fresh.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

The sixth annual convention of this national society is this year being held in Bath, under the Presidency of Mr. William Bedford. The proceedings were inaugurated on Monday evening, when the Mayor (Alderman Jerom Murch) held a reception of the members at the Guildhall. The details of the proceedings were arranged by a local committee consisting of the following gentlemen:—Mr. Austin J. King (chairman), Messrs. W. Middleton Ashman, H. Barton, F. Bligh Bond, P. Braham, H. A. Hood Daniel, Preston King (Dr.), A. F. Perren, W. Pitt, G. F. Powell, W. Pumphrey, E. A. Purvis (Rev.), and E. J. Appleby (Hon. Local Secretary).

Mr. Austin King commenced the proceedings by introducing the officials and members of the Council to his Worship. The Convention, he pointed out, was an association of gentlemen interested, whether as professionals or amateurs, in photography, and it was their custom to meet every year in some district in which the surroundings were peculiarly congenial to the practice of their art. He was quite sure the gentlemen who had honoured them with that visit would return to their homes not only with many beautiful pictures of landscapes and buildings, but with recollections more permanent than photographs in the shape of many pleasant scenes, people, and places. Mr. King proceeded to speak of the deep debt of gratitude photography owed to the Convention, and what the public owed to photography, the claims of which, in connexion with zoology, botany, meteorology, astronomy, &c., he advocated as an indispensable handmaiden.

The Mayor, who was heartily applauded, said, amongst the various privileges attaching to the office which he had the honour to fulfil, there was none he valued more highly than that of welcoming public bodies to that ancient city. He had a particular pleasure in offering a greeting to the Photographic Convention. He was old enough to remember when photography was introduced into this country, and could call to mind the first dawning of the light on their beautiful science. He could remember, too, the gradual progress of that science, and he could not fail, therefore, to welcome most cordially those who were associated with the promotion of the objects of photography. He did not know until that evening what the particular objects they had in view were, but he had always thought that when science united with the light of heaven and with human skill—two of the most subtle and far-reaching powers of the universe—it was very difficult to say what could be done. He trusted the Convention would be favoured with genial skies during the week, and that they would enjoy their visit to the neighbourhood (which contained architectural objects that deserved all their aid to make them known) so much as to make them wish to repeat it another year.

Mr. C. H. Bothamley (the retiring President) thanked the Mayor for the welcome he had extended to the Convention. They had loooked forward with great anticipation and pleasure to their visit to Bath, and certainly, so far as they were able to see, those anticipations were in a very fair way to be realised. If it appeared at all incongruous that they should visit an ancient city like Bath, when photography was emphatically an art of their own time, it was at the same time important, inasmuch as there was no city more associated with the early history of photography than Bath. To all photographers—indeed, to all scientific men—Bath was intimately associated with the names of Fox Talbot and Herschel—the one representing the earliest beginnings in this country of any photographic process of really practical value, and the other representing scientific investigation as applied to photography. Mr. Bothamley then thanked the Convention most cordially for the support they had given him during his year of office, and resigned in favour of his successor, Mr. Bedford.

Mr. Bedford then took the chair, and having expressed his acknowledgment of the honour conferred upon him, and mentioned

that he held a somewhat unique position, inasmuch as he was the first professional photographer who had been elected President, he then delivered the following

Presidential Address.

Five years have now elapsed since the first meeting of the Convention, and this, our sixth annual assembly, finds us in the City of Bath, built on the reputation of its healing waters, but of especial interest to us photographers as being in the neighbourhood of Lacock Abbey, the home of Henry Fox Talbot, and undoubtedly the first spot in the kingdom ever depicted by the photographic camera.

Since our last meeting at Chester it certainly cannot be said that the general interest taken in photography has in any degree abated; and to assure ourselves of this it is only necessary to point to the increasing number of societies and clubs which have sprung up all over the civilised world, to the spread of photographic literature and journalism, and, as a notable instance of the popularity of the art, to the successes claimed for the numerous exhibitions held at Liverpool, Vienna, and elsewhere.

Photographic societies generally have been showing marked activity. Although the scheme for the formation of a Photographic Institute, brought forward by the Photographic Society of Great Britain, has at present met with little more than moral support, and it is now clear that there is no immediate prospect of carrying it out in its entirety, the recent acquisition by the Society of premises of its own places it in a position to offer to other societies a scheme of affiliation which promises many advantages, and which can hardly fail to work, in all cases where co-operation is desirable, to the mutual advantage of all without in any way interfering with individual action.

The new premises of the Camera Club are a monument to the energy and enterprise of its management, and the annually recurring conference of that body, as well as its periodical "one-man" exhibitions, reminds us, as in past years, of the good work it is doing.

The Photo-Survey Council of Warwickshire—a body constituted out of the photographic societies of Birmingham and Warwickshire—is doing excellent work, and challenges friendly rivalry with other counties. It embraces archæology, ethnology, geology, and botany, in addition to the ordinary work of recording the general appearance of the county at the present day.

In speaking of advance in the science of Photography, it is difficult to gauge the importance of discoveries which require time to develop their capabilities, and I shall very possibly pass over without notice germs of discoveries more important than those I shall mention. There can, however, be no doubt that, in the province of systematic or specialised investigation, Messrs. Hurter and Driffield, by the further prosecution of their researches into the effect of development on the ratio densities of negatives, and other photographic scientists in critically following them, have been doing most valuable work; and, when it is remembered that these investigations are only a first step towards the establishment of an absolute standard of sensitiveness, it is easy to appreciate the importance of the elimination of all errors of observation and measurement from their calculations.

Perhaps the announcement of most interest to the photographic world has been that of M. Lippmann's discovery of a means of representing by pure photography, and subsequently fixing the colours of the spectrum. Possibly no discovery is ever announced in the present day without resorting to a long stretch of unscientific imagination, and this has certainly not been absent here; but it seems that M. Lippmann's experiments have been guided by a theory propounded in 1887 by Lord Rayleigh, that the colours of Becquerel's reproductions of the spectrum were possibly due to the action of stationary luminous waves producing, in a nearly transparent sensitive film, a laminated structure which would copiously reflect the particular kinds of light which had produced them. The essentials, according to M. Lippmann, are the continuity or absence of granularity of the film, and the presence during exposure of a reflecting surface behind this film. Spectrum red, yellow, green, and blue have thus, it is said, been vividly reproduced and fixed; but the process is not applicable, so far as can be foreseen, to the reproduction of impure or mixed colours. There seems to be plenty of scope for experiment in this direction, and, it may be added, plenty of scepticism as to the results obtained.

A practical method of producing a direct positive from nature, or a reversed negative direct from another negative, has long been a desideratum, so that unusual importance attaches to the discovery by Colonel Waterhouse, that the addition of a minute quantity of thiocarbamide or of thio-sinnamine to the eikonogen developer has the effect, in favourable conditions, of effecting during development a complete reversal of the photographic image, and this with exposures one-tenth the duration of the normal. The substance he finds to answer the purpose best is Dr. J. Emerson Reynolds' preparation of thiocarbamide with ammonium bromide, which is a combination of four molecules of the former substance with one of the latter. Additional interest attaches to this process by the further observation of Colonel Waterhouse that development is accompanied by electro-chemical action in which the current passes in the reverse direction to that observed in the ordinary course of development.

In the domain of photographic optics the outlook is encouraging. We have specifications from Dr. Ernst Abbé and Dr. Paul Rudolph of an apochromatic objective composed of two uncemented single lenses and a compound correcting lens of considerable focus; also three forms of unsymmetrical doublets, each possessing special characteristics of its own. The construction of these lenses, which has now been rendered possible for the first time by the introduction of the new kinds of optical glass, has been carried out by Zeiss of Jena, and they have been favourably reported upon by Dr. Stolze by and Dr. Eder, but they have not at present been introduced commercially.

The primuline printing process of Messrs. Green, Cross, and Bevan, which was brought before the British Association at Leeds, has attracted much attention, and has found useful application in printing on textile fabrics as well as in copying drawings and plans. It is based on the fact that diazotised primuline is decomposed by light, and can then be developed by a phenol or an amine, producing coloured designs on a yellow ground. In Feer's diazo printing process, which preceded the primuline process, similar colours are produced on a pure white ground without development. The former method requires a reversed positive, the latter an ordinary negative to print from. Both these processes are of special interest, marking as they do a new departure in photographic printing.

Mr. M. Carey Lea, further pursuing his experiments with allotropic silver, has produced a well-defined form between it and ordinary silver, of a bright yellow-gold colour, and describes the effect of different forms of energy upon it, producing varieties of colours not hitherto obtained.

When we look back on the photo-scientific achievements of the past twelve months, I think we must all agree that there has been no lack of progress to record; but it is a question of perhaps still more moment to inquire what advance has been made in the artistic direction. With the numerous exhibitions now held, we have, in spite of the unnecessary restrictions imposed, ample means of forming an opinion of the use we are making of the tools which science places at our disposal. At our last meeting it was deplored that a new school had arisen among photographers, a school whose teaching implies "that art is not to be found in the ruts of tradition, and that beauty is not to be sought in a far country," and was asking if photography, which by its mere existence had already done more than anything else to inculcate truth in art, was not itself in dire need of reform; and, further, if it was not possible to picture by legitimate means a loftier conception of nature than was attainable by a mere transcript. These are the principles it was thought dangerous to spread; and, pointing to the crude attempts of its disciples to depict their impressions of nature, some went even so far as to suggest that photography was so far counterfeiting other methods of illustration that it was running imminent risk of survival only by mimicry! This revolutionary school, however, still lives, and, not only so, but is reaping due recognition of its merits, though not unmixed with wholesome criticism of its shortcomings, and in spite of the fact that its former master, by his great act of renunciation, has left it to its own devices. After all, are we to conclude that its work is inimical to progress? Is it all to end in unilluminated dreariness? We are, at least, at liberty to exercise our right of judgment, though it is humiliating to be told that a picture one had admired on the walls of an exhibition has been singled out for distinction as an example of an evanescent printing process, and that another has been similarly honoured partly for the reason that it was taken without a lens. But we must not be too hard on our judges; we voluntarily submit our work, and must abide by the verdict and the reasons which prompt it, though one could wish that rules might be adopted for exhibitions which would tend more to the glory of photography and less to that of the individual photographer and the process he employs. It is, nevertheless, true that science and art react mutually on one another, and are inter-dependent; consequently the photographer who is a true artist can as little afford to despise the aids of science as science can afford to ignore the requirements of art. The demand is made for the more accurate rendering of tone and colour, so that we may no longer be shocked by the palpable resort to expedients which constantly meets us in photographs which would be admirable as pictures if it were not for the suspicion of unreality such practices

engender. Moreover, let us not imagine that there is any danger of our art being made too easy. Even if automatic photography be an accomplished fact, some measure of responsibility will still rest with the individual who drops in the coin. Though "art is a translation of nature," it must always be remembered that "we make from within us the world which we see" and transcribe. It is true our translations of nature may be cold glitter beside the reality; but photography is our pencil, and if we use her fairly she will not fail us.

Mr. Pumphrey (President of the Bath Photographic Society) acknowledged the indebtedness of the Convention to their President for his excellent address, and proposed a vote of thanks to him for the same.

Mr. J. J. Briginshaw (Hon. Secretary), in seconding this, assured Mr. Bedford that he could depend upon the hearty support and co-operation of the Convention in his work.

The motion was unanimously carried.

Mr. A. Pringle proposed a vote of thanks to Mr. Bothamley for his services during the past year, and in doing so announced that the county of Somerset had lately acquired Mr. Bothamley as Organizing Secretary under the Technical Education Act.

Mr. Pumphrey seconded the motion, which was carried, and acknowledged by Mr. Bothamley.

On the motion of the President, seconded by Mr. Appleby, a vote of thanks was accorded the Mayor, and, his Worship having replied, the reception terminated.

A display of lantern pictures followed. The scenes shown were those visited during the Convention at Chester last year. Many of these pictures were exceedingly fine, amongst the finest being some by a lady member (Mrs. A. R. Dresser). The exhibition came to a somewhat abrupt termination by the body of the projecting lantern, which was of very small dimensions, taking fire, a catastrophe which caused much merriment among the members.

Tuesday was devoted to an excursion to Chepstow and Tintern. A large party availed themselves of the trip, and many pictures were taken, although the weather was somewhat unfavourable.

There is an exhibition of apparatus in the Guildhall, but it is somewhat smaller than on any previous occasion. The following comprise its leading features:—

Watson & Sons: Lenses mounted in brass and aluminium; Acme and other cameras, including a neat stereoscopic one; stands, and specimens of Diazzotype printing.

J. M. Turnbull: A hand camera adapted for films, and a folding lamp.

The Platinotype Company: The Key hand camera.

Carl Zeiss: Triple achromatic and anastigmatic lenses, and a lantern condenser.

Ross & Co: Two detective cameras, one being in the form of a satchel, the other having a full size focussing finder.

W. J. Walker, Bath: Fallowfield's Facile camera, Lancaster's Instantograph, and others.

Schirm's benzine, ether flash lamp, and another; also specimens of a new photographic enamel process by Schism.

Platinotype on wood.

J. F. Shew & Co.: Several specimens of the Eclipse apparatus so long associated with their name. As a novelty in this direction there is a stereographic camera having an effective shutter.

A. W. Yabsley, Bath: Several cameras for which he is agent.

Taylor, Taylor, & Hobson: A case of lenses.

J. H. Steward: Biunial and single lanterns.

Newton & Co: Lanterns and ball and socket adjunct to camera; also microscopic and other lanterns.

C. Cloakly, Bath, exhibits several printing frames, for which he has taken a patent. They are for the purpose of preventing the shifting of the print, this being effected by wood dowels or metal pins in the backboard and frame. The backboard is formed of three thicknesses of wood to prevent warping.

On Wednesday the general meeting was held under the presidency of Mr. Bedford. The Secretary having read the minutes of the last year's meeting at Chester, the General Committee, composed of the delegates from Societies and forty other members, was elected.

An invitation from the Edinburgh Society to hold the meeting next year in that city was unanimously accepted. With regard to an invitation to meet in Plymouth in 1893, it was resolved to write to the Devon and Cornwall Club thanking them for their offer and saying it would be favourably entertained next year.

Votes of thanks were then passed to the Mayor of Bath, the leaders who had undertaken to conduct the excursions, those who had given permission for the taking of photographs (the facilities here having been as great as they could have hoped to be), and to all who had, in other ways, contributed to the enjoyment of the Bath meeting. Mr. Briginshaw, the Hon. Secretary, was also thanked for his services to the Convention. A scheme of affiliation, by which it is proposed to more closely unite the Photographic Societies of the United Kingdom for the promotion of their common interests, also came up for consideration. It was a proposal of the Photographic Society of Great Britain. Mr. C. H. Bothamley said that the matter was far too important to discuss off-hand. Ultimately it was decided to adjourn the meeting till Saturday.

This meeting was followed by one of the General Committee, by whom the following officers were elected:—

President for the Year: W. Bedford.

Council: W. Middleton Ashman, Bath; T. Barclay, Edinburgh; T. Berry, Aberdeen; Hippolyte J. Blanc, Edinburgh; C. H. Bothamley, Leeds; F. A. Bridge, London; A. A. Carnell, Plymouth; F. P. Cembrano, Richmond; — Cook, Edinburgh; A. Cowan, London; G. Davison, London; H. A. Hood Daniel, Somerset; R. P. Drage, London; F. Evans, Chester; A. Haddon, Greenwich; Martin J. Harding, Shrewsbury; H. M. Hastings, London; R. Keene, Derby; Austin J. King, Bath; P. Lange, Liverpool; W. Lang, jun., Glasgow; A. Levy, London; C. Phipps Lucas, Eltham; — Matthieson, Edinburgh; E. Marlow, Birmingham; G. Mason, Glasgow; A. Mackie, London; T. Mayne, Liverpool; J. Porritt, Leicester; A. Pringle, London; B. J. Sayce, Liverpool; A. Seaman, Chesterfield; H. Sturmey, Coventry; J. Stuart, Glasgow; J. Traill Taylor, London; A. Tate, Belfast; W. Taylor, Leicester; J. M. Turnbull, Edinburgh; W. H. Walker, London; G. W. Webster, Chester; J. B. B. Wellington, London; A. Werner, Dublin.

Offices of the Convention: London—128, Southwark-street, S.E.; Bath—The Guildhall.

Mr. W. M. Ashman, at noon, photographed the Convention in the Sydney Gardens.

In the afternoon the members again assembled at the Guildhall. Mr. W. Lang, jun., read a paper on *The Photographic Work of Herschel and Fox Talbot.* Afterwards Mr. J. Traill Taylor placed at the disposal of those present some early specimens of Talbot's works, and Mr. C. H. Talbot supplemented the paper with some historical facts relating to his father's researches.

Mr. C. H. Bothamley then gave a lecture on *Recent Developments in Printing Processes,* those selected as the subject of his remarks being the Kallitype process and the Diazzotype or Primuline process.

Mr. Taylor, in the absence of Mr. W. E. Debenham, read a paper by that gentleman entitled *The Cult of Indistinctness.*

In the evening the Convention assembled to a lecture by Mr. A. Taylor on *Recent Astronomical Photography.* Mr. Taylor on this occasion represented Mr. A. A. Common, who was unable to be present himself.

Up to the time of despatching our parcel to the printers the weather has been unpleasant, interfering much with the endeavours of the members to obtain mementoes of their visit.

ORTHOCHROMATIC PLATES AND THE COLOURED SCREEN.

In the early days of orthochromatic plates it was argued by many, and, I must confess, I leaned to that view myself, that the same result could be obtained upon an ordinary plate by using the coloured screen as upon an orthochromatic one. The supposition is just as reasonable, and is pretty well upon all fours with the allegation that the orthochromatic effect is producible without the screen. Both are true in theory, though practically not so. Orthochromatic effects may be obtained in either case, but not the full effect, unless certain conditions prevail which have not yet been attained.

The orthochromatic plate increases the activity of the yellow rays, and reduces (slightly) that of the blue. The colour screen decreases the activity of the blue—more or less, according to its intensity—and also of the yellow, though in far smaller proportion. In both cases the comparative activity of the blue and yellow rays respectively is brought closer together, and that is all. In order to gain the full effect by either means singly, the modifying action upon the respective rays must be very much increased. As orthochromatic plates exist at present, the preponderating influence of the blue rays is so great, in spite of the additional sensitiveness of the film to yellow, that without the additional aid of the screen the blue still remains the more active.

In the case of the screen it is much the same. In cutting off a portion of the blue rays the activity of the yellow is simultaneously lowered, and in the long run the blue "has the best of it," simply on account of its original excess of energy.

The reason why orthochromatised collodion films give a greater colour effect than gelatine without the screen is, it seems clear to me, due to the far greater effect produced—according to Vogel upon the yellow sensitiveness—something like seventy times increase. This gives the yellow a chance of competing on equal terms with the blue.

I speak simply of yellow and blue for clearness sake.

W. B. Bolton.

A NEW EMULSION FOR PRINTING OUT PAPER.

[A Communication to the Camera Club, and printed in its Journal.]

I remember once talking to Mr. W. B. Bolton, to whom we owe so much for our present knowledge of emulsion work, on the genesis of collodio-bromide emulsions. He told me that one of the suggestions came from Rejlander. This artist was always in trouble with his bath, or his collodion, or both, and, speaking with Mr. Bolton and some other experimentalists, he asked: "Cannot some of you clever fellows get over this eternal bother by mixing the whole lot up together?" Well, a collodion emulsion may be looked on as a mixture of the collodion and the wet plate bath. The water is the only thing that is left out, and not the whole of that.

Something of the same thing suggested itself to me some time ago in connexion with printing. I had been trying various different ways of sensitising plain paper with silver salts, trying, amongst others, some of the excellent processes of Mr. Lyonel Clark, and I got good results with many of them if I gave the necessary amount of care and took trouble enough; but the care needed was certainly great, and the trouble of the double process of salting and sensitising more than I liked. Moreover, I found that I was very liable to get defects in the way of spots, streaks, and the like, even after all the care and trouble. Why not, I thought, get over at least half the trouble by mixing the ingredients up together and applying them to the paper in one operation? Every formula that I had been using contained gelatine as one of the constituents, and had the making of an emulsion in it.

There is nothing new in this, it may be said. It is nothing more nor less than the gelatino-chloride emulsion that we are already acquainted with under various names, such as "aristotype" and goodness knows what else. I think, however, that the emulsions that I am going to describe have several novel features. In the first place, they are emulsions that need no washing, and that are made by the extremely simple process of pouring one liquid into or mixing one liquid with another. The emulsions are, moreover, ready for use at once, and, being liquid at ordinary temperatures, can be applied to paper or other materials either by floating, as in the common method of sensitising albumenised paper, or by brushing them over the material that it is wished to sensitise. Farther than this, no gloss is given to the surface of the paper. I think, indeed, that, by this process the preparation of sensitised paper—of any kind, so far as surface is concerned—is reduced to the utmost possible simplicity.

I have tried a number of variations in the quantities of chemicals, and have had more or less success with all. In fact, there is great elasticity in the proportions that may be used, and I believe that almost any formula for a printing-out gelatino-chloride emulsion might be taken, and that good results could be got, if one or two considerations were not lost sight of. The first is that the quantity of gelatine must be kept so low that it will not cause a gloss on the paper, or cause the emulsion to set at ordinary temperatures. The second is that the formula must insure a large quantity of insoluble silver salt in suspension. The reason for this is that the coating got by an emulsion that does not gelatinise immediately after coating is much thinner than if it does gelatinise.

To those who have have not had much experience in emulsion work, it may be worthy of remark that, within very wide limits, the same quantity of an insoluble silver salt is emulsifiable in a given quantity of water, whether the quantity of gelatine used as a menstruum be great or small. Roughly speaking, the haloids, or, I imagine, the other insoluble or nearly insoluble salts of silver, resulting from the decomposition of one ounce of silver nitrate, can be emulsified in ten ounces of water; but, if that quantity of silver be exceeded, a part will not emulsify, but will be thrown down in the granular form, in which it is useless for sensitising any surface. The proportions vary, however, with certain conditions, such as alkalinity or acidity of the solutions.

The difference between the failure of a silver haloid to emulsify in a gelatinous solution, and the precipitation of it from that solution afterwards, must not be lost sight of. Thus, if any of the emulsions that I am now writing of be kept for a number of days at a highish temperature—such as that of pretty hot weather—it is likely that a good deal of the insoluble silver salt will be found at the bottom of the vessel holding the emulsion; but this silver salt is not in the granular state, and can be re-emulsified by heating the mixture to about 120° Fahr., and shaking well, the more easily if a little more gelatine be added.

I select three formulæ as follows:—

No. 1.

A.—Nitrate of silver	400	grains.
Water	4	ounces.
B.—Gelatine (soft)	80	grains.
Chloride of ammonium	80	„
Citric acid	120	„
Water	8	ounces.

No. 2.

A.—Nitrate of silver	400	grains.
Water	4	ounces.
B.—Gelatine (soft)	80	grains.
Chloride of ammonium	80	„
Citric acid	120	„
Carbonate of soda (dry)	45	„
Water	8	ounces.

No. 3.

A.—Nitrate of silver	400	grains.
Water	4	ounces.
B.—Gelatine (soft)	80	grains.
Chloride of ammonium	80	„
Citric acid	60	„
Carbonate of soda (dry)	80	„
Water	8	ounces.

In my hands the first formula gives an emulsion suitable for preparing paper to be used for printing from dense negatives, the second from medium negatives, and the third from thin negatives.

The third formula is, I am afraid, dreadfully unorthodox. Unless I have made a mistake in my chemistry—which is highly probable—there is just about enough of ammonium chloride and of sodium citrate formed by the double decomposition of the citric acid, and of part of the soda, to decompose the whole of the nitrate of silver. I don't know whether, in this case, there will be carbonate of silver formed; but, if not, there remains a large excess of carbonate of soda. All I can say is, that the formula works all right, and that the paper that results from the use of it keeps very fairly. The paper resulting from either of the other formulæ will, I have no doubt, keep as long as any ready-sensitised paper. I have already kept some nearly a month, and it is still quite white.

The following is the method of emulsifying. The two solutions are heated to a temperature of 110° to 120° Fahr. The temperature should not be greater than 120°, or there is a great chance that some of the insoluble silver salts produced will be thrown down in the granular form. A is then added slowly to B with much stirring. The emulsion is filtered through a double thickness of cambric, and is then immediately ready for us. If it is wished to keep the emulsion for any length of time, ten per cent. of alcohol, in each ounce of which a few grains of thymol have been dissolved, should be added to the emulsion. It is to be observed, however, that, even with this addition, emulsion by formula No. 3 will not keep for very long.

The best way of coating is certainly by floating, allowing three to four minutes, but the quantity of emulsion needed is considerable. It is possible to get an even coating by brushing with cotton wool in the following way:—The paper is laid on a sheet of glass or a clean board, and is thoroughly and evenly damped with the solution by brushing over the surface several times in directions at right angles. It is put on one side for ten minutes or a quarter of an hour to get surface-dry, when the operation is repeated. By working in this way it is possible to do with a very small quantity of solution emulsion, and it is possible to use what there is to the last drop, but the quantity used will be found to be more per sheet than in the case of floating. The reason, I imagine, is that it is impossible to get an absolutely even coating by brushing, and that it is therefore necessary to make the coating so thick that there will be sufficient silver where it is at its thinnest. I have never been able to get an even enough coating by brushing only once.

The temperature of the operating-room should be not below about 70° Fahr., or else the emulsion should be warmed.

The paper is best dried pretty quickly before a fire, or near a stove, after it has lain face upwards for about four or five minutes to get surface-dry. In fact, the paper is best treated, in the matter of drying, like paper that has been coated with the solutions for the "hot-bath" platinotype process.

It will be found that it is possible to coat about eight sheets of "medium" sized paper (22 × 17, the orthodox photographic size) with the quantity of emulsion given above by brushing, or ten to twelve sheets with a consumption of the like quantity by floating. It will thus be seen that the process is an economical one.

The colour in the printing frames should be a rich brown with either of the first two formulæ, a deep purple with the third.

The printing is very quick, whichever of the formulæ be used, but with No. 3 it is extraordinarily so. Indeed, paper coated with emulsion prepared by this formula is, I think, more sensitive than that by any other printing-out process that I know of. It is so sensitive that it is quite necessary to take extra precautions in working it. It needs at least all the care that platinotype paper needs, although there is, of course, the difference that, in the case of the silver paper, the result of the action of feeble light is seen at once; in the case of the platinotype paper it is not seen till the time of development. I consider it best to do everything in the way of preparation by gas or lamp light.

Toning may be either by gold or platinum. I prefer Clark's platinum process to any other. I add, however, a good dose of salt to the solution, and put the prints into it dry—that is, at least, when using either of the first two formulæ. When using the third, the prints are washed in a weak solution of citric acid before they go to the toning-bath, to neutralise the alkalinity.

If a platinotype toning-bath that has been used for some time, and that has been repeatedly strengthened with chloro-platinite of potassium, be used, a colour is got that some people dignify with the appellation "sepia tint," but I incline to call it a dirty brown.

I find that the emulsion is readily applicable to wood, and I hope to get good results when I have had some panels made of one or other of the beautiful white woods, with a fibre-like silk, that are peculiar to this country.

I have got very fine colours of image by printing lightly and intensifying, as suggested some time ago by Clark, but have not, as yet, been able to overcome a tendency to staining in the whites. Perhaps Mr. Clark will help me with a hint or two in connexion with this matter.

I send a few samples of prints done by the process, but I do not think they are fair examples of what it is capable of. They are all merely some of the results of my experiments, and are on Whatman's drawing-paper, which is not very suitable for photographic purposes unless it is specially sized, and I have not sized it. It is the only pure matt-surface paper at present procurable in this country. The prints on it look tolerable only from some little distance. I hope to have some more creditable results ready later on. There are some words of explanation in pencil on the back of each print.

After some remarks from Messrs. Warnerke, Elder, Cembrano, Clark, and the Chairman, the meeting proceeded to witness the demonstration of Schoppen's method of viewing lantern-slides stereoscopically given by Mr. Woodward. The plan adopted is to interpose coloured glasses, green and red, one in front of one lens of a biunial lantern, the other over the second lens. In viewing, spectacles are used also having similar glasses, green for one eye, red for the other. The appearance of solidity is very marked, the chief defect being the dimness of the pictures due to the cutting-off of the brilliancy by the coloured discs.

W. K. Burton.

YELLOW SCREENS.

[A Communication to the Photographic Society of Great Britain.]

I believe that the principal reason of the apathy of photographers generally to the great advantage obtained by using plates corrected for colour lies in the fact that they have been frightened by the "yellow screen bogie." Every photographer who is worthy of the name recognises that the ordinary processes of photography do not give correct colour values, but many refrain from using orthochromatic or isochromatic plates because they have read that they will not work without a screen; and, just to give an idea of how vague are some of the existing notions of the use of screens, I was once asked which was the best place to put the yellow screen in making an enlargement from an isochromatic plate.

Coloured compensating screens, far from being a terror, are powerful tools, which, when rightly used, will enable the photographer to render colour values in a manner which some artists may sneer at, but will never excel.

The indiscriminate use of a screen is often worse than having no screen at all. If a plate is highly corrected for colour, then a yellow screen is not necessary in general landscape work, particularly when working without the sun, such as in glens, interiors, &c., although in bright sunshine the screen is a distinct advantage, as it cuts off a good deal of the white reflected light.

Another stumbling-block to the tyro was the abominations that have been sold as compensating screens for photographic purposes; most of them were worse than useless, from being of an unsuitable colour, too deep in tint, and of unequal surfaces and thickness. It is a *sine quâ non*, as every one knows who has had any experience in this class of work, that glass screens to be used before or behind the lens must be optically worked, so that the two faces, in addition to being perfect planes, must be absolutely parallel to each other.

The question of colour is a much more difficult one; a pale orange tint answers excellently for all general purposes, but in my experience a lemon-yellow colour is the best where a great variety of colours has to be dealt with. Green or greenish yellow is, in my opinion, worst of all.

The best method—in fact, I may say, the only method—for testing screens for colour is by means of the spectroscope; thus, a green screen will be found to absorb red and orange, as well as blue and violet, rays in proportion as the green partakes of a blue or yellow character: the more it approaches blue in colour the more red and orange will be absorbed, whilst if of a yellow-green colour more blue rays and less red and orange will be absorbed. Even a greenish tinge in glass has a very sensible effect in absorbing orange rays.

The effects noted above are equally apparent when the screens are tested photographically; and, further, with green screens there is a decided lowering of tone in the green, unless it just happens that the green to be photographed is identical in tints with the compensating screen employed, for if the green to be photographed approached to yellow in tint, and the compensating screen was of a slightly blue green, then the blue of screen would absorb the yellow of subject, and so *vice versâ*. For the foregoing reasons I have arrived at the conclusion that, except for special work, a green screen is of no practical use.

A pale orange-coloured screen—one that increases the exposure about two or three times—will be found valuable for general work. The violet and blue rays are partially absorbed without seriously interfering with the green, orange, and red rays, but when it becomes necessary to cut off the whole of the blue and violet rays, thus requiring a screen of deeper tint, then the orange colour is not so suitable, as it absorbs part of the less refrangible rays.

The orange screens are, however, the only really serviceable glass screens at present in the market. There are no pure yellow glass screens manufactured that I am aware of. Doubtless, when photographers wake up to the advantages of using colour correct plates, and the demand warrants it, a suitable glass will be manufactured. Unfortunately for photographers, most of the coloured glass at present produced is made for decorative purposes.

The most perfect screen, so far as colour is concerned, that I have yet seen, is that made in the form of a Waterhouse diaphragm, and supplied by Messrs. B. J. Edwards, of Hackney. The aperture of the stop is covered with a thin lemon-yellow medium, which absorbs the violet and blue rays, without appreciably affecting the other rays.

Birt Acres.

PRINTING NOTES AND EXPERIMENTS.

Some time ago when occupying the scanty leisure with which the unsympathetic Fates have endowed me, by carrying out a few experiments with the object of establishing—or, rather, of attempting to establish—the practicability of a printing-out process in silver which would do away with the necessity of fixing with hypo, I resolved to turn back the pages of history as far as I could in order to find out whether I was merely treading an old road, or, as I fondly hoped and believed, had hit upon a brand new idea of my own. I hasten to confess that I had to a large extent been anticipated by one of those dead giants of experimental photography whom to study is to worship with an ardour and a sincerity that are increased by the incontestable truth that the dynasty is in process of extinction. Still, I found consolation in my disappointment. One takes pleasure in the misfortunes of one's friends, and I own that something like a glow of exultation ran through me at the discovery that I wasn't by any means alone in seizing upon old ideas, unconsciously or otherwise. But I was glad that I had escaped the snare of passing them off as original, which no doubt many of the patentees, inventors, and others, who were quite justly scolded in the editorial columns the other day, would like to feel that they had avoided in time to save their pockets and reputations.

Among the books that I consulted in the course of my reading was one entitled *Photogenic Manipulation*, by Mr. Robert J. Bingham, late chemical assistant in the laboratory of the London Institution. Mr. Bingham appears to have been a skilful experimentalist, for in 1846 he published *Some Improvements in the Daguerreotype Process*

consisting of the substitution of certain compounds of Bromine, Chlorine, and Iodine with Lime for the Bromine and other accelerating solutions. The first edition of his little work was probably issued about the year 1847; that (the ninth) in my possession bears date 1852. Its aim and scope may be gathered from its sub-title of the *Theory and Plain Instructions in the Art of Photography, or the production of Pictures through the agency of light, including Calotype, Fluorotype, Ferrotype, Chromotype, Chrysotype, Cyanotype, Catalisotype, Pictures on Glass, and Anthotype.* In the eighty-two small pages of the book there is a mass of information which even now might be read by the student with a great deal of advantage, and at the time of publication, when photography, so to speak, was beginning to cast off its swaddling-clothes, must undoubtedly have been very highly appreciated. It would take a mighty clever book of the present epoch to run into nine editions in five years; genuine editions, at all events. Photography at this period was on the threshold of the collodion process.

Mr. Bingham befriended me in a peculiar emergency. The other day I saw some extremely pleasing pictures, produced by a printing-out silver-bromide process, the manipulations being the same as those of the dying albumen-silver method. Printing-out in silver bromide, I was told, was a "new" idea, and had never been made use of before. I mildly questioned the accuracy of my informant's facts, and was witheringly challenged to refer him to anything in black and white to support my suggestion that such a method of printing had ever been publicly tried or spoken of. I declined the challenge. I was aware that the ordinary albumen-silver paper of commerce had occasionally been used for printing purposes after flotation upon a solution of potassium bromide, with what results, and for what end, I did not know; but this information was no answer to my friend's demands for evidence that nitro-bromide paper, pure and simple, had ever been used or suggested. Mr. Bingham came to my rescue. When first reading his book I did not notice the following paragraph among the methods of preparing photographic paper which he gives. I exhibited it to my friend, who, of course, was surprised at the antiquity of the idea:—

"*Bromide Paper.*—Dissolve 60 grains of bromide of potassium in 3 ounces of water and soak the paper in the solution; absorb the superfluous moisture, and then wash it over with a solution of nitrate of silver having 100 grains to the ounce, observing the same precautions as with the chloride paper. If required to be very sensitive, it may receive a larger quantity of silver. This is a very sensitive paper."

This, I suppose, is one of the earliest, if not actually *the* earliest, occasion on which the term "bromide paper" was employed, and I expect a good many people will be astonished at its great age, among them some of those who are making such huge piles of money out of the other (washed emulsion) bromide papers of the present time. If printing-out in silver bromide becomes general, it will be necessary to invent a distinctive name for the paper, or confusion will surely arise. I do not know how Mr. Prestwich prepares *his* printing-out bromide paper, and I have no experience of it at all; but, in some experiments I made on the lines of the formula quoted above (and which I hope to refer to in detail another time), I succeeded in producing a sensitive surface rather quicker than commercial albumen-silver paper, and with a colour of picture which, in these days of novel tones, needed no alteration with the gold toning bath.

Mention of toning recalls the circumstance that at the time when *Photogenic Manipulation* was published gold toning had not yet been introduced, the colour of the picture being changed by the deposit of free sulphur from the hypo fixing bath charged with an acid solution. It is also, perhaps, interesting to note that albumenised paper was suggested, if not actually used, by Blanquart Evrard for obtaining negatives in the camera, albumen being salted with iodide of potassium, the paper when coated and dried being sensitised with aceto-nitrate of silver, and developed, after exposure, with gallo-nitrate, as in the calotype process. The albumen negative paper, however, needed four to five times the exposure of calotype; and "the impressions," according to its inventor, "though not so [well] defined as those on glass, are more beautiful, as the outline is less harsh, and they possess more harmony and softness." I respectfully invite the attention of Mr. Davison, Mr. Lyonel Clark, and Dr. Emerson to this process; it would save them the trouble of diffusing the focus, or shaking the camera.

But, if printing out in silver bromide can be traced back to the early morning of photography, printing by development, differing materially, it is true, from the various methods now in vogue, both in respect of the preparation of the sensitive surfaces and their treatment after exposure, appears to be almost quite as ancient. First, there was the development chloride process, which, in brief, was as follows (I quote Hardwich, 1854, not Bingham):—Paper was salted with a mixture of ammonium chloride, sodium nitrate, gelatine, and water, and sensitised with citro—or aceto-nitrate, of silver. Exposure was made in the printing frame, three or four minutes being the maximum time required even on a dull day. The faint visible image was developed with gallic acid. Then there was the iodide process, which was worked by floating paper on iodide of potassium, and sensitising in the above manner. The dried paper was exposed behind a negative, "in a feeble light, about *thirty seconds* being an average time on a dull winter's day." Development as before. Here the image was quite invisible, unless the paper had been over-exposed. It seems to me that a good development process, which would allow of the sensitive paper being exposed to a weak natural light for so short a space as thirty seconds, would be preferred by many to the more rapid modern processes which require artificial light. "By substituting the bromide for the iodide of silver in the above process," says Hardwich, "the proportions and details of manipulation being in other respects the same, a more agreeable colour is obtained." An exposure of a minute in the frame was usually sufficient, the image being nearly latent. Gelatino-bromide printing by development is an older idea than modern manufacturers are probably aware of, although there are points of distinction between the old and new processes which vitiate any comparison, washed gelatine emulsions being, at the time the above was written, nearly a quarter of a century off. I propose returning to this part of my subject another time.

Mr. Bingham is entertaining as well as instructive. Mr. Fox Talbot's patent claims appear to have excited his ire in no small degree, and it was probably all the deeper since he (Mr. Bingham) allowed his own discoveries to become common property. "We should be sorry," he writes, "for each little alteration from the paper to the glass to be made the subject of a *patent monopoly.*" "We wish, he also remarks, "the principle to be more generally recognised (and, in these days of *patents, patentees* are so apt to lose sight of it) that scientific matters freely given to the world become the general property of the public, and no system of patent law should sanction the appropriation of them by private individuals." The italics, which are the author's, exhibit him in a mood of veiled resentment against Mr. Fox Talbot, which peeps out very early in the book. I do not know whether Mr. Bingham is in the land of the living now, but there are some fine opportunities for him and other assailants of sham patents to have a little tilting practice at the present time. When I read down the report of a certain discussion in Great Russell-street the other night, I could not help noticing that a spirit of intense Binghamism pervaded it. Is there no Sylvester Laroche amongst us to give battle?

Mr. Bingham, in writing of printing processes, applies the generic term "argentine" to them. It is one not used now, and I make the paper-makers a present of the exhumation. "The argentine process" would look well in Mr. Strangeways' boldest type, and would have a profound effect. They had other advantages besides pretty names in those days. Who would not like to be a dealer and sell things now at the prices advertised in Mr. Bingham's book? Pyrogallol, thirty shillings an ounce; hypo, three and sixpence per ounce (? pound), and so on. Ah, Messieurs, *those* were the times; "the good old times, the grand old times," to quote Mr. Filer's friend.

THOMAS BEDDING.

CLAM-CHOWDER.

[A Communication to the Camera Club, printed in its Journal.]

CLAM-CHOWDER is an American dish for which Coney Island is very famous. It is now about ten years since it was my privilege to taste this delicacy, but unfortunately I have forgotten the exact formula. Suffice to say that, although the bivalve clam is the most important ingredient, yet there are many others, and fortunately so, for in this variety lies my safety. It ought to be already evident that "Chowder" is not my theme to-night, and, if any one objects to what he thinks to be a deceptive title, let him visit at least a part of his spleen upon the head of our Secretary, for it was in a fit of desperation, caused by a telegram from him to "give title or life," that an evil spirit suggested Clam-Chowder. I thought that under the cover of so multifarious a dish I could introduce anything which might suggest itself.

At a meeting of the Photographic Society of Great Britain, I made some remarks on developing baths for platinotype, and on the influence of temperature and dilution. These remarks form a fitting introduction to what I am to illustrate to-night. The printed scales referred to in that paper I now exhibit, but they are of very little help unless closely studied.

Now, I thought that, by exhibiting a series of prints from ordinary

negatives, the chief effects of certain variations in development might be readily displayed. I have here several distinct series of prints. Every print of a series is made from the same negative, printed on the same day, with paper from the same batch, the difference between the prints being only in the matter of development.

The prints shown illustrate some of the variations to be obtained by cold development of hot-bath paper. The same temperature was used throughout the experiments, namely, 60° Fahr., and the developing baths were as as follows:—

Normal oxalate solution.—One pound oxalate of potash dissolved in fifty-four ounces water.

Strong D solution (a mixture of potassic oxalate and phosphate).—one pound of the mixed salts dissolved in fifty-four ounces water.

Normal D solution.—Half pound of the mixed salts dissolved in fifty ounces water.

The results obtained may be tabulated thus:—

Normal oxalate at 60° Fahr.	Gives a quicker development than than either of the D solutions. And stronger middle tones.
Strong D solution at 60° Fahr.	These baths give a slower development than the normal oxalate.
Normal D solution at 60° Fahr.	And less strength in the middle tones. With the normal D solution the scale is slightly shortened.

If these developers be acidified with oxalic acid, the results are different, thus:—

Normal oxalate acidified by $C_2 H_2 O_4$. Temp. 60° Fahr.	Development much slower. The image weaker both in shadow and middle tones.
Strong D solution acidified by $C_2 H_2 O_4$. At 60° Fahr.	The image very slightly weaker.
Normal D solution acidified by $C_2 H_2 O_4$. Temp. 60° Fahr.	Shadows not reduced in strength, but the scale shortened. Hence a good developer for very weak and flat negatives.

The principal difference between hot and cold development of hot-bath paper is seen in the middle tones of the picture. These middle tones in cold-bath developments are generally much reduced in strength. The other differences are slight, but the shadows are given with rather less vigour by the cold method. In length of scale the hot method has usually a little advantage.

If I am asked which of the developers referred to is the best for cold development, I think, upon the whole, one of the D solutions (but not acidified, unless for special effects). These solutions have less tendency to produce a granulated effect in the prints than a plain oxalate bath. In certain cases, however, especially in large work, granulation is decidedly advantageous in helping to give transparency, and, therefore, a plain oxalate bath would be more suitable.

In using cool baths it is necessary to print more deeply than for hot development, frequently until the deep shadows are solarised. And a much longer development is necessary. The progress of development should be watched and arrested at the right moment. As a general rule, paper which is two or three weeks old will give better results than fresh. And it is often useful to spread the prints at the bottom of a drawer or in a cupboard for a few hours before developing them. A caution against handling the sensitised surface is very necessary, for in cold development finger-marks and other injuries are very readily brought to light.

In working with baths at low temperatures, a few degrees' increase or decrease will make very distinct differences in the results obtained; much more marked than with baths at higher temperatures.

To-night I have illustrated only those variations due to a reduction of temperature, but many others may be made; for instance, dilution of the developer, introduction of restrainers, such as potassic chloride, &c.

At the meeting of the Photographic Society of Great Britain, I showed some prints on wood, and yesterday I made a few more which I thought might be interesting. I will hand them round. Here is one more beautiful than any print on paper from the same negative; the transparency in the shadows is very wonderful. It was treated after it was dry with starch sizing, and afterwards with a little varnish. Here is a reminiscence of one of our excursions without any after-treatment. I don't really know how to treat the wood after printing. These are merely experiments, but I think wood might be made useful for decorative purposes, but proper subjects should be selected for the purpose; either plain dark or light backgrounds and simple subjects; copies of Japanese embroidery make very good pictures, which might be used for the panels of doors. There are certain difficulties in working with wood; it must be printed with the cold-bath process, as it is almost impossible to obtain first-rate results by the hot process. I should be very glad to receive hints as to the treatment of the wood afterwards. My best result has been obtained by the use of starch sizing, and the rubbing in of a small quantity of boiled linseed oil. I have used American holly, which is very beautiful wood. Sycamore is no good for the purpose. Pine I have not tried. Most of the examples shown are on chestnut. W. Willis.

Foreign Notes and News.

The *Photographische Correspondenz* announces the recent death of Herr Franz von Oszterhueber, a distinguished and highly esteemed member of the Vienna Photographic Society. Herr von Oszterhueber was by profession a civil engineer, and the present bridge between Hietzing and Penzing bears witness to his energy and ability. In photography, to which he devoted himself as an amateur, he attained a very considerable degree of success.

Another member of the same Society, Ferdinand Ritter von Standenheim, already well known by name to our readers, has been awarded the medal for Art and Science by the Grand Duke of Baden for his work entitled *Fahrten am Bodensee.*

Apropos of the difference between professional and amateurs, *Fliegende Blätter* has the following:—"An amateur photographs people as they *are*, a professional as they would like to be."

Our well-known contributor, Professor W. K. Burton, of Tokio, sent a work, entitled *A Trifolium of Japanese Graces*, to the Vienna Exhibition. Unfortunately, it was, among a number of other pictures, delayed by red-tapism of the Customs authorities, and did not, we understand, arrive soon enough to be submitted to the jury.

The English exhibitors have come off very well in Vienna, and the *Photographische Nachrichten* grows quite enthusiastic in their praise. Bolton and Robinson seem to have been specially commended. The catalogue played a pretty trick with the former of these gentlemen, however. He had sent a group of youthful bloodhounds—we mean, of course, a print, not the models—and in the catalogue they appeared as "*dachshunde*"—Heaven save the mark!

Among his notes for this month Professor Eder gives an account of cyanine chloride as a sensitiser for red. The cyanine occurring in commerce is the iodide. When employed as a sensitiser, fogging is often the result. If the cyanine be converted into the chloride, fogging is avoided. This may be performed as follows: powder the cyanine, place it in a platinum or porcelain dish, and cover it with water and hydrochloric acid. The mixture is evaporated to dryness and frequently stirred the while. Hydriodic acid, of course, escapes, and a residue of chloride of cyanine remains behind, containing, however, some hydrochloric acid, and is consequently not quite blue. Careful warming, however, gets rid of this body.

A German photographer of the patronymic Schneider has recently been condemned to five years' imprisonment for taking photographs of some of the forts round Paris.

Another interesting result of the application of photography to astronomical research is reported from Heidelberg. Herr Max Wolf, of that town has, by its means, discovered a new and extensive nebula in Orion. It appears to surround one of the stars of that constellation and to show very distinct traces of vortex movement. It further seems to be connected with other nebulæ to the north and east.

It may be some small consolation to know that this is not the only country in Europe afflicted at times with unseasonable weather. Liesegang writes that a few days ago a friend sent him an attractive winter-piece from the Harz—on the right a neat little log-hut, on the left, in the background, gigantic pines. Both the boughs of the pines, the roof of the hut, and the surface of the ground were covered with about a foot of snow. A more perfect winter scene could not have been imagined. This was taken in *June* of the present year!

Most of our German contemporaries, particularly Liesegang, are making very merry over the ridiculous accounts that have reached them of Edison's kinetograph. Small wonder when one reads the descriptions which have appeared in the daily papers.

A new process for the manufacture of oxygen has been patented by Dr. G. Kassner. It consists of forming a compound of barium peroxide and ferricyanide of potash, which on heating (we suppose, as it is not stated) yields oxygen, and a by-product. How this can be an improvement on the ordinary barium-oxide process is not apparent.

A new disinfectant, said to be of especial value in preventing the decomposition of gelatine, has been introduced by Schülke & Mayr, of Hamburg, under the name of Lysol. It possesses all the properties of carbolic acid without being poisonous—indeed, as a disinfectant, it is superior. We understand that chemically it is a compound of cresol with certain soaps, rendering it highly soluble in water, whence its name.

Our Editorial Table.

On our table this week is quite a number of catalogues. That of Wm. Hume, Edinburgh, contains *inter alia* a list of the sizes and forms, in which he constructs his popular cantilever enlarging apparatus. Pearson & Denham's, Leeds, contains lenses, cameras, plates, and other apparatus by well-known manufacturers. The Albion Albumenising Company, Glasgow, send a seventy-six page catalogue, in which we observe cameras, lenses, finders, plate-rockers, stands, and, of course, albumenised paper. The Thornton-Pickard Company, Manchester, confine themselves to their own productions and specialities. Their shutter is now too well known to require reference thereto; as the makers say, "it is a good all-round shutter." J. Skinner & Co., of East Dereham, Norfolk, too, have a catalogue of cameras which they make, lenses, which we shall assume they make, and lanterns, which whether they do or do not make, we have no doubt they take care are all that they represent them to be, for this firm has a good reputation for fine camera work which they would not care to sully. W. Butcher & Son, Blackheath and Regent-street, London, have a nice catalogue of goods by several makers, and which are in every-day use. James Stuart, of Edinburgh, sends a catalogue of sixty pages, containing a selection of apparatus of various makers, from the "Demon" detective camera at 5*s.* upwards into respectability.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,107.—"Improvements in or pertaining to Optical Lanterns." C. J. Schuver.—*Dated June* 30, 1891.

No. 11,150.—"Improvements Relating to Photographic Shutters." F. Shew.—*Dated June* 30, 1891.

No. 11,191.—"Improvements in Photographic Cameras, and in Stands for same." J. B. Brooks.—*Dated July* 1, 1891.

No. 11,283.—"Photographic Reliefs in Rubber or Similar Substances for Hand Stamping in Ink." J. W. Beaufort.—*Dated July* 3, 1891.

No. 11,351.—"Improvements in the Construction of Photographic Shutters." W. S. Parkinson.—*Dated July* 4, 1891.

No. 11,355.—"Improvements in or connected with Photographic Dark Slides." A. T. Hall.—*Dated July* 4, 1891.

No. 11,372.—"Improvements in Supports for Photographic Cameras." G. Mason and A. L. Henderson.—*Dated July* 4, 1891.

No. 11,394.—"Improvements in Photographic Hand Cameras." F. Shew.—*Dated July* 4, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 9507.—"Photographic Printing Frames." Brooks.—Price 8*d.*

Photographic Club.—Subject for discussion, Wednesday, July 15, Meteorological Subject. July 22, report of Convention delegates. Saturday outing to Kew Gardens. Rendezvous at Kew Gardens Station at three p.m.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 13	North Middlesex Clnb	Jubilee Hall, Hornsey Rise, N.
,, 14	Derby	Society's Rooms, Derwent-bldings.
,, 14	Manchester Amateur	Manchester Athenæum.
,, 14	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 15	Bury	Temperance Hall.
,, 15	Manchester Camera Club	Victoria Hotel.
,, 15	Edinburgh Photo. Club	5, St. Andrew-square.
,, 15	Photographic Clnb	Anderton's Hotel, Fleet-street, E.C.
,, 16	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 2.—Adjourned annual meeting.—Mr. Atkins in the chair.

The rule (notice of amendment to which had been given) disqualifying members of committee from re-election for twelve months was discussed, and the amendment removing the disqualification was carried almost unanimously. The rule setting forth the officers of the Society was also amended by the addition of the word "Librarian," and Mr. Pask declared elected to the office.

The meeting then became an ordinary one, and the Chairman and Mr. Bromley Smith showed prints from negatives taken at the last outling of the Society to Carshalton.

The adjourned discussion on Mr. Debenham's paper on *Photographic Perspective* was opened by Mr. P. Everitt, who said that the Chairman's (Mr. A. Haddon) suggestion at the last meeting to account for the apparent diminution in the size of the penny when the head was raised and the eye remained fixed upon the more distant halfpenny would not hold good, as the eye remained in the same plane, and so did the penny, although becoming more distant, remain in its same plane, and, therefore, should remain of the same apparent size.

Mr. W. E. Debenham said that the word plane, as affecting the size of image, meant plane at a right angle to the axis of the eye. Was that what Mr. Everitt intended?

Mr. Everitt replied that it was.

Mr. Debenham continued by putting a diagram on the blackboard, showing that as the position of the eye was raised, whilst the line of sight was directed more and more at an angle from the horizontal, the plane of the penny moved along the axial line farther from the eye, and was not fixed as stated by Mr. Everitt.

Mr. Everitt admitted that he now saw this.

Mr. Debenham said that, as to the penny and halfpenny, it was of no importance to his argument whether on raising the head and getting the penny much removed from the region of distinct vision it appeared to lose its size, unless such appearance were confined to the lower position, and a penny at a corresponding distance above the axis of the eye exhibited a change of an opposite character, and appeared to become correspondingly larger, as it should do according to the explanation offered by Messrs. Emerson and Goodall, founded on their statement of the upper and lower halves of the eye yielding impressions differing in size. At the last meeting the members had inspected the appliance in which he had arranged pennies at equal distances above and below the axis of the eye, and they agreed that the two did not appear to differ in size.

Mr. Everitt said that they did not appear of the same size to him.

Mr. Debenham replied that all the other members present found that they did so.

Mr. Everitt then read a paper (which he declined to have published) in reply to Mr. Debenham's criticisms on Messrs. Emerson and Goodall. Mr. Debenham had denied the truth of their statements, and had said that loose experiments were the bane of photography. He (Mr. Everitt) had repeated some of their experiments. In Proof 2 he found that the top and bottom of a door when looked at directly did appear to differ in size. His experience, however, was the reverse of Dr. Emerson's, the door appeared to him smaller at the top instead of larger as stated by that gentleman. He had also repeated the experiment—Proof 3—with slips of card (which he produced), one parallel and the other tapering, and here, again, his experience as to which end appeared larger was the reverse of Dr. Emerson's. He found the effect the same whether he used one eye or both. With regard to the angle of view included by the upper and lower halves of the eye, Mr. Debenham had said that it amounted to 45° in both directions, 90°, that is, in all. This he considered much too large an estimate. He read an extract from a work in which 60° was laid down as the limit of tolerably distinct vision. He was inclined to think that the angle of distinct vision was very small. Mr. Debenham's paper was based on the assumption that we view things with one eye, but we really see with two eyes.

Mr. Beckett asked whether it would be possible to construct a lens giving definition at one focus for the upper and another for the lower half of the field. He would also ask whether any one would assert that the perspective of a scene could be altered by merely using different lenses from the same point of view.

Mr. Cook said perspective would be altered by using lenses of different lengths of focus, a statement at once scouted by Mr. Beckett and others.

Mr. Debenham then replied to Mr. Everitt. He said that he had mentioned 45° above and below the axial line not as the limits of the view of the eye, but that the view considerably exceeded those limits. He did not, however, say distinct vision, which would be within a very narrow range, quite out of the question with regard to the point raised by Messrs. Emerson and Goodall. They had directed the experimentalist to lie on his back in the open air and note the large expanse visible through the lower, as compared with the upper, half of the eye. The limits of distinct vision were not concerned or mentioned with regard to this experiment. As to the experiment with parallel slips of

card, Mr. Everitt's was a little nearer approach to exactness than that directed by Messrs. Emerson and Goodall, wherein paper was to be used. Card would at least be more easy to keep near a true plane than pieces of paper held in the hand; but here, again, unless there were appliances for holding the card truly vertical to the line of sight, exactitude was wanting. That Mr. Everitt's conclusions, as to which end appeared the larger, were the reverse of those formed by Messrs. Emerson and Goodall, only the more strongly suggested the worthlessness of such loose and inexact so-called proofs. The introduction of the question of binocular vision was, he thought, only calculated to confuse matters. Messrs. Emerson and Goodall had spoken of the rules of monocular perspective as misleading, and devoted the first and principal portion of their paper to combating those rules, and to that he had confined himself. Why, however, had not Mr. Everitt taken up the subject of the alleged different sizes of the images seen by the upper and lower half of the eye, as claimed to be answered by the illustration of a chandelier seen as a near object in the photograph? If the contention of the authors of the late brochure on perspective, that it is because of the difference between the two halves of the eye that a near foreground object below the line of vision strikes us as being too large in a photograph, then such an object as a near chandelier should strike us as coming too small in the picture. Was it the case that it did appear too small?

There was a freely expressed opinion that it did not, and, after some experiments to prove the large angle of vision as distinct from the angle of finely defined sight, the meeting terminated.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL Meeting, for the award of the prizes, was held, July 1, at 58, Pall Mall, S.W.—the Right Hon. the Earl of Rosse in the chair.

The Secretary (Mr. A. J. Melhuish) laid before the Council the pictures for the current year. They had been classified by Mr. Glaisher into Classes I., II., III., IV., and V., and the classification, subject to two alterations, was approved by the Council. Class I. contains 139 pictures, contributed as follows:—C. Stephens, 3; General Kaye, 4; R. Murray, 10; F. S. Schwabe, 3; Major Board, 1; R. O. Milne, 9; R. Leventhorpe, 7; W. Gaddum, 8; Miss J. Wilson, 2; Mrs. R. Benson, 2; Dr. Drew, 4; Surgeon-Major Foster, 7; F. G. Smart, 10; the Vicomte de Condeixa, 6; H. O. Hutchinson, 11; F. Wrigley, 4; Miss Mahon, 8; F. Griffith, 8; W. Dumergue, 8; M. de Dêchy, 4; A. R. Dresser, 17; and H. Emmons, 3. The pictures were considered by the Council to be the best ever contributed to the Society. Some by Mr. Dresser were pronounced to be altogether a step in advance. The interiors at Fontainebleau, by the Vicomte de Condeixa, were also greatly admired. A sunset picture, by Mr. Smart, was considered quite a work of art. There are also some fine tree studies by Mr. Milne.

The following prizes were awarded:—To Mr. Arthur R. Dresser the first prize, for Nos. 1, 3, 5, 8, 11, and 12, a large silver goblet. The Vicomte de Condeixa the second prize, for Nos. 2, 4, 5, and 6, a silver goblet. Mr. F. G. Smart, for Nos. 27, 31, and 30, a silver goblet. Mr. R. O. Milne, for No. 7, a large album, handsomely bound. Mr. R. Leventhorpe, for No. 207, a handsome portrait album. Mr. H. O. Hutchinson, for Nos. 2, 11, and 13, an oil painting, in frame, by McEvoy. Mr. W. Gaddum, for Nos. 61, 130, and 162, a picture in frame. Surgeon-Major Foster, for Nos. 2 and 6, a large silver medal. Miss Mahon, a handsome portrait album. Mr. F. Griffith, for No. 3, a medal. Dr. Drew, a handsome portrait album. Mr. R. Murray, for No. 273, a handsome portrait album. Mr. W. Dumergue, for No. 7, a medal.

The following members had been previously elected:—A. Craigie, Esq., E. F. Sandeman, Esq., Francis Gosset, Esq., Deputy Sergeant-at-Arms, and Hamilton Emmons, Esq.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

JULY 4.—A numerous assortment of negatives and prints was exhibited by members taken during the recent excursions.

The half-day excursion to Erith and Greenhithe on July 25 has been altered to Kingston-on-Thames. Trains from Clapham Junction, fifteen minutes past two and fifty-five minutes past two; Waterloo, five minutes past two and forty minutes past two.

RICHMOND CAMERA CLUB.

AN outing was arranged to Brentford and Isleworth on Saturday, June 27 Four members only turned up, and the wind was too high to allow of many exposures being made.

THE ordinary meeting was held on Friday, July 3, Mr. Irvine in the chair.

The Hon. Secretary reported that the proprietors of the *Amateur Photographer* have kindly undertaken to supply a copy of their paper weekly for the use of members.

The subject for discussion was *Shutters*, and a Kershaw, a Thornton-Pickard, and an "Automatique" were shown and explained.

PUTNEY AMATEUR PHOTOGRAPHIC SOCIETY.

JULY 3.—Second monthly summer meeting, held this evening, Mr. W. H. Congreve in the chair.

Prints were shown from negatives of the Burnham Beeches excursion, which was fairly well attended.

Twelve entries were announced for the summer competition—a series of four prints.

In Mr. Macdona's absence, the Secretary, after reading Mr. H. S. Starnes' reply to an article in *Photography* (June 11) on "Lantern-slide Making by a Printing-out Albumen Process," by Mr. Macdona, showed a slide produced in this way. A discussion on the subject then took place.

The Secretary announced the presentation to the Society of the *Amateur Photographer* by the editor.

Next excursion, July 11, Dorking.

BATH PHOTOGRAPHIC SOCIETY.

THE first excursion of the season took place on Wednesday last week to Bradford-on-Avon, Avoncliffe, and Winsley. The party left the city by brake early in the afternoon, making the first halt at Bradford railway bridge, where the surrounding scenery proved to be most suitable for practice. A brief stay was next made at the top of the Bradford-road. In Bradford the principal object of attention was the old bridge, situated beyond the town. Bradford and environs are so picturesque that it is hardly advisable to attempt too much on any one visit; for this reason the party made all possible haste to the weirs at Avoncliffe, in order to secure some views ere the light should be unsuitable. This done, the members were invited to the summer residence of the Vice-President, Mr. Austin J. King, where the host and hostess entertained the guests in the most hospitable manner. After an excellent repast another very pleasant hour or so was spent in viewing the grounds and peeps of distant scenery obtainable therefrom, and it was not until the evening twilight had far advanced that the members took their leave at Rowas and returned to the city.

GLENALMOND PHOTOGRAPHIC CLUB.

JULY 4,—The President took the chair at eight p.m.

A motion was brought forward by Mr. Kitto that no papers belonging to the Club could be taken out of the library without the permission of the Librarian. The motion was unanimously carried.

The date of the sending in of competition photographs was altered to Saturday, July 18, instead of Saturday, July 11, the former date, on account of the bad weather for photography during the past week.

After the business had been settled, a "Hat-night" took place, in which twelve members took part, speaking on various subjects. There was a large show of photographs, &c. Some opals and aristotype prints were shown by Messrs. Maxwell, and some bromides by Messrs. Debution and Johnstone, after examination of which the meeting adjourned.

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A STATED meeting was held on Wednesday evening, June 10, 1891,—the President (Mr. John G. Bullock) in the chair.

The Board of Directors reported the election of the following active members:—Messrs. Howard Laurence Roberts, Thomas Lynch Montgomery, and Benjamin Sharp. They also announced that a plan was under consideration, details of which would be given later, for a competitive exhibition to be held during the coming fall or winter, of lantern slides from hand-camera negatives representing the summer work of members of the Society.

Mr. J. F. SACHSE read a paper on *The Preliminary, Secondary, and Supplemental Lighting of the Photographic Plate.*

At the conclusion of the reading, Mr. CARBUTT inquired on what date the first coloured diaphragm was used in the lens.

Mr. SACHSE said he did not know the date, but it was first used by Guillard.

Mr. CARBUTT stated that he had used a coloured diaphragm in 1858 or 1859. He was then working in a small gallery in a small way, in an interior town in Indiana. They were using the wet collodion process at that time. He used a blue diaphragm, and obtained a sharp picture in about the same time that would have been required by a very much larger aperture.

Mr. BELL said that in 1872 the photographer of the Treasury Department and himself instituted a series of experiments in preliminary lighting. The plate was exposed from three to five seconds with a red glass in front of the lens, and then exposed on the sitter. The result in all cases was less valuable than if they had not exposed to the red light at all, but had given it proper time. It might be useful where a man's chemicals were in a very insensitive condition, as it would help him to make a much better picture than he could otherwise obtain. He had also used the blue light, by apertures in front of the box, and again in the cap, and after exposure swung in front of a white screen for an instant. At that time he had slow light, and this method helped him very much to get certain pictures, such as children. Still, the results were never very good—not as perfect as would have been the case had he been able to expose the proper time.

The CHAIRMAN inquired which colour gave the best results, the blue or the red?

Mr. BELL replied that in the preliminary lighting he found the red glass was the best.

Mr. CHEYNEY said that it seemed to him they all used this preliminary, &c., lighting. While it was not intentional, they all did exactly what Mr. Sachse had described. In the first place, they took out their plates in a dark room lighted by red light, dusted them, and inserted them in the holders. That was the preliminary lighting. Then they exposed the plates. That was the secondary stage. Next they developed under the red light, and if the development did not proceed fast enough they held the plate up close to the red light to see what was the matter. That was the supplemental lighting. Hence they all did what Mr. Sachse had described.

In reply to a question from the Chairman, Mr. SACHSE said the red light employed was merely the ordinary red light of the lantern.

The CHAIRMAN asked where, then, lay the difference between this red light and that used in ordinary development?

Mr. SACHSE stated that it differed in this respect, that he personally always filled his holders in the dark. Then, after exposure, he never subjected the plates directly to the red light of the developing room, but put them in the pan in the shadow, and after a few minutes held them to the red light to see if the image had appeared. He was always very careful to keep away where the exposure was normal.

Mr. McCollin said he recollected one of the members, Mr. Browne, in the old collodion-emulsion days, brought to him some undeveloped plates; and they were made into fairly good plates by means of candle-light. They were developed in a yellow glass dish.

Mr. Cheyney explained the test he made of his lantern. He exposed a 26 Seeds plate for five minutes with a figure cut from cardboard in front of it, and could get no image—the plate was perfectly clear. So he came to the conclusion that he was quite safe in taking his time in development.

Mr. Sachse remarked that he found a difference in the makes of plates. In one make of plates exposure to the lantern invariably resulted in fog. Two other makes he was in the habit of using always came out clear.

The Secretary inquired if this was really an improvement, or only a slight veiling which, as Mr. Carbutt said, made certain details apparent or softened down the hardness of an under-exposed plate.

Mr. Sachse's experience had been that it did bring out detail. In speaking of the matter three years ago with a professional photographer, that gentleman attributed the improvement to pouring off the developer, and leaving the plate exposed to the action of the air. He contended the ruby light had nothing to do with it, and said that when he found under-exposed plates he poured off the developer, exposed to the air, and then put them into the developer again.

The Secretary said it seemed to him that plates grew in detail while being examined, as though the air, coming in contact with the plate, might have that effect.

Mr. Walmsley supposed every one working with a developer had experienced that. His own developer he kept on the plate only long enough to bring out the detail slightly; he then poured it off, put a cover over it, and it would bring out a density in a few minutes so dark that they could not see through it.

Mr. Ives stated that more density would be developed where the air came in contact with the plate than where it was kept from it.

Mr. Cheyney mentioned an instance where he had allowed the negative to rest on the edge of the dish, and the part exposed to the air was better developed than the portion immersed in the developer. In fixing, also, he had found that, where the process was slow, it was quickened by taking the plate out, and letting it stand on edge a little while before returning to the bath. There seemed to be some oxidising action of the air that helped development and fixing along.

Mr. Fox said that, in the collodion-emulsion days, when they worked with yellow light, it was a common dodge to pour the developer off the plate, and let it stand for some time. The negative would come up very well in that way; it brought the detail out rapidly.

Mr. Stirling said it had been suggested that part of the action or the benefit brought about by breathing on the plate was due to the added heat; but he wished to ask for some information. What Mr. Cheyney had said about his developing lamp was at variance with his experience. He had never handled any plate that he could expose within five inches of any lamp he had ever seen without developing fog. He thought it would be interesting to all present if Mr. Cheyney would tell what lamp and what coloured medium he used.

Mr. Cheyney stated that his lamp was a Carbutt's "Multum in Parvo." It had a face of ruby-coloured hammered glass in front of it. This he had the misfortune to break, so he took two pieces of Carbutt's yellow paper, and pasted a piece on one side and one on the other, and he could stand a Seeds 26 plate in front of it, with a figure against it, for five minutes, and nothing but clear glass could be gotten out of it.

Responding to a remark from Mr. Stirling, Mr. Cheyney said he was never more than eighteen inches or two feet away from the lantern, and he could see the details come up, and he had not very good eyes.

Mr. Stirling hinted that as Mr. Cheyney wore glasses he could probably see better than he (Mr. Stirling) could.

This Mr. Cheyney denied, and, continuing, said that when he desired to tell the density he always examined the plate by the clear red glass in the door of the lantern.

Mr. Bell spoke in favour of the sodium core or "Aladdin" lamp used by Mr. Rau. He advocated plenty of light in order to distinguish the density of the plate.

Mr. Rau, in answer to a question, said the sodium core gave a very pale orange light.

Mr. Sachse inquired whether any of the members present had ever had experience with the white or coloured camera interior.

Mr. Bell said that in the old Daguerreotype times they had used something like that, but it was abandoned, mostly for the reasons given in Mr. Sachse's paper. The images obtained were very indifferent.

Mr. Ives thought it would be of interest to the members to know that in the old wet-plate days a secret method was sold to photographers for ten dollars, which consisted of a lighted wax match, to be held until burned out—a very convenient way for supplemental lighting.

PHOTOGRAPHIC SOCIETY OF JAPAN.

The annual meeting of the above-mentioned Society was held at the rooms of the Geographical Society of Japan, Nishikonya-cho, Tokyo, on Friday, May 29, at five p.m. Mr. Ishikawa, having announced that he had received a note from Viscount Okabe (Vice-President of the Society), who had been asked to preside, to the effect that he would not be able to attend, Mr. Edmond R. Holmes took the chair.

The annual report having been read, the balance-sheet was read by the Treasurers, who pointed out that it indicated a decided advance in the prosperity of the Society.

The election of officers for the ensuing year was then proceeded with.

A large number of samples of their manufactures that had been presented to the Society by the Fry Manufacturing Company of London were distributed amongst the members present. Some excellent work, in the way of bromide prints and opals, done on certain of the samples by Mr. S. Kajima, were also shown. Mr. C. D. West had tried the plates, and had found them of very high quality. Mr. W. K. Burton showed some platinotype prints. These, he explained, had been done on paper that had been kept for more than a year, and that gave nothing but deep fog worked in the usual way. Excellent results had, however, been got by printing very deeply, then developing with a cold solution made up as follows:—A five per cent. solution of washing soda, twenty ounces; a saturated solution of bromine, in water, fifty minims. He did not remember who had first suggested the use of soda as a developer for platinotype prints. The bromine had been suggested by Dr. E. Divers, F.R.S. It formed hypobromite of sodium with the soda solution, and this was powerful restrainer of fog in platinotype work.

Mr. K. Arito showed some prints on drawing paper that were of a remarkably fine black tone. They had been prepared by the following formulæ:—

Salting Solution.

Chloride of ammonium	50 grains.
Gelatine	100 ,,
Water	10 ounces.

This was warmed, and two ounces of negative varnish were added.

Sensitising Solution.

Nitrate of silver	2 ounces.
Water	10 ,,

Toning Solution.

Chloroplatinite of potassium	15 grains.
Citric acid	50 ,,
Water	25 ounces.

Fixing Solution.

Hyposulphite of soda	2 ounces.
Water	10 ,,

The meeting ended with a vote of thanks to the officers for their labours during the past year, and to the Chairman of the meeting just finished.

After this there was a *conversazione*.

Correspondence.

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

ORTHOCHROMATIC PHOTOGRAPHY.

To the Editor.

Sir,—I am afraid the purport of my remarks at the last technical meeting of the Photographic Society, in reference to the use of methyl violet in orthochromatic emulsions, has been to some extent misunderstood.

Although I found, when experimenting a few years ago with various dyes in combination with silver bromide in gelatine emulsions, methyl violet in common with cyanine to be a most valuable sensitiser for red as well as yellow, yet I can hardly recommend it, nor have I adopted it for ordinary use, as the general sensitiveness of emulsions so prepared is extremely low, perhaps one twentieth that of ordinary erythrosine plates. Where red sensitiveness is required, and this of course is very rarely the case in landscape work, perhaps the best plan is to bathe the ordinary orthochromatic plates in a special bath of cyanine or of methyl violet as recommended some years ago by Mr. Wellington.—I am, yours, &c.,

W. Bedford.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editor.

Sir,—The Exhibition Committee of the Photographic Society of Great Britain desire me to inform you that the Annual Exhibition of that Society will be held at the Gallery of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, from Monday, September 28, until Thursday, November 12, next.

The exhibition will be open daily (Sundays excepted) from ten a.m. to five p.m., and on Monday, Wednesday, Thursday, and Saturday evenings from seven p.m. to ten p.m.

The following gentlemen have been appointed judges, and have consented to act:—Messrs. J. E. Austin, F. Hollyer, P. H. Newman, F. M. Sutcliffe, and J. B. B. Wellington.

Medals will be placed at their disposal for artistic, scientific, and technical excellence of photographs, for lantern transparencies, and for apparatus.

Negatives and transparencies, photo-mechanical prints, photographs of purely scientific interest, photographs coloured by scientific or mechanical means, and apparatus and appliances containing points of special interest, will be admitted, but photographs coloured by hand will not be admitted.

Photographic lantern slides will be shown on the evenings the exhibition is open by means of the Society's optical lantern. The Exhibition Committee will be glad to receive slides for exhibition, especially such as are illustrative of life and scenery in the British colonies and possessions. No charge will be made for exhibiting such slides, which should be delivered at the offices of the Society early in September in order to

enable the Committee to group and arrange them. Slides, however, will not be eligible for a medal unless the conditions in the prospectus be observed.

Blank entry forms, and any further information respecting the exhibition, apparatus, and lantern slides, can be obtained on application to the Assistant Secretary, P. S. G. B., 50, Great Russell-street, London, W.C.—I am, yours, &c., H. S. Lawrance, *Assistant Sec.*

Photographic Society of Great Britain, 50, Great Russell-street, W.C.
July 3, 1891.

MARKINGS ON NEGATIVES.

To the Editor.

Sir,—As I have been troubled in a similar manner to that described by Mr. Bruce in your last issue, my experience may perhaps be helpful, though I do not pretend to assert the cause.

In the first place, I always use a flat dish for fixing, but the markings never show until the washing and drying process, and then not *unless the plates have been washed in a horizontal position.* This, I believe, is at the bottom of the trouble, as quarter, half, and whole plates (which I wash vertically) will come out without a mark, but larger sizes, washed *slowly* in a flat dish, will suffer considerably.

Since I adopted the plan of washing large plates as rapidly as possible under a rose and drying *out of the dark room*, I have not been troubled. Trusting these hints may be sufficient,—I am, yours, &c.,

The City Studio, Coventry, July 7, 1891. Fred. W. Dew.

To the Editor.

Sir,—The dark comet-like markings Mr. Bruce complains of in your last issue I believe to be due to metallic impurities in the hypo.

I have occasionally had a similar experience, which has undoubtedly been caused by the fixing solution. When this has been the case I have immediately thrown away and made fresh, and the spots have generally disappeared with the bath.—I am, yours, &c., A. F. Colborne.

18, *Castle-street, Canterbury, July 4, 1891.*

AFFILIATION.

To the Editor.

Sir,—A general desire has for some time been expressed that some closer union of the Photographic Societies of the United Kingdom should be brought about for the better promotion of their common interests.

Taking this into consideration, a Committee was appointed by the Photographic Society of Great Britain to examine the question and report upon it. By direction of the Council, a copy of this report I have now the honour to enclose you herewith.

Will you kindly bring the report together with this letter to the notice of your members on an early opportunity, in order to elicit their views upon the subject, and then let me know the result?—I am, yours, &c.,

A. M. Mantell, Capt. R.E., *Hon. Secretary.*

Photographic Society of Great Britain, 50, Great Russell-street, Bloomsbury, W.C., London, July 6, 1891.

AFFILIATION.

Preliminary.

On the 11th of November last, a circular respecting the foundation of a Photographic Institute was approved of at the meeting of the Photographic Society of Great Britain, and at the next meeting was ordered to be forwarded to the Photographic Societies in Great Britain.

Replies from fourteen societies were received, and the whole question has been further considered by the Council of the Photographic Society of Great Britain.

In the meantime, an independent scheme of Federation was drafted, and invitations were sent to the London societies to send delegates to a meeting, at which the subject was to be discussed.

Some of the London societies nominated delegates, and a Committee was selected to draft a scheme, which was done; but from the first there seemed a strong feeling in favour of the initiative being taken by the Photographic Society of Great Britain.

This Committee of Delegates at its last meeting dissolved itself, but with a renewed expression of opinion that the Photographic Society of Great Britain should definitely take up the question of Affiliation, and an endeavour was made by the delegates present to pledge two members of the Council of the Photographic Society of Great Britain, who were informally at the meeting, to take action in this direction.

The Committee of the Council of the Photographic Society of Great Britain appointed to consider the matter have constantly had the whole question before them, and, in view of these decided expressions of opinion, a preliminary report was submitted to the Society at the meeting on April 13, which has since appeared in the photographic journals.

This report was of a tentative nature, intended to elicit the opinions of those interested.

The result has been a consensus of opinion that a closer union of photographic societies is desirable, and that the Photographic Society of Great Britain should take the lead in effecting it. Under these circumstances, the Committee, which at first consisted of Sir H. T. Wood, Mr. Leon Warnerke, and Mr. G. L. Addenbrooke, was, by resolution of the Council, further strengthened by the addition of Mr. W. Bedford, Dr. G. Lindsay Johnson, Mr. W. E. Debenham, and Mr. A. Cowan.

These gentlemen, having given the matter their careful consideration, have embodied their ideas in the following report:—

Report of Affiliation Committee.—*June 9, 1891.*

Although it is now clear that there is no immediate prospect of carrying out the whole of the objects originally included in the scheme of the Photographic Institute, yet some of the advantages which the Institute was intended to confer on photographers could be secured by a scheme of affiliation to the Photographic Society of Great Britain, and this without any great expenditure either of time or funds, by utilising the machinery and facilities at the disposal of the Photographic Society of Great Britain.

As this matter concerns the advancement of photography and the benefit of photographers generally, the Committee recommend that the Photographic Society of Great Britain should allow its rooms to be used as a centre, and should arrange the office work necessary for a federation of societies, as the Secretaries of the Society occupy a position to conduct with advantage the correspondence and negotiations by which a system of affiliation may be established and worked. A subscription from affiliated societies, &c., will be necessary to cover the cost of clerical labour, postage, office expenses, &c., involved, and as a contribution towards publishing the Society's *Journal*, which would be supplied to affiliated societies, and would thus become the organ of the affiliation, in addition to its present purpose.

Affiliation would be by the Council of the Photographic Society of Great Britain. All affiliated Societies would have a voice in the management. Delegates appointed by the Societies should meet in London, not less than once a year, to determine the lines of action, and would appoint a permanent subcommittee to supervise affiliation work for the next year, and to carry out resolutions passed by the assembled delegates.

It is undesirable to hamper the initial stages of affiliation by too strict definitions or restrictions. As the movement is of a novel character, it may be expected to develop itself in the best way as it goes along. As a preliminary step, however, the following prospectus has been drafted, which, with a copy of this Report, it is proposed should be sent to all photographic societies, to invite co-operation and support.

Scheme of Affiliation.

The object of affiliating all photographic societies is to promote co-operation with one another and with the Photographic Society of Great Britain, for the advancement of photography and for the promotion of mutual interests. The following desirable objects of attainment may be enumerated:—

1. Assisting societies in obtaining and interchanging lectures, papers, lantern slides, examples of good work, &c.
2. Facilitating the holding of local exhibitions.
3. Arranging for the provision and exchange of dark rooms for the use of members in local centres.
4. Extending the applications of photography to industrial purposes, and in such directions as local surveys, photographing and preserving photographs of ancient buildings, and architectural and archæological records.
5. Assisting scientific research in photography and kindred sciences.
6. Assisting the Photographic Society of Great Britain in its endeavour to promote photographic technical education.
7. Co-operating with the Photographic Society of Great Britain in securing a universal adoption of photographic standards for lenses, screws, size of plates, formulæ, &c.

To carry out these objects efficiently a united effort on the part of existing societies is essential.

The Assistant Secretary of the Photographic Society of Great Britain, who will co-operate in carry out this scheme, will be in attendance at the rooms of the Photographic Society of Great Britain every weekday, with certain exceptions to be arranged later on, from two to half-past nine p.m., and may be consulted by members of affiliated societies, and will also reply to any communications which may be addressed to him by the secretaries and members of affiliated societies.

The Secretary will try to bring societies desiring lectures on particular subjects into direct communication with persons willing to lecture, and will be glad to receive, either as a loan or as a gift, interesting lantern slides, which may remain at his disposal, either permanently or for a time, so that they may be lent to societies holding lantern exhibitions.

It is suggested that prize pictures and examples of processes might be collected, which would be at the disposal of societies, and circulated amongst them, so that all members might have a chance of seeing examples of the best work from time to time; and this, it is hoped, would help to raise the standard of photographic work generally.

It is to be expected that affiliation will strengthen the parent Society and the affiliated branches alike, to the advantage of photographic science and art; to contribute to this common end the Photographic Society of Great Britain offers to the members of the affiliated societies the following advantages:—

1. The use of its rooms and offices, 50, Great Russell-street, W.C., for the meetings of delegates forming the Affiliation Committee, and for the meetings of the sub-committees it may appoint.
2. The services of the Assistant Secretary and the provision of stationary, postage, &c., for the conduct of federal affairs.
3. Admission of members of all affiliated societies to courses of technical lectures, which the Photographic Society of Great Britain hope to organize, at half the charges made to non-members.
4. The use of the dark room at 50, Great Russell-street, W.C., by affiliated members upon payment of a small charge for the use of chemicals.
5. Affiliated societies will be supplied with two transferable season tickets for the Society's annual exhibition.
6. Two copies of the *Journal and Transactions* will be supplied to each affiliated society.

The general rules now suggested are few and simple, but may serve as a basis for an approved code.

GENERAL RULES.

Affiliation shall be by the Council of the Photographic Society of Great Britain.

All societies shall be eligible, whether London, provincial, colonial, or foreign.

Each affiliated society shall be entitled to appoint a delegate, who, in conjunction with a certain number of members to be appointed by the Photographic Society of Great Britain, shall form the Affiliation Committee, with the right to vote in all matters in which the Committee may deal.

The Affiliation Committee shall have power to nominate certain of their number to supervise and carry on the work of affiliation on such general lines as may meet the approval of the Council of the Photographic Society of Great Britain.

The Affiliation Committee shall have power to make such laws as may be required for conducting the different branches of affiliation work.

The votes of the Affiliation Committee may be taken in writing on any important subjects which require decision between the annual meetings.

The yearly subscription shall be one guinea, payable on election, in advance, on January 1 in every year. Any society whose subscription may be three months overdue shall cease to be a member of the Affiliation, but may be reinstated by the Council on satisfactory explanation and payment of arrears.

Exchange Column.

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

I will exchange good oil paintings for a good half-plate portrait camera; mutual satisfaction.—Address, ALEX. BAKER, Royal Art Gallery, Weymouth.

Ross' C.-D.-V., list price 5*l.* 15*s.*, in condition as new, in exchange for good modern quarter-plate camera and slides.—Address, B. 500, *Hull News* Office, Hull.

Will exchange Humber safety bicycle in good condition, new last season, for good complete half-plate outfit.—Address, EDGAR GREAVES, Silver-street, Halifax.

Splendid-tone violin, with bow and case, in exchange for good half-plate camera, with dark slide, without lens or tripod.—Address, H. HOWARD, 6, Hibbert-street, Luton, Beds.

15×12 single lens, by Andrew Ross, to be exchanged for half-plate camera and double slides by good maker.—Address, S. H. R. SALMON, 10, The Terrace, East Putney, S.W.

Adams & Co.'s patent single eclipse shutter, three-inch aperture, for studio use, in exchange for 10×8 tripod, grass mat, or opera glasses.—Address, W. HARE, Windsor Studio, Sutton, Surrey.

Wanted, quarter-plate detective camera, complete, in exchange for 7×7 solid mahogany camera and single dark slide, by F. J. Cox, Ludgate-hill, London, and tripod stand.—Address, J. K. EWART, Castle-street, Banff, N.B.

Wanted, quarter-plate detective camera, complete, by good maker; will exchange double-barrelled breach-loading gun (twist barrels, patent lock), warranted to kill at long distance.—Address, J. K. EWART, Banff, N.B.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

J. H. Jones, Norwich.—*Two photographs of model of house in which Lord Nelson was born.*

E. M. LLOYD.—If you send us your formula, we shall then be able to judge of its merits.

H. CARNEGIE.—The spots on the negative are due to imperfect washing. No matter whose varnish be used it will not protect an imperfectly washed film.

H. A. P.—Our black list is only for those who retain employés' specimens. Therefore your case does not apply. If you have any redress you must obtain it through the County Court.

PROFESSIONAL.—Refuse to undertake the work; it is, without doubt, a trap set to catch you. The engravings named are certainly copyright.

A SUBSCRIBER (Newbridge).—1. Use a more adhesive kind of gelatine, and apply it warmer. 2. Dextrine is best mixed with cold water and made into a tolerably stiff paste. It will then be perfectly adhesive.

W. HOLMES asks if carbon pictures can be printed with a clean margin like platinum or bromide paper?—Certainly they can if a mask sufficiently large to protect the margin of the paper be attached to the negative.

M.A.—To make prints on albumenised paper take water-colour freely, wash them once with a dilute solution of ox-gall. Some colourists find that simply licking the face of the print with the tongue is quite sufficient preparation.

E. GAEL.—A great deal has appeared in the back volumes of the JOURNAL and also in the ALMANACS on photo-lithography. It is also treated upon in Burton's *Printing Processes* (Marion & Co.), and in Mr. Wilkinson's book (England & Co.).

J. G.—To remove stains from linen caused by the ferrous-sulphate developer, wet the discolouration and apply oxalic acid. A patent was taken many years ago for a mixture of powdered oxalic acid and albumen, which, after being dried in a cake, was rubbed upon the iron-mould, previously made wet, until the stain disappeared.

C. A. S. complains that he cannot get the prints to adhere to the mounts when using starch.—The reason, perhaps, is, that the starch is not made thick enough. It should be of such consistence as to form a thick paste when cold. It should then be thoroughly beaten up with a spoon before applying it to the print, or, still better, forced through a coarse sieve.

W. S. (Edinburgh).—You may spend several days very pleasantly photographing in Jersey. No difficulty will be experienced in getting to every part of the island, as several conveyances start from St. Heliers every morning for the most attractive localities. But you will obtain full information on your arrival. The conveyances start soon after breakfast.

AJAX.—A fusible metal, which melts under 200° Fahr., may be made by melting together five parts of bismuth, three parts of lead, and two parts of tin. But for your purpose it will answer quite well to melt about an ounce of common plumber's solder, and then add to it a piece of bismuth rather less than the bulk of a pea. With this you can solder things that have been previously put together with common solder without disturbing the junctions.

REV. F. GRAY.—There is no fixed point in a combination of lenses which can be called its optical centre, unless on the supposition that the subjects are invariably to be at similar distances from the lens. The position of the centre depends entirely upon the distance of the subject. In the case of a combination, the lenses of which are identical or symmetrical, when the object to be photographed and the ground glass are at equal distances from the lens, the optical centre of the combination will be at its mechanical centre, but under no other condition will it be so.

H. B. writes: 1. "Will you kindly tell me what material is mixed with gelatine and colour in carbon tissue to give the gloss in the shadows when dry, and in what proportion? I make my own tissue, and it dries (the print) dull. Mere gelatine makes it thick and insufficently soluble. I use sugar in nearly equal proportions to gelatine—ought I to use glycerine instead? 2. I also use glue to cheapen gelatine, and to make it set more slowly, so as to take the tissue cooler. 3. Is this right? I mix a little gelatine with the glue. The waste in cost of amateur carbon printing when you do not want many prints from one negative is so immense that I have to make my own tissue, and it is an awful business, but success crowns the labour. Still, I cannot get gloss. Material such as gum arabic or white of egg would increase the cost so much that commercially they must use something cheaper, and I do not see why they should be better than sugar. Yet the commercial tissue is not sweet, like mine, to the taste. 4. Ought I to use soap? I do not do so because it is not so soluble as sugar, and it coagulates oxide of iron. 5. Please give me any hints, as finding things out is such uphill work in such an infinitely troublesome process. The Autotype Company supply no details of their tissue-making process, of course, and other accounts are very meagre. No wonder carbon printing is not popular, when it is so beset with disaster, but the results and beauty of the process repay all trouble. The gloss is my great desideratum."—In reply: 1. In the commercial tissues sugar only is used, but generally in less proportions than those of our correspondent. 2 and 3. Glue is quite unadapted for making good carbon tissue. Only gelatine of very superior quality is used by manufacturers. 4 and 5. The only hints we can give are to purchase the tissues now in the market, our correspondent would then avoid the troubles with which he is now beset. Surely, if time, trouble, and waste be taken into consideration, the commercial article is by far the cheapest.

*** *Several correspondents must unavoidably be left over till next week.*

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PHOTOGRAPHIC CABINET MOUNTS.

CORRESPONDENT writes, asking us to advocate a revolution, n the simple score of economy, in the size and shape of the rdinary cabinet mount, and he states a fairly strong case in vour of his proposal. It needs no argument from us to ove the difficulty, if not the impossibility, of altering a andard size in the case of an article of widespread use; and, ith regard to the particular article in question, the cabinet ount, we should look upon it as a chimerical project, except, rhaps, in the one direction indicated by our correspondent—e length. Any one who will take the trouble to examine a mber of cabinet pictures, as exhibited in the shop windows enclosed in any available private album, will be able to note at, allowing a fair margin and space for the printing of name d address in distinct characters, there remains yet in the wer margin about ten per cent. of utterly useless cardboard, e only possible value of which can be what would attach to as an advertising article. It is, in fact, used as a miniature gnboard, and fearful and wonderful are the arrangements in ld, silver, red, in fact, all the colours of the rainbow, that e employed to indicate to those who run and read the name d address of the skilled photographer who produced it. It , indeed, quite true that to such extent is this name-plate aboration of letter and ornament carried out in many in-ances, that the skill or ingenuity of the die-sinker is far more tractive than the sun-print above it. There will be many to y, "Very proper, too; that is just the object of advertising, attract the eye." That, however, is not our opinion. The dvertisement should be the quality of the photograph; if at should please and attract, there is no fear of the name of e producer being unfound if it be upon the mount at all.

We should not, indeed, object to see the name placed upon e picture itself, if done in a neat fashion, and in such an rangement there would be no novelty. For some time past, e signature, stamped in gold, upon the cabinet pictures sent ut from a well-known West-end studio have been familiar ough; while they also were anticipated nearly a quarter of a ntury ago. In the early days of the *cartes-de-visite* mania, hen everybody who was anybody, and many others too, made point of buying photographs of celebrities, we should think ere was not a single album in the country which did not ossess one or more *cartes*, with the legend in white letters at e bottom of the picture, "Mayall *fecit*." Such lettering, eatly done and suitably placed within the limits of the picture self, would, we think, be more artistic, and far preferable to e existing "signature" and appendages, upon the lower argin of the mount.

The suggestion, therefore, is, that cabinet mounts should e made one-tenth or one-twelfth shorter than they now are, nd that the name of the artist be placed either upon the photograph, or in the usual place; if the latter, in distinct and legible but unobtrusive characters. What are the advantages to be gained? First, there would be a decrease in the cost of carriage, the cards necessarily weighing under the new size ten or twelve per cent. less than the existing size, and, when a parcel of only ten or twenty thousand cabinet mounts have travelled from the Continent to London, this would form a very appreciable sum. We have placed this minor item first, as its existence admits of no dispute. Next, as the amount of cardboard in each mount would be so much reduced, it might fairly be expected that the actual cost of the finished mount would be reduced almost in the same proportion, as, taking a plain unnamed mount, the cardboard itself is the main cost; cutting and trimming would form a very small fraction of the price. This question, however, would depend entirely upon whether, in cutting up the large sheets, any advantage would be taken of the reduction in size. We have not exact data as to the dimensions, at any rate of foreign cards; and, further, so much would depend upon the makers' method of cutting up the sheets for the various sizes. When gilt edges are chosen the cost of the gilt leaf would again be reduced, and in proportion not greatly inferior to that governing the cost of the boards.

Then, again, in the hands of the photographer, there would be a reduction of postage in many cases; for most photographers are familiar with the annoyance of having to attach an extra stamp when just one card less would have obviated the necessity for so doing. And, unfortunately, the cost of postage of the photographs, as far as we can learn, usually has to come out of the pocket of the photographer. Lastly, the reduction in length would be an actual convenience, instead of entailing, as might be anticipated, more trouble when placing the pictures in one of the usual receptacles—the album or frame. How many possessors of albums are there who have not had to undergo the nuisance of cutting down the redundant margin of their pictures before they would go into the space arranged for them; or, whose albums would not close when full if such mutilation were not carried out. We do not know of any receptacle in which the loss of name-margin would be a detriment with the one exception of the glass with bevelled edges and stout back frames that have long been so popular. Whether there are other disadvantages or not, our readers may decide. To them and the manufacturers we now leave the question for consideration.

AUXILIARY LIGHTING.

At a recent meeting of the Photographic Society of Philadelphia an old and, at the same time, somewhat vexed question was revived by Mr. J. F. Sachse reading a paper on *The Preliminary, Secondary, and Supplemental Lighting of the Photo-*

graphic Plate. We say it is an old and vexed question, inasmuch as it was introduced in the early days of the Daguerreotype, when its utility was upheld by some, while it was decried by others. At that period, when a plate was found to be under-exposed, it was no uncommon thing to give it a slight blush of weak daylight to obtain more detail. With the view of shortening the exposure, some one at that period proposed to whiten the inside of the camera. Of course, the reflection from the white sides produced diffused light in the camera, and this would be equivalent to a supplementary exposure.

On several occasions during the reign of wet collodion this question came to the front, and several warm discussions arose as to whether there was any actual gain in the employment of supplementary lighting. Many averred that there was, if made through different coloured media, some considering blue the best, and others green, red, or yellow; while, on the other hand, many declared that the supposed gain was merely a slight fogging of the plate, so that the shadows, which would otherwise be clear glass, became slightly veiled, by which a more harmonious result was obtained, though it was denied that more detail was brought out.

In our volume for 1872 will be found details of a series of experiments conducted in our presence by Mr. E. W. Foxlee, with, of course, wet collodion. In these experiments the plates were exposed through different coloured media, both before and after the primary exposure in the camera. The results proved that there was a considerable gain in detail by the treatment, and without the slightest trace of fogging, unless the supplementary lighting was carried too far. Also, that it made no difference what coloured medium was employed provided an equivalent exposure was given, nor whether the secondary exposure was made before or after the primary one. Also, that subdued white light was just as good as any other. In fact, it was proved that it was the action of light that did the work, and the only advantage of the coloured medium was that the auxiliary exposure was more under control than when white light was used, owing to its greater activity.

Some, in repeating the experiments, found no advantage in the supplementary lighting as, even when most sparingly used, decided fog was produced, and that too without any additional detail being obtained. Whence, then, the discrepancy? It was this. Many of those who decried supplementary lighting most were actually, though unwittingly, taking the fullest advantage of it. Those who remember what many dark-room windows were in the collodion days know quite well that often a considerable amount of actinic light reached the plate both in the sensitising and in the development. Now, it will readily be seen that, if during the manipulation of the plate it received the maximum light it would bear without fogging, any supplementary lighting would certainly cause a veiling. We well remember, about the time referred to, a portraitist told us that he had just fitted up a new dark room, and, to his astonishment, he found that negatives developed in the new room necessitated fully one-third longer exposure than those developed in the old one. We at once suggested, by way of experiment, that an additional thickness of orange fabric should be put over the old window. This was done, with the result that a much longer camera exposure was entailed.

With gelatine plates it would, at first sight, appear that supplementary exposure would be of little value, as those plates ought to be sensitive enough for all purposes. Yet we venture to say that, at the present time, there is a larger proportion of under-exposed negatives made, particularly by amateurs, than was ever the case before. This is d to the fact that the majority of the negatives taken a "snap shots." Now, if these under-exposed pictures can helped up by supplementary lighting, a great benefit wou accrue. The general consensus of opinion at the Philadelph meeting was that there is a very considerable advantage supplementary exposure if made through coloured glas though the experiments made many years ago with w collodion proved that coloured light possessed no advanta over white, beyond that, with the longer exposure necessa with the former, there was less chance of error in timing.

We know some workers who, when they find a plate som what under-exposed, submit it for a second or two to bare cand or gaslight, and thus obtain more detail. At the meeti referred to, it was suggested that some were unconscious availing themselves of supplementary lighting through actin light emitted from the lantern.

Those who may be tempted to test the value of auxilia lighting should, in their initial experiments, make sure th they are not already using it to its fullest extent. If they ar then anything in addition will certainly produce fog. Man lamps and dark-room windows pass as much actinic light a most plates will stand without fogging. The same remar applies to cameras, which, from the thinness of the bellows o the reflection from their sides, often permit a faint diffuse light to reach the plate, though not in sufficient quantity t really produce even a trace of fog, yet it may be enough to ac as an auxiliary exposure.

THE PHOTOGRAPHY OF BOTANICAL SPECIMENS.

I.

Of the many possible applications of photography there is on that is apparently altogether neglected at the present day although it was one of the—if not actually the earliest—direc tions in which photographic experiments were pushed—namely the reproduction of botanical specimens. At the very earl date alluded to the choice of this class of subject was, no doubt mainly, if not entirely, due to the absence or scarcity of an other convenient form of *chiché*, or negative, for use in th printing frame. At that period it must be borne in mind tha the sensitive surfaces prepared for use in the camera wer scarcely more sensitive than many of our modern printing pro cesses, and far slower than some, and that the production o a photographic negative involved an exposure of many hours Under those circumstances, leaves, flowers, and portions o plants, as well as many other conveniently flat objects, such a engravings, patterns of lace, or other textile fabrics, formed pretty nearly the only subjects upon which the experimentalis in the new art of "sun painting" could expend his energies.

Even in far later years similar objects have been utilised by many an embryo photographer in his earliest attempts, for the very plain reason that printing, being the easier branch of the art than negative making, was usually the first taken up, and indeed, most of the earlier hand-books of the science gave this as the preliminary step in learning the practical part of photo graphy. But, entirely beyond the question of convenience in learning, it was soon found that not only decorative and orna mental results were obtainable in this direction, but also that absolutely useful employment might be made of this branch of photography, and we believe at the present time there are in existence in the British Museum and elsewhere botanical trea-

ses which have been thus illustrated by making photographic rints direct from the natural objects without the intervention f the camera.

At the present time, when such a vastly increased number ractise the art as amateurs, there must be many amongst iem who are more or less interested in botanical studies, esides many others who follow the decorative branches of art, id to all of whom this phase of photography can scarcely fail to rove of use for one purpose or another. We have recently en, for instance, an extensive collection of photographs of rare rns and seaweeds executed by a lady whose knowledge of hotography does not extend beyond the manipulation of ady-sensitised paper, and a second series of artistic designs r various decorative purposes executed under similar con-itions.

Those who have never seen the charming results that can be btained in this manner, with a little care and study of the re-uirements, would probably be surprised at the beauty and elicacy of detail of the reproductions that can be made with ery simple apparatus. But, of course, to secure the full dvantage of the photographic process, it is necessary to give me little attention to the preparation of the objects that are be operated upon. Premising that the present is a very vourable season for obtaining suitable specimens to work with, e intend to give a few simple directions for the benefit of ose who may be sufficiently interested to take up this branch the art, which has the special recommendation to those hose regular avocations do not permit them to devote a great mount of time to photography, or to travel much in search of icturesque landscape subjects, that an afternoon's stroll among uburban lanes and hedgerows will provide material for many hour's pleasant amusement at home.

We shall assume that the work is to be done entirely with-ut the camera, and therefore the apparatus required is limited a printing frame or two, and the necessary dishes for toning nd fixing, the remainder of the outfit required consisting of ne sensitive paper and needful chemicals. As regards the ze of the printing frames, this will depend upon the kind of ork to be done; if single specimens are to be treated simply *as* pecimens, then a comparatively small frame will suffice, unless, ideed, the ambition of the operator leads him in the direction f objects of extraordinary dimensions. In such case the diffi-ulties will be found greatly multiplied in more ways than one, ut especially in obtaining perfect samples from which to work, s well as in preparing them for use. If the object be to pro-uce decorative designs by the grouping of several different pecimens, then, of course, the size of the frame must be suited o the requirements of the work; but in all cases a frame of ufficient size is to be preferred, for, if filled, as it should be, vith plate glass, it is equally available for large or small prints.

The first attempts at printing may be made with the ordi-ary commercial ready-sensitised paper, if, indeed, this is not or the purpose the best medium to employ. Platinotype, or ny of the bromide development papers, may be adopted at a ater stage, if they be preferred, but we question whether the esults obtained by these means are equal, so far as regards beauty of colour, for this particular purpose to those given on silver paper. The general tone, and there is a wide latitude, s more pleasing than the cold black of platinum and developed prints; the manipulation is easier, and, above all, the albumen paper lends itself so admirably to the production of *negatives* from which to reprint positive impressions.

If a simpler process be desired for the very first steps, then the ferro-prussiate paper—also an article of commerce—may be used, and this will be found both easier to work and cheaper, until the necessary familiarity is obtained in the choice and treatment of the subjects; while for special purposes the colour of the prints gives peculiarly pleasing effects. Those who desire to venture beyond the beaten track will do well to try what can be done with the "primuline" process, which is equally applicable to paper or fabrics, and which, by suitable modification in treatment, is capable of giving a wonderful variety of colours, and is, moreover, particularly well suited to the rendering of botanical subjects. But the adoption of this process will involve the exercise of a little more chemical knowledge.

To sum up our remarks on the question of process, we should say, let the work be confined to no one in particular, but let that one be selected which best suits the subject in hand, always employing, or mainly, albumenised paper as the basis of the negative. There may be subjects occasionally met with that, from their physical character, are difficult to reproduce properly on the slow chloride paper; in such cases, of course, the more rapid development papers prove useful, and, the negative once obtained, it may be used in conjunction with any other sort of paper that may best suit the original.

We have alluded to the production of negatives. Naturally the print produced direct from a leaf or fern is itself a negative so far as light and shade are concerned, although it may not be suitable for printing purposes. Where the object is merely to produce an artistic design in which the combination of graceful forms is the chief object, then the print direct from the original in reverse, as regards black and white, will serve the purpose; but, where a true and correct rendering of nature is wanted, it is essential to first produce a negative, and from that again a print, in the correct shades of the original. For this purpose the albumen paper is the best to use, and it is necessary to print very much deeper than would be required if the impression were to be used as a positive, until, indeed, the finer details of the subject are quite lost, except by transmitted light.

In making the negative, if the printing be carried far enough, it is scarcely necessary to go to the trouble of toning the proof, as its colour is of no consequence in printing; but, if it should appear that the depth of the printing is scarcely sufficient, it will be as well to tone the image, at least slightly, as that will in a great measure prevent its over-reduction in the fixing bath. Otherwise, given the necessary deposit of silver, the untoned image is perhaps better for printing than the other. After fixing, washing, and when nearly dry, the print, or rather *negative*, should be smoothed over with a hot iron, and may be used in that state for printing; but, in order to render the operation of printing as rapid as possible, it is better to render the paper support as transparent as possible by saturating it with wax or other similar material, wax being perhaps the most convenient for the ordinary amateur.

The process of waxing is easily performed by laying the negative, albumen side downwards, on a sheet of hot metal and rubbing it with a lump of white wax, or, better still, solid paraffin, which has less tendency to discolour. When the paper has become uniformly translucent, place it between folds of blotting-paper and pass the hot iron over it until the superfluous wax is absorbed. It is then ready for printing. When not in use, the waxed negatives should be kept between the leaves of a book or in a portfolio, for the double purpose of

protecting them from injury from creasing as well as from dust, which attaches itself very readily. The glass and other portions of the printing frame should be kept most scrupulously clean for the same reason.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

We resume our report.

On Wednesday afternoon (the President in the chair) Mr. William Lang, jun., read the following paper:—

THE PHOTOGRAPHIC WORK OF HERSCHEL AND FOX TALBOT.

By William Lang, jun., F.C.S.

The two scientists whose photographic work is dealt with in the following communication were virtually contemporaries, and their connexion with the town in which we hold our present Photographic Convention may be described as direct and indirect. Talbot's connexion was essentially a direct one, living, as he did, within a short distance of Bath. Herschel's, on the other hand, has to be accounted for in the fact that his father, Sir William Herschel, resided here for several years before his appointment as private astronomer to George III. necessitated his removal to Slough, in the neighbourhood of Windsor. To the student, therefore, of the history of photography, Bath will have something more than a passing interest—for him it will be for ever classic ground. I only wish that the summarising of the work done by Herschel and Fox Talbot had been placed in worthier hands than mine, but, having been intrusted with the task, I shall do my best to acquit myself of it.

In the first number of the *Edinburgh Philosophical Journal*, which made its appearance in June, 1819, the second contribution we find to be from Herschel, and its title *On the Hyposulphurous Acid and its Compounds*. In the opening sentence we are told that the experiments about to be described are the result of an accident. Experimenting with sulphide of lime, and noticing a bitterness in the liquid when almost wholly decomposed similar to that of Epsom salts, and which could not be accounted for, Herschel was led to examine the properties of the body giving this characteristic bitterness, and which Herschel showed to be hyposulphite of lime. From the hyposulphite thus produced, other hyposulphites were prepared. In the memoir these salts—at all events, the more important—have their properties described. The action of hyposulphite of soda and of the corresponding salt of potash on chloride of silver is distinctly set forth. Referring to the soda salt, we find it stated in the memoir, "Muriate of silver, newly precipitated, dissolves in this salt, when in a somewhat concentrated solution, in large quantity, and almost as readily as sugar in water." Herschel states it broadly that all liquid hyposulphites dissolve muriate, or, as we call it now, chloride of silver. He points out the fact that such a solution possesses great sweetness to the taste, and that most of the ordinary tests for silver fail to show the presence of that metal in the solution. He further shows that zinc can separate metallic silver on being immersed in the hyposulphite solution. In conclusion, it may be noted that the contribution is dated Slough, January 8, 1819.

Herschel had evidently found congenial work in tracing out further reactions connected with the hyposulphites. In the same volume of the *Edinburgh Philosophical Journal* occurs another contribution—additional facts relative to the hyposulphurous acid. This appeared in the October issue, and the date affixed to the article is May 15, 1819. Time fails us to refer in detail to the various facts brought forward, but one observation deserves to be noted, viz., that where silver iodide is described as sparingly soluble in hyposulphites. It has to be remembered silver bromide was then unknown bromine, not being discovered till 1826; the salts of silver thus treated by Herschel were chloride, carbonate, phosphate, borate, malate, sulphite, and arseniate. The second volume of the same journal has one other memoir—some additional facts relating to the habitudes of the hyposulphurous acid and its union with metallic oxides. This contribution is dated Slough, November, 1819. The true importance of these researches did not make itself manifest till some twenty years later, when the necessity of removing the unacted-on silver salt from the developed image became apparent. Daguerre and Talbot's methods, as first propounded by their respective authors, were far from perfect, being images not sufficiently fixed. Herschel himself called the attention of these investigators to his early experiments, and the employment of hyposulphite of soda for the final operations made the Frenchman's and the Englishman's processes thoroughly complete.

As Herschel seems to have been the first to analyse coloured flames by means of a prism, it may be as well here to note the fact, although it may not strictly be termed photographic. In 1822, in the Edinburgh Royal Society's *Transactions*, page 455, a memoir is contributed *On the Absorption of Light by Coloured Media, and on the Colours of the Prismatic Spectrum, with an Account of a Ready Mode of Determining the Absolute Dispersive Power of any Medium by Direct Experiment*.

In 1827, Herschel, among other articles, wrote that on Light in the *Encyclopædia Metropolitana*. Up to about this time Herschel had been an adherent of the emission theory of light, but the labours of Young and Fresnel had induced him to accept the undulatory theory.

In 1832, a short communication in the form of a letter was made to the British Association at their second meeting, which was held at Oxford. The title of the paper indicates the subject-matter—*On the Action of Light in Determining the Precipitation of Muriate of Platinum by Lime Water*.

Herschel went abroad in the latter end of 1833 to carry out a long-cherished desire to survey the heavens of the southern hemisphere. His destination was Feldhausen, six miles from Capetown, and here, for four years, were carried on those astronomical observations which will for all time be associated with the name of Herschel. I am not aware that during the period in question anything bearing sufficiently intimately on what may be called photographic research has to be recorded, although solar radiation observations were made from time to time. The third meeting of the British Association was held at Cambridge in the month of June, 1833. Two papers were contributed by Herschel, *On the Absorption by Light of Coloured Media, viewed in connexion with the Undulatory Theory*, and *The Principle and Construction of the Actinometer*. It has to be noted that the instrument described was one destined to estimate the heating power of the sun's rays, not what we photographers understand by the title. The former paper appears only in abstract in the Association Reports, but was printed *in extenso* in the *London and Edinburgh Philosophical Magazine and Journal*, vol. iii. p. 401.

Before the Royal Society, on March 14, 1839, a paper was read by Herschel, entitled *Note on the Art of Photography; or, the Application of Chemical Rays of Light to the Purposes of Pictorial Representation*. At the outset the author states that his attention had been but recently called to the subject of Daguerre's concealed photographic processes, and that he had not known that the question had been considered by Talbot, or by any one in this country; as an enigma to be solved, a variety of processes at once presented themselves. First, the so-called dioxidising power of the chemical rays in their action on recently precipitated silver chloride; secondly, the instant precipitation of a mixture of platinum chloride and lime water by light, forming an insoluble compound, which might be blackened by various reagents; and, fourthly, the decomposition of an argentine compound, soluble in water exposed to light in an atmosphere of peroxide of chlorine. Confining his attention to silver chloride, the author inquires into the methods whereby the blackened traces can be preserved, and the unaltered salt removed. This state of things can best be brought about by the use of the liquid hyposulphites. The author then specifies other salts of silver more sensitive to light than the chloride, viz., the carbonate acetate and nitrate. Commenting on investigations to be made on the spectrum, he advocates that the spectrum be produced, not by the prism, but according to Fraunhofer's method, by the interference of the rays of light themselves in passing through gratings, and fixed by the heliostat.

Accompanying the paper thus briefly referred to were twenty-three specimens of photographs, one a picture of the large telescope at Slough, produced in the camera. Through the kindness of Professor A. S. Herschel, I am enabled to show a photographic reproduction of the frame of the great telescope belonging, if not to this particular period of the year, at all events to several months later.

The year 1839, I need scarcely remind a photographic gathering, gave to the world Daguerre's method of securing "sun pictures," and, as this had been but recently divulged before the annual meeting of the British Association, we find it engaging the attention of the Mathematics and Physics Section. Talbot's remarks will be referred to when I come to deal with his work. Herschel's contribution on that occasion was a letter addressed to the President of the section, wherein he stated that, in experimenting with Talbot's paper and exposing it to the spectrum, he got coloured impressions. He also records the action of the red rays on paper which had, in the first instance, been exposed to light. On February 20, 1840, Herschel presented to the Royal Society a paper entitled, *On the Chemical Action of the Rays of the Solar Spectrum on the Preparations of Silver and other Sub-*

stances, both Metallic and Non-metallic. The reading of the paper extended over three meetings, viz., 20th and 27th February, and 5th March. The whole memoir is full of suggestive material; there is only time to note one or two of the more important points. The terms positive and negative are here introduced for the first time to indicate respectively pictures in which the lights and shades are the same as in nature, and in which they are the opposite (par. 8), and these distinctive terms remain with us to this day. The first part of the memoir is devoted to the fixing of photographs, and the comparative merits of hyposulphites, potassium iodide, potassium ferrocyanide, &c., are discussed. The bleaching of the image by mercuric chloride is here recorded (par. 19). The second part relates to the taking of photographic copies and transfers. The third treats of the preparation of photographic paper, the photographic possibilities of lead compounds. The author describes a method of precipitating on glass sensitive silver compounds, and refers to such films being likely to lead to an extension of the art of photography. After stating results of his experiments with iodide, bromide and chloride of silver, he suggests that similar experiments be made with silver fluoride. Gold and silver salts were also experimented on.

The fourth division of the paper is occupied with what the author calls the chemical analysis of the solar spectrum. It would be beyond the limits of this communication to go further into all the experiments and speculations recorded in this classical memoir. The paper occupies sixty pages of the printed *Transactions* of the Royal Society, and it may be regarded as the foundation stone on which subsequent researches and experiments have been reared. One of the Society's medals was awarded to the author for this contribution to science.

The eleventh meeting of the British Association was held at Plymouth in July, 1841. Herschel, on that occasion, addressed a letter to the Physical Section, accompanied by fifteen specimens of coloured photographic copies of engravings and mezzotints, "the whole" (as the writer puts it) "being tinted with substances of vegetable origin, variously prepared."

In the following year, viz., 1842, another memoir was presented to the Royal Society, *On the Action of the Rays of the Solar Spectrum on Vegetable Colours, and on some new Photographic Processes.* Although appearing in the *Philosophical Transactions* as one contribution, there were originally three papers read before the Royal Society, the respective dates of which were June 16 and November 17 and 24. The memoir is a continuation of the one given in 1840. Elaborate experiments with gum guiacum and expressed juices of flowers are first given in detail, and these are followed by others where the salts of iron have their reactions studied, the outcome of which we have in the two photographic processes known as chrysotype and cyanotype. Briefly stated, the first-named consists in coating paper with a solution of ammonia-citrate of iron, exposing to light, and afterwards developing with a solution of gold chloride. Some specimens thus prepared are here, by way of illustration. The fixing of chrysotype was effected by means of potassium iodide. The reduced iron compound can also be rendered apparent by means of a solution of silver nitrate. A print thus produced is here for inspection. Cyanotype is perhaps better known to most of us as the blue process. In this method, development is effected by means of a solution of potassium ferricyanide, red prussiate of potash. The memoir closes with some experiments bearing on the photographic properties of mercury.

In these early years of the photographic art, the *Athenæum* was in the habit of reporting matters appertaining to photography. In consequence of some discrepancies in the account given by this paper of the foregoing discoveries, we find a letter from Herschel making the necessary corrections. The letter, dated 10th August, 1842, appears in No. 773, p. 748, of the *Athenæum.*

Professor Draper, of New York, having, towards the end of the year 1842, presented Herschel with a Daguerreotype impression of the solar spectrum, the latter, in acknowledging its receipt, contributes to the *Philosophical Magazine* an article entitled "Action of the Rays of the Solar Spectrum on the Daguerreotype Plate." From it we learn that Herschel had himself been experimenting in securing spectrum impressions on Daguerreotype plates, and, although he admits that his manipulation was not all that could be desired, still his results were such that comparisons could be instituted between Draper's plate and his own. The whole tenor of the paper is philosophical, and occupies twelve pages of vol. xxii. of the journal already referred to.

At the Cork meeting of the British Association in August, 1843, a paper was communicated by Herschel—*Notice of a Remarkable Photographic Process, by which Dormant Pictures are Produced Capable of Development by the Breath or by Keeping in a Moist Atmosphere.*

In the *Philosophical Transactions* for 1843 we find another memoir contributed to the Royal Society—*On Certain Improvements in Photographic Processes Described in a former Communication, and on the Parathermic Rays of the Solar Spectrum.* This communication was made on November 24, and is, in effect, a continuation of the two former memoirs, the numbering of the paragraphs running continuously throughout.

At the York meeting of the British Association, held in September, 1844, Herschel announced a new photographic process, to which he gave the name of Amphitype, a term suggested by Talbot, in consequence of the picture, according to the method adopted in the subsequent manipulations, becoming either a positive or a negative reproduction. It may be here remarked that Herschel, in all these experiments, seems to have used engravings instead of the ordinary negative. Herschel, from his researches, had realised the fact that silver bromide was more sensitive to light, or, rather, that it was affected by a wider range of the rays forming the solar spectrum, than silver iodide, which formed the staple of calotype, and afterwards that of the collodion process. Accordingly, when the Photographic Society of London was formed, in 1853, among the first contributions to its *Transactions* we find one from Herschel—*On the Substitution of Bromine for Iodine in Photographic Processes.* This paper was read June 2, and I may be allowed to quote one pregnant sentence from it, which may almost be regarded as prophetic: "A new photography has to be created, of which bromine is the basis." In 1855, Herschel advocated the desirability of securing daily photographic representations of the sun. The original communication was read before the Astronomical Society, and will be found in the volume for 1854–55 of the *Monthly Notices* of the Society. It is also to be found reported in the *Athenæum*, in No. 1435.

In 1858, at the Leeds meeting of the British Association, Herschel presided over Section B, the Chemical, and his introductory remarks, so far as they relate to our own science of photography, may be appropriately quoted. The words used by Herschel in 1858 are no less significant in our own day:—

"Hitherto, the more attractive applications of photography have had too much the effect of distracting the attention from the purely chemical question which it raises, but the more we consider them in the abstract the more strongly they force themselves on our notice, and I look forward to their occupying a much larger space in the domain of chemical inquiry than is the case at present."

The same sentiment regarding photography has been otherwise expressed by Major Russell, who is credited with having said that photography would be a most interesting subject were it not for the pictures.

In 1859 an article from Herschel appeared in the second volume of the *Photographic News*, in the number for July 22, "The Action of the Solar Spectrum upon Certain Compounds of Silver," and in the third volume of the same paper, in the number for September 9, under the same title, a further communication is to be found. This article has an accompanying illustration of the apparatus employed by the author in securing his spectra impressions.

In the *Photographic News* of May 11, 1860 (vol. iv.), Herschel contributes an article, "Instantaneous Photography." He discusses the possibility of taking a rapid series of pictures of moving objects, and recombining them in the optical apparatus, the phenakistiscope. The appearance of motion is again imparted to the eye when the pictures are rapidly revolved. This method, as you are all aware, has been adopted by Muybridge. A term is used by Herschel in this communication which although common enough nowadays, is very significant, and describes well the taking of an instantaneous picture. I refer to the term "snap shot." I make the statement subject, of course, to correction, but I think we may give to Herschel the credit of coining this photographic term for us equally with the better known terms of "positive" and "negative."

In 1861, in the eighth volume, page 384, of THE BRITISH JOURNAL OF PHOTOGRAPHY, Herschel contributes an article, "Forms of Lenses suited for Destroying Spherical Aberration."

The foregoing represents an epitome of the work done by Herschel. We will now consider Talbot's share in the development of our art.

Talbot's experimental photographic work appears to have been begun about the year 1834. By means of paper impregnated with silver chloride, Talbot asserts that he had secured camera pictures of his residence as early as 1835 (*vide* appendix to second edition of Tissandier's *Photography*, written by Talbot). It was not, however, till January 25, 1839, at one of the Friday meetings of the Royal Institution, that the process was first publicly announced, and as Faraday, who brought the matter forward, explained, it was done so for the purpose of "establishing a date." Daguerre's process had been announced in January, but the particulars were only known to his friend Arago. Talbot had in the meantime sent in a paper to the

Royal Society, and he was afraid that Daguerre's process might be divulged before his communication to the Royal Society was published. On the Thursday following, however, viz., the 31st January, 1839, Talbot's paper, entitled, *Some Account of the Art of Photographic Drawing; or, the Process by which Natural Objects may be made to Delineate Themselves without the Aid of the Artist's Pencil*, was read. The paper was not published in the *Philosophical Transactions*, but an abstract of it is given in the *Proceedings of the Royal Society*, vol. iv. p. 120. It was printed *in extenso* in the *London and Edinburgh Philosophical Magazine*, March, 1839, vol. xiv. p. 209. Both at the Royal Institution meeting and that of the Royal Society, specimens of "photogenic drawing" were exhibited, along with the camera pictures of Talbot's residence. On the 21st February, 1839, a paper entitled, *An Account of the Processes Employed in Photogenic Drawing*, was communicated to the Royal Society. The memoir divides itself into two parts, first the preparation of the paper, and secondly the fixing of the design, which was effected by a solution of potassium iodide of the proper strength, or by a strong solution of sodium chloride. Talbot at this stage was doing little more than producing negative designs from opaque natural objects.

A communication from Talbot to the *Philosophical Magazine*, "On a New Property of the Iodide of Silver" may be here referred to. It appears at p. 258, vol. xii., and is a note of the appearance that silver iodide presents when heat is applied. A pale primrose yellow when cold, this salt when exposed to the heat of a fire turns to a rich, gaudy yellow. Before passing on to consider Talbot's later researches, I may be allowed to refer, as briefly as possible, to some of his earlier work, giving the original source of publication.

In 1826, "Some Experiments on Coloured Flame," *Edinburgh Journal of Science*, v.

In 1827, "On Monochromatic Light," *Quarterly Journal of Science*, vol. xxii.

In 1833, "Remarks on Chemical Changes of Colour," *Philosophical Magazine*, vol. ii.

In 1834, "Experiments on Light," *Philosophical Magazine*, vol. v., pp. 321-334; and *Royal Society Proceedings*, p. 298, vol. iii.

In 1835, "On Nature of Light," *Philosophical Magazine*, vol. vii.

The foregoing by no means exhaust the scientific contributions of Talbot. His mathematical memoirs were considerable. A Royal Society's medal was awarded him in 1838 for "Researches in Integral Calculus."

Dealing again with the year 1839, we find Talbot making a short communication to the Royal Society on March 21st, the title of which is, *Note respecting a New Kind of Sensitive Paper*. In using bromide of potassium instead of sodium chloride the author finds that greater sensitiveness is manifested. He also refers to a mode of making a negative design on glass by blackening the same by means of the smoke of a candle, and etching out the lines by means of a needle point.

The ninth meeting of the British Association was held at Birmingham in 1839. It opened its proceedings on the 29th of August, ten days after the public announcement of Daguerre's method. Accordingly, we find Talbot contributing a paper to the section of Physics and Mathematics, dealing with the Frenchman's discovery, *Remarks on M. Daguerre's Photogenic Process*. Talbot's paper is for the most part taken up with the consideration of the optical phenomena presented when a particle of iodine is laid on a silver plate and afterwards gently treated. He seems, moreover, to doubt the superior sensibility of Daguerre's plate over his photogenic paper. The discussion that ensued is reported in No. 618 of the *Athenæum*, August 31, 1839.

Up to this point, as we have seen, Talbot had been busying himself with the obtaining of actual images—"printed out" subjects, as we would now call them. Talbot's own words, referring to his calotype process, may be here quoted. They are taken from the appendix already alluded to. "The discovery of the latent image and the mode of its development was made rather suddenly on September 20 and 21, 1840. This immediately changed my whole system of work in photography. The acceleration was so great, amounting to fully one hundred times, that, whereas it took me an hour to take a pretty large camera view of a building, the same now only took about half a minute, so that, instead of having to watch the camera for a long period, and guard against gusts of wind and other accidents, I had now to watch it for barely a minute or so. Portraits were now easily taken in moderate daylight. One of the first portraits taken was sent to the French Academy of Sciences, where it excited great interest, and was passed from hand to hand, and afterwards to the public in the galleries, my friend Monsieur Biot being my informant.

"I soon drew up an account of this new process, which I named the Calotype, and transmitted it to the Royal Society."

The memoir in question was read at the Royal Society meeting of June 10, 1841, its title being *An Account of some Recent Improvements in Photography*. The process, briefly stated, consisted in forming silver iodide, in the first instance, on the surface of paper, sensitising thereafter by means of gallo-nitrate of silver, developing the image after exposure by further applications of the gallo-nitrate solution. The fixing was effected by means of a soluble bromide. The process was patented in February, 1841, but in 1852 Talbot, with certain reservations, gave the right to work it to his countrymen. Specimens of early calotypes I have here with me, and can be inspected afterwards. The calotype, or Talbotype, was a negative picture, the positive reproduction of which was obtained by means of his photogenic paper. By a modification of his process Talbot worked out a method whereby positives were secured in the camera. The *modus operandi* was as follows: Sensitised calotype paper was exposed to sunlight till a visible browning took place; afterwards it was dipped into a solution of potassium iodide (twenty-five grains to the ounce), washed in water, dried with blotting-paper, and a good full exposure given in the camera. Development by means of the gallo-nitrate solution was then resorted to, when a positive reproduction was obtained. I pass a camera picture round secured by this method.

In 1842 the Rumford gold medal was awarded Talbot in recognition of his photographic discoveries. At the Cork meeting of the British Association in 1843, Talbot was asked by the General Committee "for his report on photography and its applications to be presented, if possible, at the next meeting." The report asked for does not appear, but we find a communication from Talbot detailing his experiments on sulphate of iron as a developer in his calotype process. As is well known, the proposal to use ferrous sulphate emanated from Robert Hunt. The short abstract of Talbot's paper will be found at page 105 of *Report of Transactions of British Association* for 1844.

In 1843 Talbot was over in Paris for some little time, giving lectures and demonstrating his process.

In 1844 the first part of the famous *Pencil of Nature* made its appearance. Its publication extended over a period of two years, several unforeseen difficulties having been met with. There were six parts in all, and twenty calotype illustrations in the complete work. In 1845 another work was published having similar photographic illustrations, with the title of *Sun Pictures in Scotland*. Both works are here for inspection of those interested. In 1843, in the *Art Union* number for June 1, an article entitled "The Talbotype Sun Pictures," evidently inspired by Talbot, forms the first contribution. As a supplement a calotype was furnished with each number. There must be still extant a goodly number of these pictures hidden away in old bookstalls and in libraries. The original issue was something like 7000, and a large number of negatives seem to have been employed. In all those reproductions which I have seen I have not yet met with a duplicate. I have with me for inspection two of these early Talbotypes.

In June, 1851, a remarkable experiment was performed by Talbot at the Royal Institution. A printed paper was attached to a wheel, which was made to revolve rapidly in the dark. On illuminating the paper for a very brief interval of time, by means of the electric spark, a photographic transcript of the printed matter was obtained on a plate prepared by a method described in the *Athenæum* of December 6, 1851. The process was patented by Talbot.

In 1852 Talbot secured a patent for photo-engraving. He gave the name of Photoglyphy to his method, and made use of the well-known action of light on bichromated gelatine, the etching of the plate being performed by means of iron perchloride. A subsequent patent was taken out in 1858, the improvement consisting in the application of a resin to the plate before commencing etching operations.

A supplemental illustration of this mode of engraving was issued with No. 10 of the *Photographic News*, appearing November 12, 1885. Several plates were employed to give the necessary number of prints for the circulation of the paper; we find, therefore, that the subjects depicted are somewhat varied, and they are mostly Continental.

A more perfect illustration appeared with No. 54 of the *Photographic News*, September 16, 1859 (vol. iii.). In this supplement there was only the one subject chosen, a view of a portion of the Tuileries. The plate which furnished the proofs was copper, and had been steel-faced. I regret that I am not in a position to show specimens illustrative of Talbot's photo-engraving. A specimen of a half-tone engraving appears in a second edition of Tissandier's *Photography* already referred to, as also a specimen of line work.

These, as I have the book with me, can be seen. Several other patents connected with photographic applications were applied for. We need only refer to one taken out in conjunction with Malone for

the use of unglazed porcelain instead of glass, and employing an albumen process.

Enough has been said to show how very assiduously Talbot must have worked at the various photographic methods he from time brought forward; but other scientific matters engaged his attention as well. It would be beyond the limits of this communication to enter into these. We are only more immediately concerned with the facts which we have just glanced at. I regret that the marshalling of these had not fallen into the hands of one more capable of rendering full justice to them. It will be our privilege, as a Convention, to visit the shrine of Lacock Abbey, where the illustrious Talbot worked, and surely that "building which was the first that was ever known to have drawn its own shadow," to use Talbot's own expression, must have an interest and significance to the photographic pilgrim which to the ordinary visitor will be completely wanting.

At the termination of the paper,

Mr. J. Traill Taylor said he had the honour of having been personally acquainted with Mr. Fox Talbot, and he had often come in contact with him. In sending around a copy of *The Pencil of Nature* for inspection, he said that those present would see a fading of the pictures around the margins. When engaged many years ago in writing his life of Fox Talbot that gentleman had told him the circumstances under which that marginal fading had taken place, and the disgust he had felt at discovering that silver prints were liable to fade. This had led him to the determination of producing a process in which the image should be formed of an unalterable material, such as carbon, out of which was evolved his process of photoglypty, in which the photographs were produced in printers' ink from a metallic plate photographically produced and engraved.

Mr. C. H. Talbot followed with some remarks relative to the earliest works of his father, and the methods he had employed for fixing both the negatives and the prints. It was in September 1840 that his father discovered the existence of a latent image capable of being developed, and he had in his possession specimens taken at that time, which were fixed by iodide of potassium. The name Talbotype was given to his father's productions, but he never liked it, and invariably employed the term Calotype to designate them. He referred to several specimens of his father's early work now in the possession of the Bath Photographic Society. For particulars of such early work he referred them to the *History of Photography*, by Gaston J. Tissandier, to which his father, and subsequently himself, had contributed matters of historical interest. He had numerous specimens both of calotypes and photoglyphs which he would lay out and show to those members who would attend the excursion to Lacock Abbey on the following Friday.

Mr. C. H. Bothamley then read the following paper on

RECENT DEVELOPMENTS IN PRINTING PROCESSES.

Later developments of printing processes have proceeded along certain well-marked lines, the one common aim being to render the use of albumen unnecessary, and, in view of the want of permanency that characterises albumen prints, it will be admitted that the attainment of this result is much to be desired. For some time the development was all in the direction of the production of prints with a black or even blue-black colour, and we were afflicted with one of those attacks of artistic cant from which photography suffers now and again. It was urged that, quite apart from any advantage of greater permanency, the new prints are much more artistic, simply because they are black. The preachers of this faith seem to have forgotten that etchings and mezzotints, to say nothing of photogravures, are very rarely printed in black, and that some of the most famous etchers and mezzotint engravers have printed in very warm browns and, at times, in red-browns. Now, I for one decline to admit that a black print is necessarily more artistic than a brown print simply because the one is brown and the other is black, and I welcome the still later tendency towards the production of prints with warmer colours, provided always that the prints are permanent.

Methods for the production of prints with warm colours, such as gelatino-chloride paper, alpha paper, and Lionel Clark's silver toning, are too familiar to require more than passing mention, and I propose to speak in detail of only two or three methods, which are based either on novel principles, or on principles that have not hitherto been successfully applied in practice.

Platinotype has long been regarded as the first of the black printing processes, but the present very high price of platinum has stimulated investigation in the direction of replacing the platinum by some cheaper metal that will produce prints of the same character and, as far as possible, with the same degree of permanence. So far, the only important outcome is the process that is known as kallitype, which in principle is precisely similar to the platinum process, except that the image is formed of metallic silver instead of metallic platinum.

Kallitype is based upon the old observations of Herschel and of Hunt that when ferric tartrate, citrate, or oxalate is exposed to light, and thus reduced to a ferrous salt, and the ferrous salt is treated with a solution of silver nitrate, metallic silver is precipitated in quantity dependent on the quantity of ferrous salt that has been formed on each part of the surface. Until quite recently these facts had not been utilised, but Dr. W. W. J. Nicol, working with a full knowledge of the chemical changes involved, has succeeded in producing a practicable printing method by making considerable alteration in the details of the process. Kallitype, in fact, is an excellent example of the way in which an old observation, apparently of little practical value, may become of very great utility in the hands of a man who has sufficient knowledge of chemical and other principles to develop it in the right direction and in the right manner.

The details of the process, as first published, are to be found in patent specification No. 5374, February 15th, 1890 (The British Journal of Photography, XXXVII., 170–171; *Photographic News*, XXXIV., 207). Paper is coated with a solution of ferric citrate, ferric tartrate, or ferric oxalate, or mixtures of all or any of them, and is dried. It is then exposed behind a negative until a faint image is formed, just as in platinotype, and the image is developed by treating it with a solution containing 10 per cent. of sodium citrate, 1 per cent. of silver nitrate, and sufficient ammonia to just keep the silver in solution. The patentee recommends a solution containing 1·5 per cent. of silver nitrate, but I find that better results are obtained with only 1 per cent., and the best method of making up the solution is to dissolve the silver nitrate in a small quantity of water, add dilute ammonia very carefully until the precipitate formed is just, and only just, redissolved, then add the sodium citrate, previously dissolved in five or six parts of water, make up to the required volume, and filter. It is also recommended that a very small quantity of potassium dichromate should be added. The sodium citrate has the double function of dissolving the ferrous salt, and thus enabling it to reduce the silver nitrate, and of preventing precipitation of the iron by the ammonia. After development the print is immersed in a 20 per cent solution of an alkaline tartrate or citrate, made strongly alkaline with ammonia, and afterwards in two successive baths of a dilute solution of sodium citrate containing free ammonia. The alkaline tartrate or citrate removes the iron compounds, whilst the ammonia removes the silver compounds, and finally the prints are washed in water.

The chief objection to this process was the use of silver compounds in the developing solution, which, of course, was very liable to stain the fingers of the operator, and quite recently a modification of the process has been made, which not only removes this objection, but also enables prints to be obtained with a very warm colour. The silver salt is in the paper instead of being in the developer, and it is interesting to note that the modifications in kallitype have followed the reverse order to the modifications of platinotype; in the latter the platinum was at first in the paper, but in the latest modification it is in the developer.

The specification of the patent of kallitype No. 2 is not yet published, but Dr. Nicol has kindly informed me that the paper is coated with a solution containing ferric oxalate, ferric nitrate, silver oxalate, silver nitrate, and oxalic and nitric acids. It must be kept as dry as possible, but does not require the same minute precautions as the old platinotype paper. The pads, &c., of the printing frame must also be dry. My own experience leads me to the conclusion that care in this matter of keeping the paper dry is of very great importance.

The paper is exposed until the detail in the densest parts of the negative is very faintly indicated, the appearance of the image being very much the same as in platinotype, and it is then developed, the composition of the developing solution varying with the colour required in the finished print. For *black prints*, the exposed paper is immersed in a solution containing 10 per cent. of Rochelle salt, and 10 per cent. of borax; for *purple prints*, 10 per cent. of Rochelle salt, and 2 to 5 per cent. of borax; for *sepia prints*, 5 per cent. of Rochelle salt, 1·25 per cent. of borax, and a small quantity of hydrochloric acid. In all three cases a small quantity of a dilute solution of potassium dichromate must be added. The dichromate keeps the whites clear, and increases the contrasts, and the character of the prints can be altered by varying the proportion of this salt; too high a proportion destroys the half-tones. The examples shown demon-

strate this point very clearly; in each case two prints were made of as nearly as possible the same intensity, and one was developed with a solution containing no dichromate, the other with a solution to which the dichromate had been added.

The prints are allowed to remain in the developing solution for some time, in order that the Rochelle salt may remove the iron from the paper; and the excess of silver salts is then removed by immersion for about fifteen minutes in—*water*, eighty parts; *strong ammonia solution*, one part. The prints are afterwards washed in water.

My own experience indicates that, even after prolonged immersion in the developer, there is danger of iron salts remaining in the paper, with, of course, loss of purity in the whites, and I recommend that, after removal from the developer, the prints should be immersed in a 10 per cent. solution of Rochelle salt before being put into the ammonia. After the Rochelle salt has been used frequently for this purpose, it may be utilised for making up fresh developing solution.

The black prints have a good colour, with a very slight bluish tinge, the whites are clear, and the gradations good.

The sepia prints are not so satisfactory; the colour is often too red, and is sometimes not uniform throughout the print. It seems, in fact, that it is more important in this case that the paper should have been kept thoroughly dry. Prints should be somewhat deeper than for the other developers, and the developer, if used frequently, must be kept acid by addition of a few drops of hydrochloric acid.

The permanence of the kallitype images is of considerable interest. The black images by both the first and second method are not altered by exposure for forty-eight hours to the products of the combustion of sulphur in air, nor by immersion in a solution of sulphurous acid for the same length of time. A solution of sulphuretted hydrogen, if dilute, changes the colour to bluish black, but produces no other alteration; if the solution is strong, the bluish black image undergoes a further change, and becomes brown. A dilute solution of ammonium sulphide changes the colour to brown, with no loss of detail and not much loss of intensity; the brown colour thus produced is very suitable to certain subjects.

The sepia paper, likewise, seems unaffected by the products of the combustion of sulphur; sulphuretted hydrogen or ammonium sulphide first changes the sepia image to black, but it afterwards gradually becomes brown.

No prolonged experiments on the behaviour of mounted prints have as yet been possible, but there is no reason to doubt that under ordinary conditions kallitype prints are permanent. It is, of course, not to be expected that kallitype can as yet equal platinotype, but it is by no means improbable that in time the difference will be chiefly a possible difference in permanency. The process is already capable of giving very good results, and it is considerably cheaper than platinotype.

The other processes that I shall describe belong to an entirely different class; they are the first practicable photographic processes based on the use of coal-tar colours. Both processes depend on the formation of azo-colouring matters from diazo compounds, and they may be spoken of as *diazotype*, but they differ in the nature of the change that the light produces and in the condition under which the colouring matter is formed.

Diazo compounds are a class of compounds characterised by their power of uniting with carbolic acid or any other phenol, any naphthol, or any amine to form an azo-colouring matter, the tint of which depends on the nature of the diazo compound and also on the composition of the particular phenol, naphthol, or amine. Yellow, orange, brown, purple, scarlet, and blue may be cited as examples of the variety of colour that can be obtained in this way.

Feer-type is the first of these processes, and is so called from the inventor, Dr. Adolph Feer (German patent 53,455, December 5, 1889). It is based on the fact that diazo compounds in contact with acid sulphites form diazo-sulphonic compounds, and these form no colouring matter. If, therefore, a diazo-sulphonic compound is mixed with an equivalent quantity of a phenol or an amine, no colouring matter is formed. If, however, the mixture is exposed to light, the diazo-sulphonic compound is decomposed, the diazo compound is set free, and, since a phenol or amine is already present, a colouring matter is formed as fast as the diazo compound is liberated.

The process is applicable both to paper and to textile fabrics. The paper or fabric is coated with a solution of a diazo-sulphonic compound of high molecular weight, mixed with an equivalent quantity of a phenol, or a naphthol, and an alkali, or with an equivalent quantity of an amine and an acid. The patent specification recommends sodium ditolyltetrazo-sulphonate, but Feer has since recommended sodium diazopseudocumidene-sulphonate, which can be obtained from Dr. Schuchardt, of Görlitz. My own experiments, which are as yet but few in number, were made with this compound and β naphthol. An exposure of ten seconds to comparatively weak sunlight produces a very decided quantity of colouring matter, and an exposure of a very few minutes gives a deep-coloured print. The rate of formation of the colouring matter decreases as the exposure continues, because the colouring matter formed in the superficial layer acts as a screen to the unaltered material behind. The light from burning magnesium will also produce a print, and prolonged exposure to gaslight will produce an easily recognisable amount of colouring matter. Some "nature prints" from fern-leaves are exhibited; they show a very considerable amount of detail as well as the outline.

The Primuline Process is the second process of this class, and is the invention of Messrs. Green, Cross, & Bevan (English patent 7453, May 13, 1890). Primuline was first made by Mr. Green, and is a yellow colouring matter that contains sulphur. It has the peculiar property of dyeing cotton, linen, paper, or any other material consisting of cellulose, without the use of a mordant. The exact constitution of primuline is not yet known, but it contains an amido group, and, therefore, will yield a diazo compound which in its turn will form colouring matters. Diazo-primuline, in the pure, solid state, is practically unaffected by even prolonged exposure to light, but when in contact with cotton, linen, or cellulose, it is rapidly decomposed by light, with complete destruction of the diazo compound and consequent loss of the power to form colouring matters.

The primuline process is applicable to fabrics as well as to paper, and gives better results with the former. Herein, in fact, lies its special merit. Fine calico, linen, &c., free from grease, is immersed for a short time in a boiling solution of primuline (about 3 parts in 1000) containing a small quantity of common salt, and is then washed with water. If necessary, it may at this stage be dried, and will keep for any length of time. In order to sensitise the material the primuline is converted into diazo-primuline by immersion for a short time in a dilute solution of sodium or potassium nitrite (1 part in 400), acidfied with hydrochloric, sulphuric, oxalic, or some other acid. It is then washed and dried in the dark without the aid of heat. If made too dry, the material becomes less sensitive.

The sensitive material is exposed in an ordinary printing frame, a very short time being required in bright sunlight, but a much longer time in a dull light. Since the correct time of exposure cannot be judged by mere inspection, a strip of the same material is exposed outside the printing frame, and is touched from time to time with a drop of the developing solution. When the latter ceases to produce any colour, the diazo-primuline on the test strip is completely decomposed, and it may be taken that decomposition in the high lights of the transparency is also complete. The print is then ready for development, which is effected by immersing the print in one of the following solutions: for *yellow*, phenol; for *orange*, resorcinol; for *red*, β naphthol; for *maroon*, naphthol-disulphonic acid. One part of the substance is dissolved in 400 parts of water, made alkaline with caustic potash or caustic soda. Other developers are: for *brown*, meta-phenylenediamine; for *purple*, alpha-naphthylamine; for *deep blue*, eikonogen. The eikonogen is dissolved simply in water; the two amines are dissolved in water acidified with hydrochloric acid. Different developers—stiffened, if necessary, with starch—may be applied with a brush to different parts of the same prints. The developed prints are washed with water, and, in the case of the blue and purple developers, the last wash water should be *slightly* acidified with tartaric acid. In the other cases the prints are improved by being washed with soap and water. In all cases the appearance of the print is improved if, after removal from the printing frame, the back of the print is exposed to light for a short time in order to secure complete decomposition of the diazo-primuline in the high lights. The ground of the prints always remains pale yellow, and at present no method has been discovered by which a white ground can be obtained.

In Feer-type the quantity of colouring matter formed is proportional to the quantity of light action, and hence we obtain a positive from a negative, and *vice versâ*. In the primuline process the quantity of colouring matter is *inversely* proportional to the amount of light action, and hence we get a positive from a positive, and a negative from a negative.

The prints, being formed of azo-colouring matters, will gradually fade if exposed to sunlight, but are permanent enough if exposed only to the diffused light of ordinary rooms.

Neither of the diazotype processes is at all likely to displace any of the ordinary printing processes, but they may be specially useful for the copying of engineers' plans, &c., upon cloth, and, since a variety of colours can be obtained, the processes are likely to be very useful for decorative purposes. The primuline process is very simple

and cleanly, and can be readily used by ladies, who, with the help of dried ferns and other leaves, can produce a great variety of designs on linen, &c., and these can be mounted in any desired manner. In this connexion it may be useful to point out that the disagreeable smell of the purple developer (alpha-naphthylamine), which clings very tenaciously to the fingers, can be removed by dipping the fingers into the solution of nitrous acid used for sensitising the primuline.

The following paper was then read:—

THE CULT OF INDISTINCTNESS.

By W. E. Debenham.

Every now and then, in some field or other of art, a disturbance occurs which threatens to be in the nature of a revolution. Some few active minds take up an idea which has been brought into prominence by the peculiarities of some one or more professors of the particular art, and carry on a vigorous crusade on behalf of a view which, to judge from their professions and actions, they think destined to create a revolution. The leading ideas may not be, and, indeed, generally are not, new, but are in the nature of a revival, conscious or unconscious, of something which has before been practised to a certain extent, but has been allowed to fall into neglect and so much of oblivion as to give a character of novelty when put forward with energy and some freshness of expression. Within living memory such attempts at upheaval have occurred in the fields of poetry, of music, and at least twice in that of pictorial art, without leaving much permanent effect on the general appreciation of what are to be considered as the highest and most valuable qualities in the respective fields of labour involved.

It could scarcely be expected that photography should be exempt from disturbances of a character similar to those referred to as affecting other arts, and, in fact, there has recently been a revival in a very aggressive manner of a claim for superiority in results, differing mainly from those which have been accepted as representing the best work in photography in the indistinctness characterising them in whole or in part. The renewal in question is, doubtless, very largely due to the energetic advocacy of Dr. Emerson, and, although he has renounced what he had written in that connexion, some of those who adopted his suggestions and supported his arguments still maintain the superiority of that photographic work in which indistinctness is the most promising characteristic, and do so with an aggressiveness and an assumption of artistic excellence that seems likely to induce a good deal of acquiescence, especially amongst the newer and less experienced amateurs, who are only too likely to be persuaded that the dimness and indistinctness which are so easy for them to produce are something more artistic than the class of work with which they would find it harder to compete. These loudly asserted claims of artistic superiority seem, too, to have induced a certain amount of acquiescence among a larger class, photographers often submitting too readily to what claims to be artistically authoritative. It is not easy otherwise to account for medals being awarded to photographs which, independent of the question of indistinctness, one might have expected to be debarred by heavy artificial printing down of skies—a printing down which, in some cases, involves the confusion of such objects as would in nature, in painting, and in simple true photographs, stand out in decided relief against the aerial background.

The claim to artistic superiority for "soft" over "sharp" photographs depends, as has been previously pointed out, very much upon the different meaning attached to the word "sharp" by painters and and by photographers, the latter understanding the word to mean minutely defined, and the former harsh in outline. Softness and thorough sharpness, in the photographic sense of fine definition, are quite compatible in a photograph in which, by extreme care in exposure and development, and, when necessary, by the use of orthochromatic methods, the gradations are properly rendered. It is, no doubt, easier to obtain a fictitious kind of softness by losing definition, but to claim a monopoly of artistic merit for this kind of softness seems to be about as reasonable as it would be to do so for those productions of the brush in which the badger softener had been freely employed by the painter.

As an example of the assumption of the monopoly of artistic merit by the professors of the indistinct school, and of the unworthiness of those who do not share in their views, may be mentioned the remarks of Mr. Maskell at the Camera Club Conference on the paper by Mr. Pennell. The last-named writer had condemned photography as false in representation, and as a hindrance rather than as a help to art; and Mr. Maskell replied to the effect that he could assent to these charges if applied to photography as practised until quite recently, but that some of the productions of the last two or three years—naming those workers who belong to the same school of indistinctness that he does—were of so different and superior a character that Mr. Pennell's criticisms were no longer justified. This assumption was more irritating than Mr. Pennell's easily refutable statements as to the inaccuracy of photographic perspective and other condemnations of our art. So then, works such as those of England, Gale, Wilson, Robinson, Frith, Valentine, Bedford, Abney, Pringle, and hosts of others, English and foreign, are all to be rejected as fit for the denunciations heaped upon photography by Mr. Pennell, and only those of the circle to which Mr. Maskell belongs are useful to the draughtsman or worthy of anything but condemnation!

Then, again, Mr. Davison, at his lecture on *Impressionism in Photography* at the Society of Arts, spoke of those who had smirched photography by taking photographs sharp all over, and printing them on albumenised paper. That is to say, that those who have been recognised as the ablest workers are set down as having "smirched" photography by producing works in which the details and gradation of tone visible in the natural scene are, as far as practicable, reproduced in the picture.

With regard to the true rendering of gradation or tone, it may be remembered that Dr. Emerson particularly insisted upon preserving it as far as possible with the photographic means available. In this point he was at one with Abney and others, and I understand it to be the one point in his teaching which he did not renounce. By such devices as sunning the whole of the print—tending to indistinctness of another kind than that resulting from want of focus—and insisting upon matt surface, and even upon rough-surface paper for printing upon, the range of gradation, already insufficient in photography, is weakened, and truthfulness of representation to some extent sacrificed. An out-of-focus photograph, printed on rough paper, may suggest an unfinished sketch by a painter, but is not on that account really entitled to be called artistic, however loudly such a quality may be claimed for it.

Concerning such an essentially artificial (not the same thing as artistic) practice as sunning a photograph all over, Mr. Davison says (*Photography*, April 3, 1891), "It struck us at the last Pall Mall Exhibition that nine-tenths of the photographs collected there would have been less objectionable for a judicious sunning down, even if applied all over the prints." To set down nine-tenths of the works of one's co-exhibitors as "objectionable," from one cause alone, seems to me to be characteristic of that assumption of superiority by the professors of the cult of indistinctness, to protest against which is the object of the present paper. The remedy or palliative treatment prescribed will probably strike most people, besides the producers of this condemned nine-tenths of the work, as being itself objectionable.

Pretensions to artistic superiority are not necessarily justified in proportion to the dogmatic way in which they may be put forward. Gloom, mist, and indistinctness do not exhaust the beauties of nature, and are not its only phases worthy of representation, although in photography they may be the easiest to suggest, whether existing in the original subject or not.

In the evening Mr. Taylor, in absence of Mr. A. A. Common, gave a lecture on *Recent Astronomical Photography*. He showed on the screen numerous views of the nebulæ in Orion and other constellations. It is now well known that even with the most powerful telescopes there are stars so faint as to be quite invisible to the eye, but which, by their long impact on the photographic plate, show their existence. Our readers are, however, already familiar with the project for mapping the heavens by means of photography, and hence a report of Mr. Taylor's address is the less necessary.

On Thursday, after the return of the members from their excursions to Salisbury, Clifton, and Bristol, the report of the Lens Standard Committee was received.

Mr. A. Haddon said the Committee consisted of Dr. James Edmunds, Messrs. W. Bedford, A. Cowan, H. M. Hastings, and A. Haddon (secretary). He said, "We have but little to add to our report submitted at Chester. The only addition we wish to recommend in connexion with lens mounts and flanges is an extra size—viz., 2·25, twenty-four threads to the inch."

Mr. Wm. Taylor suggested that the Chester report (published in our last volume) be read, and then a vote taken on the whole. This was done, when Mr. Bothamley proposed the adoption of the report; seconded by Mr. Levy. Mr. Warnerke then addressed the meeting as follows:—

There is one point in the recommended standard I wish to direct the attention of the Convention to—viz., the unit of the rapidity of lenses. Some ten or twelve years ago the Photographic Society of Great Britain chose *f*-4 as the unit, and it is also

recommended now by the Committee of the Convention. The ten or twelve years that have elapsed since the introduction of that unit is certainly long enough time to look back and examine what is the practical outcome of that measure. Constant readers of our numerous publications cannot but observe that whenever the question of rapidity of the lenses occurs the numbers of the unit standard are not used. The present meeting of the Convention offers an excellent field to verify the popularity of the measure. During our numerous excursions, when everybody is busy using his camera, the most natural question in conversation is, What diaphragm do you use? This question invariably has been answered, *f*-10 or *f*-6, &c. Even members of the past and present Lens Committee, and opticians marking their lenses with unit standard numbers, do not use them when answering this constantly occurring question.

Certainly there must be something in the measure proposed that is not practical. In reality, this standard is not the best, and that I think is the reason why it is not practically adopted. It requires too much calculation, that cannot be accomplished without pen or pencil. There are two other units—$f\sqrt{10}$, proposed by Mr. Dallmeyer, and *f*-10, adopted by the Paris Congress. To find the unit standard number for a certain diaphragm, it is necessary to find the square of the fraction representing relation of focus to the diameter of aperture of that diaphragm, and divide it by the square of unit diaphragm—viz., by 16 in the case of the proposed unit, by 100 for French unit, and by 10 for Dallmeyer's unit. It will be readily seen that division of any number by 10 or 100, requiring only removal of the decimal point, is much simpler than division by 16.

However, this is not the only plea in favour of *f*-10 as unit. We are going to the Brussels Congress, and certainly it will not be becoming to English photographic societies to propose a measure that is not the very best, and consequently one that has no chance of being adopted universally; *f*-10 is better than *f*-4, because it is simple. It is already adopted by the Paris Congress, and it is clear that for these two reasons it will have all Congress in its favour.

Supporters of *f*-4 unit put forward an argument that some opticians have already adopted the system for marking their lenses, and that any change of the system will put them to inconvenience. To that I can answer, and that not only on supposition but as the result of inquiry, that those who have adopted already *f*-4 will adopt without hesitation any other system recommended as best by recognised authority.

There is also a great deal to be said respecting the system of weights and measures sanctioned by the last Convention. If we insist on the adoption of the system that is palpably inferior to the generally used metrical, we shall be put at great disadvantage at the Congress. The same is to be said respecting a system of weights and measures, elsewhere proposed, recommending us to express our formula in parts. I shall put as an instance, how can you answer a question, "How much emulsion have you to use to cover a sheet of paper of certain size, using parts as measures?"

Photography, like all other sciences, is not national, but belongs to all humanity; therefore it must use terms that can be intelligible to all humanity, and that is the object of the Congress. The metrical system is that universally intelligible expression of weight and measures.

After remarks by Messrs. Bothamley, Haddon, Mackie, Pringle, Taylor, and Braham, the report was unanimously adopted.

The President spoke of the great services rendered in this matter by Mr. Haddon, which elicited much applause.

Mr. Warnerke then read the following paper on—

PROPOSED INTERNATIONAL STANDARDS.

Responding to the invitation of the past President of Convention to open the discussion on International Photographic Standards, proposed by the last Paris Congress, I have been prepared to give a detailed account of the work done by the Congress, but want of time decided me to shorten that part of my paper, referring persons interested to the article of *Photography*, published July 2, entitled *International Photographic Standards*, by C. H. Bothamley, and containing abstract of the decisions of the last Paris Congress.

It is useless to dwell on the extreme importance and imperative urgency of putting our houses in order. Photography has grown to such an extent, so numerous are its applications, that I can compare it to a huge central factory, surrounded by others producing everything that constitutes human industry—social and domestic comfort, science, art, commerce, and trade, all these surrounding factories depending on the central one. It will not only produce some materials and tools necessary, but often control and verify its works. Its resources are inexhaustible. It is capable of supplying any demand. One thing only causes a great anxiety, there is no harmony among different departments of the central factory, and even among the individual workers of the separate departments. They not only each use different tools, different patterns, models, shapes, and sizes, but even different denominations, somewhat like the workers of the Tower of Babel.

To avoid the fate of the unfortunate tower, we must put order into our house. This country was the first to feel the necessity of that order some ten or twelve years ago. That was a good beginning, but it affects only one department of the central factory, and only a very small branch of that department.

That Babelian condition is felt very painfully everywhere where photography is used, and where is it not now used? and that was the motive that brought forward the scheme of the photographic congress—universal or international. The first idea was generated in Belgium in 1884. Some unfortunate circumstances prevented the Belgians from organizing that congress in their own country, and the French, taking advantage of the Universal Exhibition of 1889, decided to hold a photographic congress. A committee appointed by the Paris Photographic Society, and consisting of the leading luminaries in the French scientific world, prepared a series of questions, and submitted their own solutions, which, after slight discussion, was embodied in the resolutions indicated above.

No doubt the labour of that Congress was great and conscientious, but, unfortunately, the place of congress was not well chosen. Foreigners (from political considerations) did not take part in the deliberation, and that is the reason why the resolutions of the Paris Congress are one-sided, and not international enough. However, the final decision, that the labour of the Paris Congress is to be continued by the following periodical congresses, offer the opportunity to amend indicated shortcomings.

The next Congress is to take place at Brussels, in Belgium, in 1891, from August 23 to 30. No better place can be chosen for the Congress. It is central, and the ground politically neutral. Photographic societies of all the world are preparing by sending delegates of their own to submit resolutions and take part in the discussion at that Congress. My object in this communication is to draw the attention of this Convention to the necessity—nay, to the urgency of putting our shoulder to the common wheel. Here I cannot sufficiently accentuate the fact that any photographic standard adopted will not confer complete benefit unless it be universally adopted, and, consequently, international. In order that it can be adjusted to the conditions of this country with the smallest friction, representatives of this country must contribute to its shape, and that is the reason why our duty is to be strongly represented in Brussels.

The organizers of the Brussels Congress have already issued a programme of that Congress. It is physically impossible to discuss the details of the Congress during the few hours this Convention has to exist. Therefore, I think it will be reasonable to appoint delegates and a special (active) committee, whose duty shall be to examine the programme and draw up the instruction for the delegates. If any chosen representative pleads want of knowledge of the French language, I can assert with sufficient probability of correctness that if English be spoken in the Brussels Congress it will be perfectly understood.

I know that many, even endowed with clear and independent appreciation of things, are apathetically awaiting the sanction by Act of Parliament of an alteration of the impossible habits and rules made by our forefathers.

I am sorry to say that study of the spirit of the House of Parliament will soon persuade any careful and independent observer that sanction by the Act of Parliament of the alterations so urgently demanded is unobtainable. Here is one example: Every year influential deputations, including all Chambers of Commerce of the Kingdom and other bodies, approach Parliament asking for the adoption of the metrical system of the weights, measures, &c. Here is an extract from the *Times*, May 9, 1891, of the last attempt:—

"Mr. S. Montagu, M.P., Sir William Thomson, Mr. J. E. Dowson, and Mr. Alexander Smith, on behalf of the Decimal Association, then spoke in favour of the introduction of the decimal system, especially as regards weights and measures.

"Mr. Goschen, in reply, said that was not a new subject to him, as they were aware, and if he were a young and active politician he might share in the movement with some faith that it might be of advantage to the country if carried out. But such experience as he had had was that they could not undertake a more difficult and complicated task, or one in which they would be baffled more at every step, than to undertake the revision of our currency, which touched everybody in this country, or the weights, which touched such an enormous class. He could perfectly understand that they might persuade people of the advantages of it, but to change

the weights, for instance, must interfere with, and confuse for a time the transactions of almost everybody in the country, and all those would be satisfied who gained by the change, while, on the other hand, an enormous body who would lose something would be dissatisfied. He did not wish to discourage them, but, if Mr. Montagu could induce the House of Commons to appoint a Select Committee to inquire into the subject, he would have no objection, though he could not see his way to recommend the Government to appoint a Royal Commission. To carry out the change would affect everybody's transactions, and the innate conservatism of the English people—with regard to their habits, he meant, and not politically—would make it an extremely difficult task to carry out. It would be a task which could be undertaken only when there was no other work to be done, when there was general, profound political peace, and when everybody would be prepared to look with the most friendly eye upon every change which might be made. Everybody would have to learn the new weights and measures, and the more ignorant would go to the wall, so that it was highly probable that the tradesman, being more educated than most of his customers, would gain an advantage. He admitted that he was not arguing the question on high grounds, but on practical grounds. He ventured to think that the country was not ripe for a revolution which would affect all their transactions, and he could hold out no hope that the Government would take the initiative in the matter. He would watch the progress of public opinion on the question, for he admitted it to be a reform which would be accompanied by great advantages, but it could not be done unless the country were satisfied, for the sake of ultimate advantage, to go through very great present inconveniences."

In the same issue of the *Times* we find the reason why the question affecting the science cannot obtain the hearing of the legislators. The Earl of Meath, in the course of a speech in the House of Lords on May 8 last, pleaded for the necessity of introducing some instructive lectures in connexion with museums, picture galleries, &c. In the course of his speech he says: "*These art collections were purchased by our ancestors at a time when this country was, to a large extent, governed by the cultivated classes. Every day, however, England was becoming more and more governed by those who were less cultivated.*"

It is in the memory of everybody that a few years ago, when Sir Charles Dilke was approached by the advocates of the decimal system, the argument used by that statesman, which upset most logical pleading in favour of the system, was that, the diameter of the half-penny coin being exactly equal to half an inch, it was impossible to make alteration.

From what was said, I conclude that, having no chance during the present generation of obtaining that Act of Parliament, we must count on our own forces, and introduce alterations recognised as necessary. This we can do without interfering with law. That was done by the scientist, and we are of the number.

Mr. Cowan, in speaking of the sizes of plates, such as 24 × 18, said that a standard should be adopted which would divide equally all through.

Mr. Bothamley reminded them that in applying the decimal system of measurement the unit need not necessarily be a foreign one, but the English inch, and that this applied to our ounce also.

Mr. William Taylor then explained several specimens of interchangeable screwed work which he had brought for exhibition, describing the principle on which interchangeability must be secured.

Friday was devoted to excursions to Glastonbury and Wells, and to Lacock Abbey.

In the evening the annual dinner took place. There was a good attendance. Among those present we observed Mr. William Bedford, President (in the chair), Ald. Murch (the Mayor of Bath), Messrs. A. Pringle, Bothamley, J. T. Taylor, W. H. Walker, A. Mackie G. W. Webster, J. J. Briginshaw, Appleby, Braham, Bridge, Perrin, Ashman, Drage, Haddon, Scotton, A. Levy, Cembrano, Charters-White, Warnerke, Austin-King, Lang, H. M. Smith, Snowdon Ward, Redfern, F. York, A. L. Henderson, George Mason, Werner, Seaman Montefiore, Phipps-Lucas, A. Keene, H. Sturmey, G. F. Powell, J. Lawley, J. Birtles, H. M. Hastings, H. W. Lewis, Pitcher, Porritt, and several others.

The Chairman proposed the toast of the Convention, which was responded to by Messrs. Briginshaw, Austin-King, and Appleby.

The Artistic, Scientific, and Literary Institutions of Bath was a toast which received fitting response from the Mayor in an eloquent speech.

The toast of the Press was acknowledged by Messrs. J. Traill Taylor, H. Sturmey, and Snowdon Ward.

Mr. F. York acknowledged in a graceful manner the toast of the Ladies of the Convention, proposed by Mr. Charters-White.

Mirth, music, song, recitation, and tobacco smoke prevailed till a late hour, when the usual Convention song was indulged in, after which "Auld Lang Syne" terminated a *séance* that was felt to have been unusually pleasant.

On Saturday morning a business meeting was held. Mr. Briginshaw resigned his position as Hon. Secretary, a course which caused very general regret, although it was felt that in the midst of a large and increasing business, and of sad domestic trouble, the Convention had no right to tax his time as it had done since the initiation of the Convention. The thanks tendered to him were heartfelt. Mr. F. P. Cembrano, 10, Cambridge Gardens, Richmond, Surrey, was unanimously elected to fill the vacant office.

The names of Messrs. J. J. Briginshaw and A. L. Henderson were added to the Council.

It was proposed that Mr. H. P. Robinson be invited to become President for the next year.

The warmest thanks of the Convention having been tendered to the Bath Society, and the various members and local friends who had conduced to render this such a pleasant and successful meeting, the proceedings terminated.

We must unavoidably leave over till next week our Notes on Bath and the Bath Convention.

THE BRUSSELS CONGRESS.

Organized by the Belgian Association of Photography, and under the patronage of His Majesty the King, several of his ministers, and a number of the most eminent native men of science and others, the International Congress of Photography will be held in Brussels during the week beginning 23rd August next. The meetings will take place at the Ecole Industrielle, Palais du Midi, Boulevard du Hainaut. The Secretary of the Congress is Mons. Ch. Puttemans, to whom applications for membership should be sent, at the above address, accompanied by a remittance for ten francs, in return for which applicants will receive a card of admission constituting them members of the Congress, and entitling them to take part in the discussions and conferences, and also to participate in the excursions to various places of interest which, we understand, will be arranged.

The present Congress is, in some measure, a continuation, or, as it were, a resumption, of the International (so-called) Congress which assembled in Paris two years ago, and some of the resolutions of which our readers may remember we felt it our duty to subject to unfavourable criticism. At that Congress a permanent commission of six was appointed to take in hand the work of organizing the meeting for 1891, a committee representing the Belgian Photographic Society being associated with them. The joint committee have sketched out the rules and programme, which are now before us in the form of a small pamphlet.

We gather from these rules that delegates from other societies and institutions will stand on the same footing as members of the Congress by payment in speaking and voting, and thus the "international" element will in some shape or other appear in the deliberations of the Congress. The permanent French Commission will, at the first meeting, nominate the executive of President, five Vice-Presidents, and five Secretaries. We hope that MM. Davanne, Pector, Londe, Sebert, Bordet, and de Villecholle will recognise the fact that this country has the strongest claims to official recognition at a photographic Congress, and that the international character of the Brussels meeting will be promoted by nominating one or all of the photographic Society's delegates to the executive.

The permanent commission think that it requires a longer space of time than that which separates the Congress of Paris from that of Brussels to judge of the work of the first Congress, and this consideration has guided them in sketching out the programme for the Brussels meeting. It is intended to appoint standing delegates from this Congress to take part in any future international consideration of matters of common photographic interest. The decisions of the Paris Congress are, we gather, to be left intact, but note will be taken of what has been done by various countries and photographic societies in regard to them, particularly as to standard light, actinic intensity, and determination of plate sensitiveness; lenses, diaphragms, and shutters; dimensions of plates, photographic formulæ, custom-house

regulations, copyright, and so forth. The questions for discussion are grouped into two sections, the first series arising out of the 1889 Congress, the second being new subjects. The one embraces determination of the principal characteristics of lenses, new sizes and modes of mounting same, stereoscopic lenses, new sizes of plates, thickness of glass plates, new formulæ for expressing liquids, photographic nomenclature; while the other includes questions as to the means to be taken to bring all photographic societies into connexion with each other and to place matters of interest before them, and, finally, the steps to be taken to make the Congress periodical and representative.

We shall watch the deliberations of the Brussels Congress with much interest, and hope that it will attract many members from this country.

STEINHEIL'S LENS MANUFACTORY IN MUNICH.

The new workshop erected by the firm is situated about twenty minutes' walk from the town, in the neighbourhood of the Bavaria Restaurant. Work was commenced in the building on March 1 of the present year, and about fifty workmen are now employed. The whole is two stories in height, and consists of a central building with wings, in which the workrooms are situated. Of these there are some fifteen of various dimensions, but all are lightsome and airy, the smallest of them having a surface of thirty square metres. In these rooms the grinders, polishers, mechanicians, carpenters, &c., carry on their operations. The first floor contains the dwelling apartments of the manager, while the second floor contains a commodious testing-room, sixteen metres by seven metres, in which all the lenses, apparatus, &c., turned out by the firm are tested, except the larger sizes of telescopes, which are subjected to the same ordeal in a passage (forty metres long) on the ground floor.

The glass used has, since that firm has been in existence, been supplied by Schott & Co., of Jena, either in the form of slabs or of pressed lenses, which latter, however, have to be carefully annealed before being despatched from the Jena manufactory. The lenses are, first of all, roughed out in cast iron moulds by hand, and then ground fine by means of emery powder and water in glass moulds. Each workman is provided with a glass model of the surface to be imparted to the lens. It goes without saying that all the surfaces to which the lenses are ground are spherical, *i.e.*, no hyperbolic or other forms are employed. Each surface is tested to see if it has received its proper curvature by means of a so-called spherometer. The different operations of grinding, finishing, polishing, centering, &c., are all performed by separate workmen, who are practised in one of these particular branches only. The grinding and polishing rooms are carefully separated from one another, as also the machinery employed, by which means the presence of emery powder where it is not wanted is prevented, and the scratches and injury to the lens which result therefrom are avoided.

The lenses are polished by means of rouge, in moulds made of pitch, instead of on cloth, as in many other manufactories, which enables a more perfectly spherical surface to be obtained. All the lenses are polished separately, and not *en bloc*. A two-horse gas engine, working in the cellar, drives the polishing machinery, lathes, &c. Sometimes three or four polishing machines are coupled together, and driven by the engine, and are then managed by one workman. The perfect sphericity of the surfaces is tested by applying the glass model, of which mention has been made above. After both the glasses have been carefully freed from dust, &c., the one is superposed upon the other. Thereupon Newton's rings make their appearance, which should be the case if the surfaces fit properly, while, with a surface of which the radius of curvature is different from that of the model, they show no colour.

Very special attention is bestowed upon the centering both of the single and combination lenses. Centering in the optical sense means grinding the edge of the lens in a lathe in such a manner that it is equidistant at every point from the optic axis. To effect this the lens to be centred is cemented on to a lathe with horizontal spindle, centred by a poppet, and an adjusting lever, and then turned. This, next to the attainment of a perfectly spherical surface, is the most important requisite of a good system of lenses.

Another operation of great delicacy is the manufacture of prisms, both for optical and photographic purposes. It should be remembered that the angles of the prism, which must be highly accurate if the desired effect is to be produced, must be obtained by grinding and correction. For example, the angle of a right-angled prism is only then exactly 90° when parallel rays of light falling on the two surfaces enclosing that angle are reflected parallel to one another, when the position is such that a line joining the source of light and the angle of the prism should, if produced, bisect that angle. The correction of the two 45° angles is also ascertained by construction, and likewise the so-called pyramidal error.

The firm was founded in 1855, and, besides its well-known photographic objectives, produces also telescopes of sizes up to 33 cm. object-glass diameter. An instrument of this size is now in process of manufacture for the Upsala observatory, and others have been supplied for the observatories of Potsdam and Catania.

—*Deutsche Photographen Zeitung.*

Our Editorial Table.

Tourist Guide Books.

By Percy Lindley, 123 and 125, Fleet-street, E.C.

These comprise several handbooks, copiously illustrated. Some of them we have already noticed in earlier editions, such as *Epping Forest* and *Walks in the Ardennes*. This, however, does not apply to either *Walks in Holland* or the *Tourist Guide to the Continent*, the latter of which embraces a wide scope, taking in, as it does, Antwerp, Malines, Brussels, and other favourite cities in Belgium and Holland; the Rhine, with its towns and castles; tit-bits of Swiss scenery, and other things equally attractive. These special handbooks having 156 pages, many illustrations, and a good map, we can recommend them to photographers going abroad. Price 6*d.* each.

Xylonite Developing Dishes.

The British Xylonite Company, Limited, Homerton, N.E., have sent us an assortment of developing dishes. They are in three colours—chocolate, coral, and white. They have sunk channels in the bottoms, and require much less solution than those in which there are ridges extending along the bottom. They are exceedingly strong and light, and cannot fail to find much favour with photographers. Mr. Gotz also has sent us specimens of dishes in like material, white and black in colour. The bottoms are smooth, and in practice they behave most admirably.

A Camera-stand Attachment.

In our issue of last week we published, among the patents applied for, one by George Mason & A. L. Henderson, entitled Improvements in Supports for Photographic Cameras. We have since received from Messrs. George Mason & Co., Glasgow, one of the articles in question, and it is something that will undoubtedly prove very useful. Every one knows the tendency there is in a camera tripod for its legs to open out when placed upon a smooth floor, such as that of a cathedral. By this invention such a thing cannot possibly take place. Three slotted brass rules are "hitched" on each to the cross-bar near head of the camera-stand, and are kept together by a central screw, which allows the extension of the legs to any desired extent, but which, when the winged nut of the screw is turned, renders the whole thing rigid, the legs being absolutely fixed. They are to be placed upon the market very soon. They will also prove the "very thing" when a lantern is erected upon an ordinary camera tripod-stand.

Vista Mounts.

Under this title Percy Lund & Co., Bradford, are issuing a mount—or rather the materials for forming a mount—that will enable any one to frame a *carte* or a cabinet in a *passe-partout* style in an incredibly brief period of time, and at a price very low indeed. The papers which form the mount are of different colours and surface texture; each is pierced with an aperture, through which the picture is shown. The print is backed with cardboard cut to the proper size, and the facing paper is turned over it and pasted on the back. Provision is made for a ring being attached to the back.

Photographic Printing Meter.

Mr. Herbert Barry sends us one of his printing meters, for which he has secured patent protection. It is a neat little thing, the whole length not exceeding three and a half inches. The principle of action consists in allowing the light to be transmitted to a slip of sensitive paper through a series of holes of graduated areas, and then through a translucent medium, such as a strip of opal or ground glass, the paper being thereby impressed in various degrees of intensification corresponding with the area of the holes. For further particulars we refer the reader to the specification of Mr. Barry's patent, published in the present number.

Foreign Notes and News.

THE well-known firm of F. Tellgmann, of Mühlhausen, has just celebrated the fifty years' jubilee of its existence. The head of the firm, Herr Tellgmann, was originally a painter, but since 1841 he has taken up photography, and was among the first, if not actually the very first German to do so. In spite of the fact that Herr Tellgmann was both deaf and dumb, the business developed rapidly, and is now one of the largest in Germany, having branches in several towns. The jubilee has been celebrated on a very generous scale, all the *employés* at present engaged having been invited, and, in addition, all who have at any time been in the employ of the firm. All the participators were photographed together, and the resulting tableau now forms a part of Herr Tellgmann's collection of trophies. We are glad to know that things went off satisfactorily.

ANOTHER amusing novelty in the way of detective photography was described by Herr Merker at the last meeting of the Vienna Photographic Society. The apparatus, which has been invented and patented by the describer, is a photographic hat. In the centre of the crown of an ordinary felt hat is fixed a case for the objective. A camera, which can be extended by hand, is also accommodated in the same receptacle, and takes an 8 × 10 plate. The shutter is arranged for both time and instantaneous exposures, and a caoutchouc sack is provided for changing the plates. The apparatus costs about 2*l.* 10*s.* We only trust that the individual who carries all this in his hat will not fall a victim to an attack of pressure on the brain!

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,434.—"Improvements in Portable Photographic Dark Room Developing Lamps." D. ALLAN.—*Dated July* 6, 1891.

No. 11,520.—"A Method or System by Means of which Pictures Projected upon a Screen from an Optical or Magic Lantern or Lanterns are seen in Relief, or with Stereoscopic Effect." J. ANDERTON.—*Dated July* 7, 1891.

No. 11,572.—"An Improved Sliding Tripod Head for Photographic Cam era Stands." G. E. VARDEN.—*Dated July* 7, 1891.

No. 11,578.—"An Improvement in Roll Holders for Photographic Cameras." C. H. GUEST.—*Dated July* 8, 1891.

No. 11,728.—"Improvements in Apparatus for Changing Sensitised Plates for Photographic Cameras." W. E. KERSLAKE and P. W. JOHNSON.—*Dated July* 9, 1891.

No. 11,783.—"Improved Means for Backing Photographic Plates and Films." M. A. WEIR.—*Dated July* 11, 1891.

PATENTS COMPLETED.

PHOTOGRAPHIC PRINTING METER OR ACTINOMETER.

No. 12,814. HERBERT ALFRED LUCAS BARRY, 17, East-parade, Newcastle-upon-Tyne.—*June* 20, 1891.

THIS invention has for its object the registering of the amount of exposure given in printing platinum, opal, or other prints.

The body of the meter is composed of wood, or other suitable material, carrying on the top a metal plate pierced with a number of holes of graduated sizes, countersunk to allow free access of light without shadows.

Beneath the top plate is a piece of ground glass, inserted and cemented into the body of the meter, to diffuse the light passing through the holes in the top plate. The light then passes down through holes in the body of the meter, arranged concentrically with the holes in the top plate. Into the lower surface of the body a second ground-glass plate is inserted, and cemented in position, thus preventing dust entering the body of the meter. On this second glass plate, or preferably along the edge of the base plate opposite the holes in the body, are figures corresponding to the graduated-sized holes in the top plate.

The whole of the body carrying the top plate and the two ground-glass plates is hinged at one end to a metal base plate, which is fixed to the printing frame, and is held down, when closed, by a spring catch. This base plate has provision for holding a slip of sensitive paper, on which the body of the meter rests, so that the light, passing through the holes in the top plate and down through the body of the meter, prints certain impressions on the sensitive paper, according to the amount of light allowed to pass, and so registers the amount of exposure received by the paper in the printing frame.

When a negative is being printed the progress of the printing process can be ascertained from time to time by merely opening the meter upon its hinge and examining the impressions, printed by the light passing through the various sized holes, upon the sensitive paper, the intensity of the impressions being graduated in proportion to the size of the holes, and thus, a test print having been obtained of the required intensity, any number of others may be printed having the same intensity, by observing the impressions made upon each new slip of sensitive paper indicating the quantity of light which has passed through each hole.

The claims are :—1. A photographic printing meter or "actinometer" in which the required intensity of tone is ascertained, from a test print, by the action of light passing through holes of graduated areas—through some translucent medium—on to a sensitive surface, upon which impressions of varied intensities, corresponding with the areas of the holes, are produced, the faintest of which impressions repeated upon successive sensitised surfaces regulates the exposure required for any number of succeeding prints substantially as described, and, in one form, shown by the drawings. 2. The photographic printing meter or "actinometer," consisting of the various parts in combination constructed and operating to effect the objects hereinbefore set forth, and in the manner shown by the accompanying drawings and description of same.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 21	North London	Wellington Hall, Islington, N.
,, 22	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 22	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 23	Burton-on-Trent	The Institute, Union-street.
,, 23	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 9,—Mr. P. Everitt in the chair.

Mr. HOWSON requested the opinion of the members as to a piece of yellow glass which had been sent to him as eminently suitable for a screen for orthochromatic work. It appeared to be flashed or stained, and not pot metal.

The CHAIRMAN remarked that it was very uneven in the coating, and a member, on observing the reflection of the gas flame, said that it was far from being plane in surface, and quite altogether unfit for the purpose.

Mr. ATKINS referred to some optically worked screens shown by Mr. Gotz, as specimens of what such a screen should be.

Mr. W. E. DEBENHAM said that Mr. Gotz had expressly disclaimed the expression "optically worked," in connexion with his own screen, although as they were ground flat and polished, and successfully performed the optical service required of them, it might seem like excessive scrupulousness to do so. Still, with respect either to optical or orthochromatic claims, they had had too many instances of a contrary tendency.

The CHAIRMAN, speaking on the subject of plate, said that he used burnt sienna with dextrines, which he found very effective. It seemed to him that the only light reflected from it was red, which was almost inoperative on the photographic film. He instanced the case of photographing a church interior, when he had given, with a stop of *f*-32, half-an-hour to the subject generally, but a door which was included had been opened for one second only, and there was no halation around the opening.

Mr. DEBENHAM said that in backing the colour of the lights reflected from this substance was not the only consideration. The first consideration was that the backing medium should have a refracting index as nearly as possible equal to that of the glass. With mediums of lower refractive power there was an angle at which the light falling on the back of the plate was reflected back into the film without entering or being in any way affected by the backing. In the Chairman's example, the doorway having been exposed for so short a time might very well escape halation although with the backing used. If there had been a fixed opening during the whole of the exposure given to the rest of the picture, it might have suffered badly.

The general discussion on orthochromatic photography, which had been arranged for the evening, was postponed owing to the absence of the member set down to open it, and to that of so many others who were attending the Convention meeting at Bath.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JULY 7,—Mr. Tanner in the chair.

Mr. HUDSON exhibited a lens in which he stated that he had improved the marginal definition, which had been imperfect, by placing a stop on each side of the lens, close to the glass, in addition to using the ordinary diaphragm.

The Chairman showed some excellent proofs of snap-shot views, taken from a steamboat on the Thames. Proofs of the flashlight pictures taken at the last meeting by Mr. Hudson with his continuous flash lamp, the "Kohn," were then shown. These had been printed by Mr. Oakley, and, for pictures taken under such rough conditions, were all that could be desired.

The SECRETARY then read a paper entitled *Leaves from my Note-Book and How I Use Them.* In his introductory remarks, Mr. Clarke pointed out the many valuable hints which lie scattered up and down in the pages of photographic journals, both ancient and modern, embedded, as it were, in a mass of most valuable scientific information, the latter of which, though valuable in its way, was not of so much practical use to the every-day work of the amateur as these hints were. He also pointed out the enormous number of valuable lessons that were learnt in daily practice and at the meetings of our Photographic Societies. He showed that amateurs, working, as they mostly do, alone at their practical work, always require by their side a guide, philosopher, and friend, who may give them at all times just that help which will get them over a difficulty and no more. He drew attention to the practical use of such works as *Wall's Dictionary of Photography*, to the column entitled "Practical Work" in the *Practical Photographer*, and to the many invaluable hints in the columns of THE BRITISH JOURNAL OF PHOTOGRAPHY and the other photographic journals. It had been his practice for years to copy all the hints which he knew to be invaluable in daily practice, after testing them, into note-books, which he kept always by his side in his work-room, so that, when at fault on any subject, he had but to turn to the pages of his note-book and he could always find something which would put him right. The reader then proceeded to open his note-books, and from their pages demonstrated that, in any branch of photography, from focussing the picture to its completion, enlargement, or conversion into a lantern slide, he had secured some of the most valuable notes extant, the directions in every one of which had been tried and proved to be effective before being entered in the note-book.

A hearty vote of thanks was accorded to Mr. Clarke for his valuable paper,

and, at the suggestion of several of the members, it is more than likely that the note-book will be published shortly for the use of amateurs in general.

An outing was then arranged to Edgware for Saturday, July 11. Tuesday, July 21, will be a technical evening.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

JULY 13,—Mr. H. Smith in the chair.

This being the opening night of the new session, the meeting partook somewhat of the nature of a *conversazione*. Objects of interest were passed round for inspection. The new pattern Thornton-Pickard, and the automatic time and instantaneous shutters were shown and thoroughly discussed. Cameras were shown by Mr. Braine and Mr. Gill. An ingenious printing frame, to be used in combination printing, or for making lantern slides by contact from selected portions of a large negative, was shown by the President.

The usual competition of views taken at the Society's field-days was then held. Mr. H. Smith received the vote of merit for views taken at Enfield and High Beach, and printed on Celerotype paper.

Mr. H. Barry exhibited several of his new printing modes for platinotype paper, to be tested and reported upon by the members.

The PRESIDENT (Mr. J. W. Marchant) then addressed the members. Having given valuable advice to beginners in the choice of appliances, and the best method of conducting photographic manipulations, he strongly urged the members to identify themselves with the Society, and with this object in view to cultivate a closer acquaintance with each other. He pressed upon them not to hoard up knowledge, but to impart it freely to each other; and upon those beginning the study of photography to make known their difficulties, and to ask for information, and upon all to offer any suggestion to the Council tending to make the Society more useful.

A discussion followed on the same lines, the members pledging themselves to maintain the spirit of good-fellowship which has always been a feature of the Society.

Four new members were elected.

HOLBORN CAMERA CLUB.

JULY 10,—Mr. T. O. Dear in the chair.

Mr. E. CLIFTON gave the members a few hints on the method of finishing the negative. He had found that amateurs took a great deal more trouble in developing their negatives than professionals, but in fixing and washing they reduced the careful developing to *nil*. While the print was in the fixing bath they would look at it every now and again and admire. The air, acting upon the silver, caused the film to turn a sickly yellow, and the result was flat negatives. Speaking of the final washing, he said a negative not thoroughly washed was very liable to damp, to say nothing of fading and other kindred evils. He finished his hints by some remarks on reducing and intensifying.

HACKNEY PHOTOGRAPHIC SOCIETY.

JULY 9,—Mr. Beckett in the chair.

Mr. B. FOULKES-WINKS read an exhaustive paper on the *Details of Silver Printing*, going through all its stages from sensitising the paper to the mounting of the finished print.

Saturday, July 11, was a hand-camera day down the river.

MANCHESTER PHOTOGRAPHIC SOCIETY.

ON Saturday last a party of members of the Manchester Photographic Society spent a very pleasant day in the neighbourhood of Youlgreave, in Derbyshire. Taking the train to Rowsley, where carriages were in waiting, they drove past grand old Haddon, and, though a visit to that "poem in stone" was not in the programme, the temptation was too great to be resisted, and every camera was soon hard at work. So interested were the party with this, the most be-photographed place, probably, in the kingdom, that it was with great difficulty that the leader, assisted by the cravings of hunger, could drag them off to the proper field of operations. A drive of about three miles brought them to Alport, beloved of artist and angler, and another half mile to the ancient and picturesque village of Youlgreave. After lunch the lovely valley of the Bradford was visited, and, although the light was not all that could be desired, so pleased were the members with the charming scenery that every plate was exposed, and most of them regretted they had not a further supply. Tea at the cosy Boarding-house Hotel at Alport, and a drive along one of the prettiest roads in Derbyshire to Rowsley station, brought a most enjoyable day to a close.

OXFORD PHOTOGRAPHIC SOCIETY.

THE Committee has succeeded, after nearly a year, in obtaining suitable rooms, at a reasonable cost, at 136, High-street. The rooms were opened at the meeting held on July 7, and was well attended, considering that the notices of the meeting were not posted until 5.15 that evening. This short notice was unavoidable, as the chairs did not arrive from the manufacturers until that day.

The table is already well filled with books and papers; the walls require to be covered with pictures. It is requested that all communications may be addressed to the Hon. Secretaries, Photographic Society, 136, High-street, Oxford.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

JULY 7,—Mr. B. J. Taylor in the chair.

Mr. T. J. Hibbert brought for inspection the automatic hand camera by G. Houghton & Son, fitted with one of Wray's lenses. Several members brought copies of prints taken at the recent excursion to Lincoln, after which Mr. E. Beck gave a practical demonstration on platinotype printing by the hot-bath process. It was also arranged to have Saturday afternoon excursions as heretofore.

ROTHERHAM AMATEUR PHOTOGRAPHIC SOCIETY.

JULY 7,—Mr. E. I. Hubbard (Vice-President) in the chair. A new member was elected.

It was decided that the second excursion of the season should take place on Saturday afternoon, July 18, the resort selected being Roche Abbey.

Holiday Equipment was a subject introduced by the CHAIRMAN, and a profitable discussion followed.

The Treasurer (Mr. Leadbeater) showed two negatives of lightning, and several members handed in specimens of hand-camera work.

EDINBURGH UNIVERSITY PHOTOGRAPHIC SOCIETY.

THIS Society held its monthly meeting in the Class Room, Chambers-street, on Tuesday evening, July 7. The HON. PRESIDENT, Professor Crum Brown, E.U. (Chemistry), as Chairman, delivered a short lecture on *The Chemistry of Intensification*. He stated that he would only treat that evening of the gelatine negative image and its intensification, as negatives of that class were practically the only kind of photographic negative with which there were familiar and in the habit of working with. In this direction he warned the members not to place absolute reliance on the chemical formulæ found in current photographic literature and even in the standard works. Many of the equations contained errors—probably enough printers', but still errors—and therefore they should be carefully scanned and studied before they were made use of. A principal method of intensifying a weak image on a gelatino-bromide plate was accomplished by first bleaching the developed and finished negative with a solution of mercuric bichloride, which thus became changed into a compound of calomel and silver chloride, after which the plate must be thoroughly washed, not merely by allowing it to rest in water with changes for an hour or two—this was not really sufficient; it must be thoroughly washed; and, as a test of this, he recommended the use of a long test-tube, into which a portion of the last washing-water should be placed, and into which should be dropped a few drops of a solution of ammonium sulphide. After shaking and examining this the lengthway of the tube, if the slightest darkening was visible the washing was incomplete, and should be continued till all was eliminated. The plate was now ready for blackening, a solution of ammonia being frequently used, but he advised the use of sulphide of ammonia; this changes the image in the negative into mercuric sulphide and silver sulphide, with the addition of a trace of mercury in a state of very fine division. This is followed by thorough washing, and if the negative should be still too weak the operation may be repeated until the required density be obtained. In this connexion he mentioned that faded silver prints were said to be capable of restoration by a similar bleaching treatment. In this instance a weak solution of hypochlorous acid was used, followed by washing and then darkening it with the bisulphide of ammonium; but he had not tried it, and was rather doubtful of what the results would be, complicated with the other organic matters and the paper.

Dr. DRINKWATER preferred the use of sodium sulphite for the darkening of the negative, as he believed the results to be more permanent than with the ammoniacal salt. He therefore handed round a number of prints he had been experimenting with on Alpha paper, showing the great range of tones and colour attainable. They were exposed in subdued daylight, and developed with a very weak solution of hydroquinone.

The meeting finished with thanks to the Professor.

Correspondence.

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

HOME-MADE NITRATE OF SILVER.

To the EDITOR.

SIR,—I have dissolved a quantity of silver coins and various silver trinkets, old wire, &c., intending it for a sixty-grain bath for floating albumenised paper, but the resulting liquid is of a bright emerald green, and, in testing it for printing, I find it prints all right, but loses in the fixing, and leaves only a faint impression on the paper. Will you inform me how I can separate the impurity from it? It shows seventy grains to the ounce.—I am, yours, &c., OLD SUBSCRIBER.

[The emerald green colour is caused by the copper with which the coin is alloyed. To separate the nitrate of copper, crystallise the whole mass, and then expose to a moderately strong heat, by which the copper will be oxydised in the form of a black powder. Then dissolve in water, when the copper oxide will be found at the bottom as an insoluble ingredient.—ED.]

MARKINGS ON NEGATIVES.

To the EDITOR.

SIR,—We were at one time greatly troubled with similar markings, also a series of hideous transparent marks like scab on plates that looked well in every other respect. As a last hope we gave up the alum bath before fixing, and with that the spots have ceased to trouble us.—We are, yours, &c., McISAAC & RIDDLE.

Esplanade, Oban, July 4, 1891.

To the EDITOR.

SIR,—In answer to your inquiry in "Correspondence" by Mr. Robert Bruce, I would say, what I wrote you years ago, that I had the same experience using a japanned or varnished iron dish for fixing with rather old hypo in it. Here is how I cured it. After well washing, I flowed

over plate a weak solution (probably one ounce to one pint of water) of nitric acid until the spots disappeared. I fixed again, after rinsing in *new* hypo and another dish, and washed again. Fixing in same hypo as before allowed the spots to appear again. The spots can be seen before drying thoroughly and when set up a few minutes to dry.

The same has happened to me once with old hypo in a hard rubber dish. This I cannot explain, but in the iron one I suppose it to be the iron where varnish scaled off.

Can you, in exchange, tell me how to cure a tacky varnish when printing in the sun? Paper sticks to it and often scales.—I am, yours, &c.

4, *Avenue Pinel, Asnières, Seine, July* 6, 1891. ALBERT LEVY.

[Revarnish with button lac dissolved in alcohol.—ED.]

To the EDITOR.

SIR,—I think the comet-like markings complained of by your correspondent Robert Bruce may have been caused by a dirty fixing bath, as I well remember experiencing similar trouble when I was more economical with my hypo than I am now.—I am, yours, &c., R. ROBINSON.

31, *Great Western-road, W., July* 8, 1891.

THE PHOTOGRAPHIC EQUIVALENT OF COLOUR.

To the EDITOR.

SIR,—In photographing landscapes I find it is very difficult to eliminate from my mind the effect of colour, and, in consequence, I am often much disappointed with my prints.

I think I have read in the ALMANAC of a black mirror—called, I think, a Claude Lorraine mirror—which shows a view in monochrome, but I can find no trace of it in the indices nor in any optical catalogue.

I shall be obliged if you give me any information regarding this instrument, or any view-finder or appliance giving a similar result.—I am, yours, &c., A. BROWN.

Bank House, Ledbury, July 18, 1891.

[A Claude Lorraine mirror is simply a plate of black glass held so as to reflect the view, which is thus seen shorn of most of its bright colours. An equally good effect is obtained by looking at the view *through* a small piece of green glass.—ED.]

THE VALUE OF THE COLOURED SCREEN.

To the EDITOR.

SIR,—In the short article in your last issue by Mr. W. B. Bolton, entitled *Orthochromatic Plates and the Coloured Screen*, the writer states, "In cutting off a portion of the blue rays the activity of the yellow is *simultaneously*" (the italics are mine) "lowered, and in the long run the blue 'has the best of it,' simply on account of its original excess of energy;" and winds up by saying, "I speak simply of yellow and blue for clearness' sake." It is curious that he confines himself to yellow and blue, for these are just the colours that the merest tyro in orthochromatic photography could entirely upset Mr. Bolton's deductions.

Does Mr. Bolton know that a *pure* transparent yellow medium absorbs the blue rays and allows the yellow rays to pass through with only a very slight loss? If it were not for the fact that yellow glass absorbs the blue (actinic) rays, it would be impossible to successfully develop an ordinary moderately rapid plate when such a medium was employed in the illumination of the dark room, and, as it is universally admitted that yellow or even orange light is useless for developing when colour-sensitive plates are employed, perhaps Mr. Bolton will explain the paragraph to which I refer, for the benefit of your readers.

I would not again have trespassed on your space, Mr. Editor, but I consider the subject of compensating screens to be of too much importance to allow misleading statements to pass without comment.—I am, yours, &c., BIBT ACRES.

LACK OF BUSINESS AMONGST PHOTOGRAPHERS.

To the EDITOR.

SIR,—With reference to your editorial remark that my "reasons why people do not buy photographs" do not apply to portraits, permit me (speaking as one of the outside public) to say, that I think we are tired of the ordinary photographic portraits that require ponderous albums, or frames, for their keeping. We dislike adding album to album, and filling our rooms with them. If we could have our portraits made like the steel engravings in books—as permanent, as easy to handle, having neat white or tinted margins, requiring no mounting on card-board, and yet remaining perfectly flat, so that a hundred might be kept loose in a neat, thin portiolio, I think a renewed impetus might be given to the trade. It seems worth a trial.—I am, yours, &c., E. J. W.

To the EDITOR.

SIR,—The severe depression which has so long prevailed in professional photography has other causes besides those given by some of your correspondents, and certainly merits careful investigation.

It must be borne in mind that all businesses, with few exceptions, are and have been much below the average. Butchers, bakers, grocers, drapers, &c., are complaining of bad trade; therefore our profession, which is not an *essential* one, feels a touch of commercial depression more acutely and quickly than other businesses which minister to the material wants of the public. Then the amateurs have had something to do in making things bad for professionals, though perhaps there is a tendency on the part of some of the latter body towards exaggerating the extent of the mischief. However, a goodly percentage of work is diverted from the professional, outdoor work generally and the view trade being the most affected.

The business in enlarged pictures is nothing as great or so profitable as it was a few years ago, thanks in a great measure to the unfair way of doing business by the trade enlargers and so-called "wholesale" houses, who most of them cater to the amateur, and make their enlargements, and supply them with material on the same terms as the man who has to support himself and family by the art.

Several cases have occurred to me as follows:—A gentleman of title, an amateur, brought me a collodion negative and requested me to make him an enlargement about 12 × 10 size. The original was 2½ × 2, the figures being about 1¼ inch; there were many spots and pinholes, &c. I made a bromide print 8 × 6, worked this up carefully, copied it, retouched the negative, and from this made a 12 × 10, which was also carefully worked up. I made a charge of 30*s.* for all this, but, though the gentleman complimented me on the great success of the result, he positively refused to pay my charge. He informed me that he was in the habit of sending his negatives to —— to be enlarged, that their charge was 3*s.* 6*d.* for a 12 × 10, but he was willing to pay me 7*s.* 6*d.*, as it saved him the trouble of packing, writing, &c., to have the work done in his own town! After a rather prolonged discussion he said he should not pay my bill, and referred me to his solicitor! Had the dry-plate makers kept up the prices, allowing a liberal discount to photographers and dealers, and the trade enlargers done the same, it would have been much better all round. Photography is, perhaps, the only business where the public is on the same footing as the "trade."

In respect to the cutting down of prices, no one is to blame but the photographers themselves, and I fear there is no remedy. Cheapness will draw the masses in all and every trade, and when a time of commercial depression comes on the man without sufficient capital is very apt to attempt to mend his own business by lowering his prices. I think more attention should be given to the business aspect of our art, both at Conventions and in the pages of what were originally "trade" journals, and I trust that the subject may be well threshed out, and that some of our "wise-heads" may be able to evolve some schemes for placing photography on a more business-like footing, though the problem appears a difficult one. I cannot believe, as I have heard some say, that professional photography is "played out." The same thing was said at the time of the great panic about twenty years since; very prosperous times came afterwards, though we were without the very questionable blessing of the quick dry plates for some years, and that has to be taken in account, as, did the collodion process still reign supreme, the number of photographers would be far less and competition less keen. Trusting these remarks may elicit some useful discussion—I am, yours, &c.,

AN OLD PHOTO.

A CORRECTION.

To the EDITOR.

SIR,—Referring to the opening lines of Mr. W. K. Burton's article in last week's issue, I fancy my old friend has got a little "mixed" in his recollection of our conversation, though perhaps he is correct in his remembrance of the main idea.

I never had the pleasure of Rejlander's acquaintance, therefore never had a conversation with him; but a communication of his which appeared in this journal in the summer of 1864 just turned my attention in the direction of collodion emulsion. In it, if I remember rightly, he related his troubles with the silver bath on a recent journey, and prayed for its abolition.

The happy suggestion of "mixing the whole lot up together" first occurred in Mr. James Mudd's clever "skit," entitled *A Photographer's Dream*, a paper read before the old Manchester Society in 1865, in which a fanciful description was given of a twentieth or twenty-first century photographic society's meeting and what went on there. "Professor Messer" (happy name!) is made to describe his new simplification of photography, in which by mixing up the whole of the chemicals, "from the plate cleaning to the fixing solutions," he gets rid of many previously existing troubles. The chief difference between this process and collodio-bromide seems to have been, that, whereas the only results of his process were to be seen in his stained and generally dejected appearance, collodion emulsion became a practical success.—I am, yours, &c.,

W. B. BOLTON.

MESSRS. OEFFELEIN & CO., of 54, Berners-street, W., have shown us quite a number of specimens burnt-in on glass. They are in a variety of colours, and are applicable to the decoration of church and other windows. Mr. Oeffelein, who does not intend to give any information respecting the method he employs, requests us to hazard an opinion as to the process, which we respectfully decline doing in the face of the numerous vitrifiable processes we have previously published.

Exchange Column.

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

Will exchange complete "Nameit" for grass mat, rockwork, or accessory.—Address, J. JACKSON, Trafalgar Studio, Coventry.

Key camera by Platinotype Company wanted; exchange, 10×10 camera by Meagher, or tricycle.—Address, FRED SPALDING, Chelmsford.

I will exchange three volumes of the *Photographic News*, 1886-7-8, and two volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY, 1889-90, for whole-plate landscape lens, working at *f*-16.—Address, The Studio, South View, Shelley, Huddersfield.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—
A. D. Melvin, Malvern.—*Photograph of performing dog.*

H. J. GODBOLD.—You are correct in your surmise. The affair is a swindle.

R. ROBINSON.—If you are not successful with French chalk, prepare your glass by waxing it.

M. KIERMAN.—The individual who held that business was Celier. He has long ago disappeared from this locality.

C. W. CLARKE (Devizes).—Your query was answered in due course in this column. We do not undertake to give replies by post.

J. PRESTON.—1. Pyro stains will succumb to an acidulated wash, such as a solution of citric or tartaric acid. 2. Bisulphite of soda is meant.

BEACH.—Write to the Superintendent of Police of Ryde, asking him to make inquiries in the matter. To us it appears little less than a swindle.

MANCUNIAN.—Render yourself quite independent of places where plates can be changed by taking with you a small lamp. That is what we do when on a tour.

MEDIUM.—From the description of your difficulty in retouching, we surmise you are putting the medium on too thickly, and employing too soft a pencil.

J. MILLER.—Ferrotype plates, suitable for squeegeeing gelatine prints upon, may be obtained at most photographic warehouses. Fallowfield, we know, keeps them in stock.

J. ELLIOTT AMPHLETT.—The yellow stain arises from incomplete fixing. The hypo solution has either been too weak, or the print has been allowed to remain in it for an insufficient time.

K.—Treat the stained Daguerreotypes with a weak solution of cyanide of potassium. The instant that the stains disappear wash thoroughly, completing this with distilled water and drying by heat.

T. D.—1. Not having registered your picture, you have no claim on infringers. Registration at present will stop future piracies. 2. The advantage would be in favour of the man who sensitises the paper himself.

A. R. COLLIER.—Having decided upon the place where you would like to go—whether America, Australia, or India—we advise you to go there, and then call upon such firms as would be likely to require your services.

A CONSTANT READER (Southport).—Messrs. Marion & Co. supply cases for ferrotype plates in wholesale quantities. The actual manufacturers would perhaps not accept orders for less than hundreds of grosses at a time.

E. JEFFERY.—The fading may arise from several causes. First, the print may have been but imperfectly fixed; secondly, the mountant may have been unsuitable or the mount itself may be at fault. The last is not all that is desirable.

C. P. CARTLAND.—No such work exists, but in the last (the ninth) edition of Hardwich's *Photographic Chemistry* a few pages are devoted to a description of chemicals. Much information may also be gleaned from a perusal of our former ALMANACS.

WELSHMAN.—The carbon process is not difficult to work, neither does it require any costly plant; but, like all other processes, it requires learning before it can be worked satisfactorily under all conditions. The *Autotype Manual* will be the best work you can consult on the subject.

W. A. MEIGH.—Thin sheets of vulcanite can be obtained from almost every dealer in rubber goods in London. Hard calendered millboard will answer your purpose equally well. We will be glad to have an account of your tank for washing plates either for the JOURNAL or the forthcoming ALMANAC.

T. H. JOHNSON writes: "I enclose sample of paper, which is all stained in the sensitising bath. Can you please tell me the reason for it? I keep the bath from getting acid by using common washing soda."—The stains are evidently caused by foreign matter on the back of the paper. Particles of pyrogallic acid, sulphate of iron, &c., would fully account for them.

NAVAL.—If you put your pennies in the slot and did not get pictures, but only laughter and jeers from the bystanders, you should write to the Company and demand your money back. We are not sufficiently versed in law to advise you as to whether you could successfully proceed against the Company for obtaining money under false pretences.

J. W. B. writes: "I have some recollection of having seen mention in some paper of an electric retouching pencil. Will you kindly inform me where such is to be obtained, and if of any practical use?"—Such an apparatus was introduced some years ago, but whether it is in the market now we cannot say. It was said to be inconvenient to use, and was somewhat expensive to purchase.

C. A. S.—Our opinion is that your neighbour is dealing very leniently with you in proposing that you pay his law costs, insert apologies in the local papers, and give 5*l.* to the cottage hospital. Remember you are liable to a penalty of 10*l.* and costs for every print you have sold which has been pirated from his copyright pictures. We advise you to accept the conditions without further cavil, and be a wiser and more conscientious man in the future.

W. BLAKE.—We cannot advise you as to the best method of securing the most advantageous photographs in the "ancient lights" lawsuit on which you are engaged. All depends whether you are on the side of the plaintiff or the defendant. The former would desire the photographs to show all the injury sustained from the new building, while the latter would require them to show directly the contrary. The plaintiff would naturally desire the effect to be shown at its maximum and the defendant at its minimum.

H. R. HALLETT.—We have handed your inquiry to Dr. Chesterman, who thus replies:—"I keep stock solutions of the developer referred to on page 357, made up as follows: In eighty ounces of water I dissolve six ounces of soda sulphite; acidify with eighty minims of H_2SO_4, and finally add one ounce of pyro, using troy weight for the solids. The stock solution of carbonate consists of six ounces (troy) of Na_2CO_3, in eighty ounces of water. These solutions do not require dilution, and the quantities work out exactly as given by me on June 5. This also answers 'H. S. W.,' who wrote you on June 19."

A. BUTLER writes: "I am an amateur, and recently copied a cabinet portrait of a friend and sent the negative to a firm of enlargers to be enlarged and finished in monochrome, and they have charged me fifty per cent. more for the working up than their catalogue price. In reply to my expostulations they say that this is the custom with copies from paper prints. Why should it be so?"—As copies from paper prints entail at least fifty per cent. more work from the artist in the finishing, the firm is fully justified in the charge, which is customary. We do not see what right you have to expect the trade discount. Clearly you have no claim to it.

DETECTIVE asks: "1. Would you kindly let me know if I can purchase any book or article on the working of a nitrate of silver bath, or where I can gain any practical knowledge of same, as lately I am getting into grievous errors? 2. Could you also give me the formulæ of a certain intensifier for wet plates?"—Any of the elementary manuals of photography of a dozen years ago will give the information desired. Hardwich's *Photographic Chemistry* treats very fully on the management of the nitrate bath for wet collodion. There is no work specially devoted to the subject. 2. Two excellent formulæ for the intensification of negatives are given on page 757 of the current ALMANAC. They are equally as applicable to collodion negatives as to gelatine ones.

TEMPO says: "I wonder if you can oblige me with a little advice in your JOURNAL this week? My neighbour has put up a pig-house within twelve feet of my garden wall, which my customers have to pass on the way to studio, and the smell is sometimes unbearable. If you can help me with your opinion as to whether he can do so I shall take it as a favour, and what way would be the best for me to proceed. I may say that we have a Corporation, but the thing is this—is it lawful to put it so near?"—A pigstye in the neighbourhood of a photographic studio must be a great nuisance. There is a law that, in most places, piggeries are not allowed within a certain distance of a dwelling, and we believe it applies in all populous places. As you have a Corporation, bring the matter before it, and we have little doubt that the nuisance will be quickly abated by its sanitary inspector.

H. BARRACLOUGH says: "I have a studio, with north-east light, 24 feet long and 11 feet 6 inches wide, and 10 feet 6 inches high to centre of roof, sloping down to 5 feet 6 inches. At present I am using 12 feet of light, having the other shut off temporarily. The sides are about 5 feet 6 inches high, with 2 feet of blank boards at bottom; other glass. Size of glass squares in skylight are 2 feet by 18 inches. I have 4 feet of black blind at sitter's end, and the remainder are divided into two white ones, but with that arrangement I can't get good lighting, and I want your assistance. Can you give me any advice? Enclosed are a few prints taken in the studio."—The studio appears to be well arranged, and capable of yielding good results, but those sent are not good. The pictures bear the appearance of under exposure and the use of too direct a side light, which gives the ears on the light side too great a prominence, while the shadows on the other side are too strong. A little more experience and observation will set matters right.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 22, *Salting and Sensitising Photographic Papers.* July 29, *Developing en route.* Outing next Saturday (July 18) to Welwyn; train from Moorgate-street at fifteen minutes past two.

MESSRS. WHITTAKER & Co. are about to introduce a new *Library of Popular Science*, the first volume of which is to be an elementary introduction to Astronomy, by Mr. G. F. Chambers. This will be ready in a few weeks, and will shortly be followed by others.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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AN UNSUSPECTED CAUSE OF BAD NEGATIVES.

Among the many small things that occasionally spring up to annoy the photographer to the extent of rendering it impossible for him to obtain clean vigorous negatives is one which we have just run to earth after having the beauty of two dozen exposures seriously impaired.

The brand of plates we preferred to employ for a special occasion was so excellent, and had invariably yielded such good negatives, that we unhesitatingly loaded our reservoirs with them in the certainty of bringing home valuable mementoes of the locality visited. And yet, with all our care and irrespective of what developer we employed, there was not a single negative that was fit to be inspected as a specimen of good photography, being all thin, foggy, grey, and wholly lacking in brilliance. They were, in short, precisely like many negatives that we receive almost weekly from neophites in the art, who send them as specimens of what they allege to be the badness of the plates with which they have been supplied by the plate-manufacturers.

But in the present case we knew that the makers could not possibly be to blame, as with the same brand we had not a fortnight previous obtained some of the finest negatives we have ever taken. Where, then, lay the fault? Subjecting the camera to a systematic examination, we found, first of all, that it was absolutely light-tight. There was no leakage of light about the shutter, which worked to a charm. The lens—but there could be no suspicion of it, a rectilinear finely figured and well polished; still, to render our examination complete, it too had to be inspected. And here we realised the fact that, owing to the particular make of the camera, we could not get access to it without the aid of a screwdriver and the exercise of some mechanical labour. The outer surface of the front glass while *in situ* was amendable to the dusting influences of a soft wash leather, but the other three surfaces were inaccessible, and the construction of the hand camera precluded the possibility of looking through it to see if it was all right.

The friendly surfaces of the screwdriver eventually enabled us to take the lens asunder, when we found a fine lining of dust, delicate but decided, incrusting all the previously inaccessible surfaces. Here, then, lay the source of the mischief, a fact that was placed beyond a doubt by our transferring the lens to another camera having a ground glass, previously removing its lens, a facsimile of the offending one, and by which the high-class negatives previously spoken of had been taken. We found, as anticipated, that the fine and barely visible crustation of dust had served to radiate the light all over the focussing screen, thus rendering it absolutely impossible to get any approximation to vigour in the negatives. On the surfaces being cleaned with wash leather, the lens became its own good self once more.

Now, as we know, there are numerous photographers who use hand cameras to the inner surfaces of the lenses of which they have no ready access, and as we know further that complaints are not unfrequently made of the haziness of negatives, the blame being attributed to the plate-manufacturers, we have thought it well to describe the manner in which we run the evil to earth, in the hope of its proving of benefit to some who have been suffering in like manner, without suspecting what would probably turn out to be the real cause. A well-polished lens transmits light without radiating it; one whose surfaces are grey distribute a large proportion of the light all over the surface of the sensitive plate, thus causing weakness of the image and fog; the dust on the surface acts most effectively as a radiator in just the same way as would a half-polished lens, and such fine, almost invisible, atoms of dust will find their way into every lens in the mount of which there are cut passages, through which the diaphragms are inserted. A certain moisture, that occasionally settles on the surfaces of the lenses, serves to bind the dust, rendering it impossible to be removed by even the strongest camel's hair brush; wash-leather, therefore, must be employed.

It would be well if all makers of hand cameras, especially those of the magazine class, would so construct them as to render the removal of the lens not merely possible, but easily so, without necessitating the user to have recourse to mechanical tools when he wishes to make sure that his lens is clean and in working order.

Dust, on any surface of a lens, is most readily distinguishable by pointing it to the flame of a lamp or candle, or to the sun.

THE PHOTOGRAPHY OF BOTANICAL SPECIMENS.

II.

And now a word or two may be said on the selection and preparation of the subjects. It is scarcely necessary to say that it is not every "botanical specimen" that is suitable for reproduction by direct printing in the photographic frame. A rosebud, for instance, beautiful though it may be, is utterly unfit for this mode of treatment. Even leaves or sprays are far from invariably suitable, for many different reasons. They may, for instance, be too thick and fleshy, as in the case of most samples of cactus, or they may possess thick ribs that prevent contact with the printing paper. The leaf itself may be thin and translucent enough, but may be so curled and "crinkled" as to be utterly beyond the power of any one to lay flat, while finally it may be so opaque or so devoid of veins or markings as to present nothing but a mere outline to be operated upon.

In some cases, as for instance many of the maidenhair ferns

and similar things, the delicate tracery of the outline alone, without any further detail, forms a sufficiently pleasing subject for reproduction, but the most beautiful results are only obtainable when the leaf or spray is sufficiently transparent to exhibit in their entirety all the veins and markings; and how beautifully these are rendered when the object is properly selected and treated should be seen to be believed. In many of the larger kinds of maidenhair fern, even in so simple an example as a spray of rose leaf, the tracery of the veins and ribs is exquisite, and so delicate as to be almost beyond reproduction except by means of photography.

The first necessity, then, is to judiciously select subjects of a suitable character, and, what is of equal importance, to see that they are perfect. Until the experiment has been tried it would scarcely be believed how difficult it is to pick a leaf, or spray, or frond of fern that is perfect, in the sense of being free from small deformities and blemishes, and injuries arising from the ravages of insects. Perfect specimens, when found, should therefore be all the more taken care of. For this purpose, in collecting, a sufficiently capacious portfolio should be used, and the leaves should be preferably of blotting-paper. In transferring the subjects to the portfolio, they should be carefully extended in a natural and graceful position, and care taken that the leaf is closed down on them without disturbing the arrangement.

On arrival home they should be placed under pressure for a few days, or until pretty well set in position, when they should be gone over to see that none have been injured. If any of them possess thick or fleshy ribs, these should be carefully pared down with a sharp knife. If a spray be too closely foliaged, or appear unsymmetrical, it should be "thinned out," and, while this overhaul is taking place, leaves and sprays of the same kind should be sorted into pairs or sets that will match one another in grouping. After this has been done they are again placed under pressure until thoroughly dry. The treatment of seaweeds is a matter requiring special attention and special method, and would take too much space to describe here; but those who know how to properly mount these beautiful objects will be fully repaid in their reproduction.

Finally, we may allude to that class of specimens which either naturally or in drying become too opaque to allow the finer details to print through; and, unfortunately, this class is a large one. The trouble arises in many cases as much from the colour as the actual thickness of the specimen, but naturally in any case the removal, wholly or in part, of the colouring matter must conduce to the transparency of the object. Fortunately, this is very easily effected, all that is needful being to immerse the leaf or spray in methylated alcohol in a suitable vessel—a wide-mouthed bottle. Sulphuric ether acts more rapidly and effectually, but is more difficult to handle, on account of its volatile nature, and it is also more expensive, so that, on the whole, we recommend the spirit. This treatment removes the chlorophyll, and after a day or two's immersion the leaf is left in a "sere and faded" condition certainly, but much more permeable to the action of light. The treatment with spirit also greatly facilitates the laying out or arranging of sprays and groups, as it renders the framework supple and easy to manipulate. Some leaves may be rendered still more transparent by means of wax, Canada balsam, or castor oil, especially if applied after soaking in the spirit and before drying; too many, however, refuse to absorb the wax or oil. In this manner it is very often possible to get the very best results from objects previously so opaque as to be useless.

Skeleton leaves form another class of objects suitable for this class of reproduction, but their preparation constitutes a special process in itself. The best and most perfect leaves possible should be selected and allowed to soak in plain water for a day or two. They should then be carefully transferred to a very hot solution of potash or soda, or a strong solution of washing soda, to which a quantity of freshly slaked lime has been added, and after well stirring allowed to subside. It is not safe to actually boil the leaves in the alkaline ley, as in the tender condition to which they are reduced they would be almost inevitably damaged by the ebullition.

When the fleshy portion of the leaves appears to have been sufficiently softened to come away from the skeleton, let them be laid singly upon a glass plate and with a camel-hair pencil kept well wetted with water; the framework may be cleaned with tolerable ease. Force should on no account be applied, but, if any portion of the tissue remains adherent, the leaf must be returned to the alkaline solution until it is sufficiently softened to be easily detachable. It may be as well perhaps to pass the leaves through water before beginning to manipulate them, or the alkali may cause some discomfort to tender fingers.

If the skeletons are to be preserved for other than photographic purposes, their appearance will be improved by immersion in a solution of chloride of lime or other bleaching liquor. *Eau de Javelle*, Labarraque's solution, or metabisulphite of potash act well as bleaching agents, but probably the chloride of lime will in most cases be found as convenient as and cheaper than any. When only required for photographic reproduction, the bleaching is unnecessary.

Before drying, the skeleton should be allowed to soak in clean water for some time in order to remove the alkali or bleaching agent, which, if allowed to remain, would render the specimens extremely rotten and liable to injury. That end having been attained, nothing remains but to dry the leaves between sheets of blotting-paper under gentle pressure.

By the exercise of a little trouble very pleasing and artistic combinations may be made in the manner indicated suitable for a variety of purposes, ornamental as well as useful; and, as we stated at the commencement of our previous article, now is the time to collect the necessary specimens for use during the coming autumn and winter evenings.

THE TRADE IN COUNCIL.

During the last year or so, as our readers are aware, three distinct Associations have been formed by those directly and commercially interested in the progress of photography, the aims and objects of each of them being, so far as we can discover, of the most laudable kind. To take one instance, the principal manufacturers and dealers, or at least a fair number of them, have combined for mutual help and protection in their transactions with professional and amateur photographers as well as among themselves. The results of the deliberations of a body of this character are necessarily withheld from non-members, and we are, therefore, not in possession of any detailed information of what the Association has done during the first year of its existence, although from a trustworthy source we learn that the record is not absolutely a barren one, and that the Association, in some respects at any rate, has objectively made good its *raison d'être*. We are also informed, however, that the measure of success achieved is not large enough to assure

the Association's existence for an appreciable length of time, and that there is a probability of its having to terminate its brief and uneventful career within the next few weeks, unless it receives increased support from those who were instrumental in its formation, and to whose interests it was wholly and solely dedicated.

That there is a clear call in the widening domain of photographic production for the operations of some such body as the Association, whose ends are fully set forth in the official memorandum which we published in our pages last September, no one at all acquainted with the relations of dealers and manufacturers towards themselves and the various classes of consumers will for a moment deny. Competition, which has been defined as the soul of business, but which, nevertheless, is frequently its greatest bane, is no doubt the chief cause of the unsatisfactory state of things which brought the Association into being. The cutting of prices, the irregular and often unfair allowance of discounts, the difficulty of distinguishing the *bonâ fide* dealer, photographer, and amateur, are matters which have notoriously exercised the minds of traders for a long time past, and, together with the numerous minor questions of policy and custom inseparable from all industries of any magnitude, fall rightly within the province of those interested in them for consideration and settlement. In these and other respects, if we are correctly informed, the Association has done little or nothing yet, and we are sorry, for the well-being of the trade, that the present prospect of anything at all being accomplished is so poor.

The difficulties that confronted the Association from the outset were very great, and not the least of them was that several of the large traders, and most of the small ones, held aloof from it, a factor which heavily handicapped whatever chances of success it might have seemed to possess. The experience of other walks of commerce distinctly proves that a body of this kind is practically impotent unless it is generally, if not unanimously, supported. It would have required almost absolute unanimity on the part of the photographic dealers and manufacturers of the country to destroy the principal abuses which the Association sought to remove—abuses which it is only right to point out are mainly due to several of those who founded the Association, and who, Frankenstein-like, now feel a strong desire to repress the creatures of their own raising. Although we sympathise to some extent with these efforts, we should be much surprised to find the day arrive when individual traders sacrificed the privilege of conducting their businesses in their own fashion, and when it would be no longer easy, in many quarters, for an amateur to buy as cheaply as a photographer or a dealer; when the bogus "dealer" was suppressed; and the prices of materials were uniformly agreed upon for each class of buyers. As for any attempt to raise the prices of plates or other articles to a more profitable level, it would be labour in vain, unless glass, silver, gelatine, and labour also rose permanently in price. This matter, we understand, was mooted at a sectional meeting of the Association, but nothing came of it. We trust the Association will not have to be dissolved, as, apart from what we venture to consider the impracticability of several of its aims, there still remain many opportunities for beneficially influencing commercial photography which we should be sorry to see thrown away.

Within the last ten or a dozen years the conditions of commercial photography—by which term we distinguish the buying and selling and manufacture of materials—have undergone a complete revolution. This has been caused, we need hardly say, by the enormous number of amateurs who have been attracted to the art, and who, notwithstanding the frequent prediction that the craze would not last, appear, if anything, to increase rather than decrease. The output of the various manufactures has, of course, grown accordingly, while the business of distributing them has also been taken in hand by very many to whom photography in pre-gelatine days offered no inducement for the investment of capital and enterprise. But we cannot find that concurrently with the expansion of amateur photography professionalism has also expanded, even so much as in the ratio of the ascertained increase of population; indeed, there is a general belief, in which we are tempted to join, that it has not advanced at all. Thus we are driven to the conclusion that the once-despised amateur is now the main prop and support of the trade, and that, were the great craze to dwindle and die out, the industry would instantly shrink to a mere shadow of its present self. We do not for a moment think that any such falling away is likely to occur for a very long time at all events. Amateur photography is no longer a craze; it is an institution, and is with us for good and all.

There are numerous amateurs who spend more money on photography than many professionals, who order their plates by the gross, have several lenses and cameras, use a considerable quantity of chemicals, cards, and so on, whose accounts, in fact, total up to considerable yearly sums, and are worth having. Amateurs of this kind very often buy more cheaply than the professionals. If we understand the motives of the dealers' Association aright, they would stamp out this kind of thing; but is it possible, politic, or even equitable while, as the Hibernian says, "one man's money" remains "as good as another's—and sometimes better?" Again, plate-makers and others do not scruple to place some photographers who are large consumers upon the most favourable terms, of which the wholesale dealers complain. But the photographer perhaps uses more plates than the dealer sells. The Association, we believe, would take the photographer's discount away, but what are the chances of such a thing being universally agreed to in the trade? Very poor, we are afraid.

Every town, every village, nay, almost every hamlet in the kingdom has its photographic dealer nowadays, who, in the smaller places, is very often the local chemist and photographer rolled into one. On the strength of selling a dozen plates and a bottle of pyro to a chance customer now and then, he henceforth palms himself off as a dealer, and receives dealers' terms for his supplies, the greater part of which he possibly uses in his own business or pleasure as a photographer, amateur or professional as the case may be. It is not the least bit likely that any individual breathing would forego such an opportunity of turning a momentary advantage into a permanent benefit for himself, and the consequence is that the manufacturers have found spring up a class receiving dealers' terms who are not really entitled to them, and that the Association has attempted to remove the anomaly. We do not envy them the task.

It is apparent, then, that the path of the Association has not been a smooth one, and it will not be astonishing if it finds that its further existence is useless. The body of which it was the indirect foundation, namely, the National Photographers' Association, which held a meeting at Birmingham the other day, and no doubt will presently come further south, will perhaps rejoice at the collapse; but let us hope it will learn a useful lesson therefrom, and, as we said on a former occasion,

not start by attempting too much. Of the Assistants' Union initiated by Mr. A. G. Field, whose disinterested exertions deserve a better reward than they seem likely to earn, we are without any recent news. Truly, the three Associations do not appear to have commenced so well as might be wished; but time, of course, will decide their ultimate fate.

ANENT the subject of bad business, a correspondent, in reference to a query replied to last week in the column devoted to Answers, writes complaining that it is very unfair for wholesale houses, in any department of photography, to supply amateurs at the same price as they do professionals. Our correspondent gives details of several cases similar to that quoted by "An Old Photo." in our last issue. It is quite true that there are few trades in which the amateur is treated on the same terms as the professional. But this has always been, more or less, the custom in photography, though formerly not to the same extent as now. Dealers say that it is often very hard to draw the line between the amateur and the professional nowadays. Many, they say, call themselves professionals when purchasing their goods, but amateurs at other times. This is not honourable, as they are certainly sailing under false colours.

WHETHER amateurs injure the business to the extent that many surmise may be doubtful, but that they do so is incontestable, although it may be at considerable cost to themselves. Here is a case in point, and we have heard of several similar. A photographer was recently engaged to take a wedding party including a large number of persons, and made preparations the day before the event. In the morning he received a telegram saying his services would not be required, as one of the party, an amateur, would take the photographs. The negatives, 10 × 8, proved tolerably good, and were sent to a trade printer to be printed, and to a professional mounter for mounting. As there were over seventy persons in the group, an equal number of copies were required. These were supplied, and no charge made. Here a genuine amateur had clearly injured a professional, as the latter would have had the order at a good price. As we have said before, it is quite possible that amateurs injure the profession more indirectly than they do directly.

APROPOS of the above. Has the *furore* for amateur photography reached its zenith yet? Many think it has, and that many who took it up simply because it was the fashion to do so are not by any means so enthusiastic as they were, and some have discarded it entirely. Many fashionable amusements have been the rage for a time, and then cool down, to be superseded by something else, which will then have its day. Will it be so with photography? We think not.

IT appears that the London County Council are still persevering with their scheme for widening and improving the Strand, and it is certain that eventually those quaint old houses in Holywell-street will disappear. Archæologists of the future will appreciate photographs of this ancient thoroughfare. As successful photographs of the street are not easily taken, negatives should be secured as opportunity occurs. "Ancient London" buildings are rapidly disappearing, and the photographing of them is frequently delayed until they are disfigured with hoarding and "posters." Good photographs of Middle-row, Holborn, and other London antiquities, are now very rare.

SEVERAL times, during the last quarter of a century, it has been predicted that the days of silver printing were numbered. Notably was this the case when the carbon process was first introduced, and again when, in its modified form, the "chromotype," it was heralded forth. Also was this the case with the platinotype, bromide, and chloride emulsion papers. Yet the fact remains that, although carbon, platinum, and bromide paper have largely superseded albumen paper for the higher class of pictures, by far the largest number of prints are still made on albumenised paper, notwithstanding the fugitiveness of the results. This is, doubtless, due to the method being simpler to work and cheaper than any of the others, while the results are such as please a certain portion of the public best. If any process were forthcoming which was as simple in its manipulations as silver printing, and not more costly, while the prints would be durable, it ought to prove a great success. Rumour has it that such a process will shortly be forthcoming, in which silver will not be used in any form. By the way, what has become of the process that Professor Meldola demonstrated with in one of his Cantor lectures at the Society of Arts, in which no silver was said to be used?

WIDELY different ideas exist as to what constitutes the beautiful. A friend of ours was recently on a photographic tour in Wales; but a view he wished to obtain was sadly disfigured by some one or two rows of newly erected cottages of the modern type, with their geometrical roofs of shining slates. To a rustic, who was evidently interested in the continual moving of the camera from place to place in order to avoid the building, our friend remarked, "Very pretty neighbourhood about here." The reply was, "Yes, sir; but it will be a great deal better soon. The village will, in a few years, be three times the size it is now." So much the better, perhaps, for the district; but so much the worse for photographers in search of the picturesque. There are various notions as to wherein consists beauty.

THE weather at Henley during "the week" was more unfortunate than usual, yet photography was well represented, mostly by cameras of the detective type handled by the *dilettanti*, the majority of whom, no doubt, send their plates to professionals to develop and print from. Such was the idea of one who was there.

WHAT a great improvement it would be in vignetted portraits if, instead of the plain monotonous background, a little hatching or scumbling effects were introduced. This is always done with vignetted enlargements when they are finished in monochrome. If this treatment enhances the effect in large pictures, why should it not do so in small ones? Many years ago Mr. N. Sarony introduced a method of producing hatched backgrounds in small vignettes which gave them much the appearance of miniature Richmond heads. Sarony's plan was to take the portrait with a plain light background, and then to print in the hatching from a second negative. The same effect can now be obtained by taking the portrait with a hatched background placed behind the sitter. With the comparatively small apertures now generally used with lenses sufficient sharpness of the hatching will be obtained. We recently saw some pictures taken in this way that were a great improvement on the ordinary style of vignettes.

BATH CONVENTION NOTES.—I.

LACOCK: HENRY FOX TALBOT.

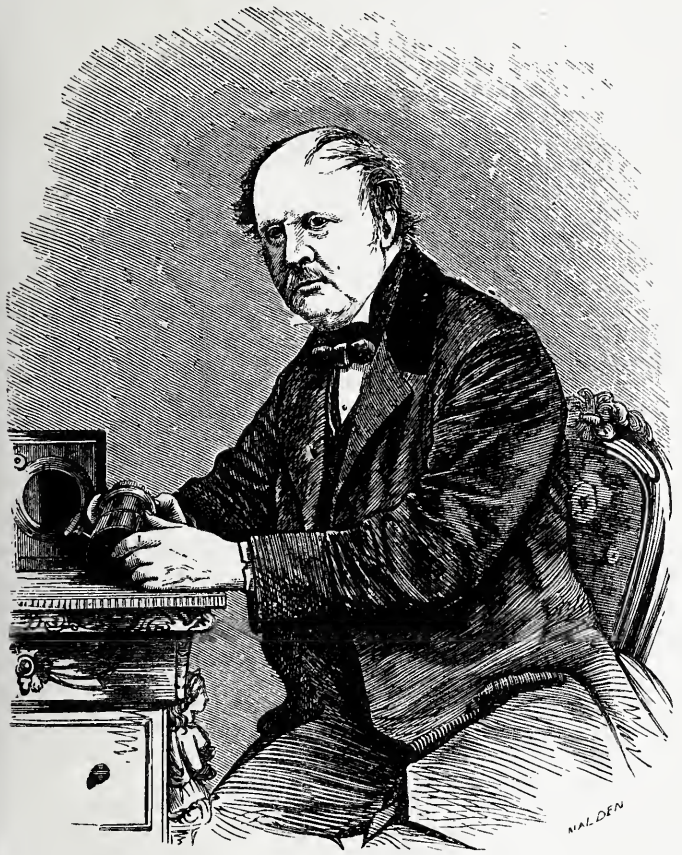
BATH, being so intimately associated with the invention of practical photography, it is fitting we should speak first of all of one who shed a far greater lustre on the place than all the Beau Brummels, Beau Nashes, army and navy generalissimos, or even princes that have ever haunted its pretty and intensely respectable streets.

Lacock Abbey, where Talbot resided, and where he conducted so many of his experiments, is situated adjoining the village of Lacock, in Wiltshire, a few miles out of Bath. One fine morning during Convention week saw two large brakes drawn up in front of the Guildhall, these being quickly taken possession of by a large and happy party of Baal-worshippers, who were soon driven off to the Mecca of their aspirations under the guidance of Mr. Middleton Ashton. Halting by the way at Box, the party penetrated into the bowels of the earth to inspect the famous quarries from which the equally famous Bath stone is mainly obtained. Many a (seemingly) weary mile did they, with torches alight, pass through the intricate subterraneous passages of this vast catacombal region, hundreds of feet below the surface of the ground, and in which an army of a "hundred thousand men" might easily have been stowed away without possible chances

of discovery. It is a case of mining, in contradistinction to quarrying, and the visitors were grateful to the manager and his assistants for the kindness and courtesy displayed during their peregrination all through this deep-seated congeries of railways and passages. Resuming carriages, the party eventually reached Lacock, a village which, happily for artistic effect, the modern architectural improver has as yet not set his eye upon. Here there is good food for the camera, comprising houses and cottages simply glorious in their antiquity. After partaking of a sumptuous luncheon at the hotel we entered the grounds of Lacock Abbey. Mr. C. H. Talbot, son of Fox Talbot, and the present owner, showed us all over the place.

Lacock Abbey is a religious structure of great antiquity, erected early in the thirteenth century, and is famous as being the first building "that was ever yet known to have drawn its own picture.' It was in the summer of 1835 that this scientific feat was achieved.

We were here shown several unmounted proofs of prints which were published in Talbot's *Pencil of Nature* in 1844.



As it may interest many to see a portrait of Mr. Fox Talbot, we here give an admirable one, to the fidelity of which we attest, from one of the few photographs ever taken of this *savant*. It is by the camera of Mr. John Moffat, Edinburgh, and was taken, if we recollect aright, in or about 1861.

Mr. Talbot was born at Melbury House, Dorsetshire, in 1800. This was the seat of his maternal grandfather, the Earl of Ilchester.

Mr. Talbot's attention was first turned to the subject of photography by the following incident: In the autumn of 1833, while in Lombardy, one of his amusements consisted in sketching the scenery around the Lake of Como. This he did by aid of the camera lucida, the ingenious prism which had been invented by Dr. Wollaston twenty-five years previously, and which was at that time largely employed for drawing landscapes. Dissatisfied with the result, Mr. Talbot then employed the camera obscura, which was fitted with a mirror placed diagonally, much like our "finders" of the present period. But the labour of having to trace natural scenery by pencil also dissatisfied Mr. Talbot, as it implied previous skill in drawing and a prolonged stay upon the spot. Moreover, under no circumstances could minute detail be obtained.

Impressed with the reality and beauty of the picture as it existed in the camera, Mr Talbot was insensibly led to reflect on the possibility of causing these fleeting images to fix themselves. He reasoned thus:—"The picture, divested of the ideas which accompany it, and considered only in its ultimate nature, is but a succession or variety of stronger lights thrown upon one part of the paper, and of deeper shadows on another. Now light, where it exists, can exert an action, and in certain circumstances does exert one, sufficient to cause changes in material bodies. Suppose, then, such an action could be exerted on the paper, and suppose the paper could be visibly changed by it; in that case surely some effect must result having a general resemblance to the cause which produced it; so that the variegated scene of light and shade might leave its image or impression behind, stronger or weaker on different parts of the paper according to the strength or weakness of the light which had acted there." He was aware at this time of the claim made by chemical writers for the peculiarly unstable character of nitrate of silver under luminous action, and accordingly he made choice of this substance on which to try his experiments.

(*To be continued.*)

SPECTROSCOPIC DETERMINATION OF THE SENSITIVENESS OF PLATES.

Last January, whilst engaged in a series of spectroscopic examinations of various plates, to ascertain not only their general sensitiveness, but also their particular sensitiveness to the green and yellow rays of the spectrum, there appeared in the *Chemical News* an article by Professor V. Schumann bearing a similar title to that above. This was referred to in a leader on page 51 of the current volume. In Schumann's article there are several errors in translation; however, his remarks were evidently the results of his investigations into the colour sensitiveness of the so-called orthochromatic plates, whilst mine were based upon that of ordinary plates, and, collaterally, into emulsions sensitive to green and yellow.

Probably many of those who may employ a Warnerke's sensitometer will have noticed that a plate which reveals, say, twelve or fourteen under the sensitometer—apparently a very slow plate—will, when exposed in the camera on a view, yield an image indicating a degree of sensitiveness equal to that obtained in another plate of a reputedly higher sensitometer number. Reasoning on this, one is driven to the conclusion that the apparently slow plate is slow only as regards its susceptibility to weak blue rays—those of the luminous tablet—but really rapid when exposed to white light. Then, again, certain plates I could name which are of reputedly high sensitometer numbers, when subjected to the camera test, do not work at all satisfactorily with brief exposures, the image on development being decidedly inferior to that of the nominally slower plate under conditions of exposure and development identical. These are some of the anomalies of the luminous tablet sensitometer. Schumann, in his article, draws direct attention to the nature of the light absorbed by the luminous tablet. There is one point needing explanation. He alludes to the pale blue monochromatic light of the luminous tablet, and points out how, if the tablet be excited—magnesium or sunlight will do—then covered with a card, in which a slit is cut an inch long and a tenth of an inch wide, and examined with a "prism," nothing beyond a pale blue streak is seen. In using the word "prism," many have misunderstood the Professor to mean a spectroscope, but that is not so. The whole luminous tablet can be examined in the dark room by a triangular piece of flint glass—a broken lustre off a chandelier, which can be bought for a penny at any gasfitter's. It will be found that there is no fringe of colour observable, which would happen if the light emitted from the tablet was chromatic. Any spectroscope of ordinary construction reduces the light too much to render observation easy; but the prism, or lustre, stops no light, and it may be used to test the dark-room window or lantern just the same way. If the light is safe, there will be no fringe of colour; but, if some one strikes a match near, instantly the flame is fringed with the usual colours. The only care needed is to observe that the examination is made through the angle of the prism, not mistaking the reflection from the flat side of the triangle.

Commercial plates are, generally speaking, sensitive between H, the violet, and E in the green, occasionally extending towards D in the yellow; but the maximum sensitiveness lies between G and F. It is easily to be understood, therefore, how very sensitive any ordinary plate may be to the pale blue rays of the luminous tablet, and it is also quite apparent that a plate, in itself highly sensitive to green and yellow, fails to record the fact when submitted to the monochromatic, pale blue rays of the tablet. Here, then, we have con-

vincing reasons for concluding that the luminous tablet, as a standard light, entirely fails, and does not approach our requirements nearly so well as the standard candle, which, to say the least of it, is certainly not monochromatic in its light, however far it may fall behind the components of ordinary daylight. The monochromatic rays of the tablet bear no analogy to daylight, and, as it is usually daylight with which we work and base all our calculations, it is evident, I think, that we must seek our standard light in some substance that shall emit rays approximating those to be found in ordinary daylight. It seems to me idle to be going on examining our plates with a pale blue light; we don't want to know whether our plates are sensitive thereto. We know they are abundantly sensitive to blue, indigo, and violet, but our modern requirements demand sensitiveness to green and yellow, and this the luminous tablet sensitometer fails to notice.

Those who are accustomed to examine plates spectroscopically find that most ordinary plates are sensitive as far as the double H lines in the violet. Sensitiveness in that direction is of little value except as contributing towards obtaining density in the developed image. Hence the reason why certain plates are highly spoken of by users who consider the property of yielding density is of the greatest importance—quite as much as that of rapidity. Such plates will usually be found sensitive only between H and F, yield very vigorous negatives, prone to too much contrast by exaggeration of the light shades into high lights, whilst the shadows remain clear glass, and green or yellow fail to be translated as anything but the deepest shadow. A plate, of which the foregoing is a type, will register a high number with the luminous tablet sensitometer, and it may also be fairly rapid with a camera exposure; the two things seem to fit because of its sensitiveness to blue in the maximum. But when we come to judge another grade of plate, whose sensitiveness lies between G and E, by the same rule, we find discordance in the fact that, whilst it is of standard rapidity in the camera, it fails to develop a high number under the luminous tablet.

One could adduce numerous other points, if evidence was required, to prove the unfitness of our present system to ascertain the sensitiveness of our plates. I will now explain the method I adopt to ascertain the relative sensitiveness of plates to daylight. Procure a small direct-vision pocket spectroscope, having adjustable slit and sliding focus. To the front of any ordinary camera that will extend to sixteen or eighteen inches, fit a temporary front of soft pine half an inch thick, and in the centre of this bore neatly with a centre bit a hole of such diameter as will take the eye end of the spectroscope; unscrew the eyehole, and push the tube into the hole in wood, bushing the hole, if necessary, with a strip of black velvet glued in to make a tight fit. By fixing the smaller tube in the front of camera we can focus by sliding the outer tube thereon; if we fix the larger tube in the front, we should have to focus inside the camera, obviously most inconvenient in practice. Place the front carrying the spectroscope *in situ* in the camera, and rack the latter out to its full extent; point the camera towards a bright sky, or the sun itself, if you can, whilst you endeavour to get a good focus. The spectrum will be seen on the ground glass, probably equal in dimensions to that of a quarter-plate. Proceed to focus by sliding the outer tube to and fro until the colours are quite clear and distinct, and at same time screw down the slit until the Fraunhofer lines appear. By using the direct rays of the sun, and focussing carefully, and adjusting the slit to the correct width, the lines can be got fairly sharply. Slide your front so that the spectrum falls on the ground glass in just such a position as a quarter-plate glass would occupy when in the dark slide, and arrange matters so that the red comes to your left, and the violet to the right, and invariably adopt that plan. It is advisable to include the double H lines in the violet on the right-hand edge of your plate—they afford an unerring point from which you can calculate backwards, finding G, F, E, &c., by their relative positions to the violet lines, otherwise you may be mistaken as to what portion of the spectrum you are really photographing. The red should just be seen along the left edge of the quarter-plate. When all is arranged thus, you utilise three-fourths of your plate with the spectrum, with just a little clear glass at each end. Before disturbing the arrangement of the apparatus, it is desirable to scratch a mark on the sliding tube, and make a memo. of the position of all the parts, so that they may be taken away and replaced exactly, and thus save time in future.

To take a photograph of the spectrum, put a quarter-plate in the dark slide and place in camera; point the camera towards a bright sky, or white cloud, near the sun—not at the sun, as there is considerable difficulty in keeping the direct rays exactly in the axis of the spectroscope—draw the shutter, and give, say, sixty seconds. On development, you will probably obtain a good spectrum at the first trial. The duration of exposure must, of course, depend upon the brightness of the day; but, if the experiments are to have relative values, the period of exposure must be distinctly noted, and comparisons made for a normal exposure of sixty seconds, ninety seconds, two minutes, or more, just according to whatever object one has in view in making the experiments. With a given exposure the results will vary with the light and the width of the slit, as well as being influenced by the character of the instrument itself. Further, all such experiments should be made with a normal developer, and development continued for a definite time; the only exception to this rule would be in the event of wishing to ascertain the utmost that could be got out of a plate, but, under ordinary circumstances, the developer ought never to vary, nor yet the duration of development. To try the effect of various developers, or varying time in development, a departure must be made of such a nature as would operate to bring out upon each plate, or piece of a plate, the utmost it would develop short of fog, against which caution must be adopted in all spectrum experiments.

On development, say, for one, two, or three minutes, wash off and fix. You will recognise the H violet lines and the others to the left, and this experiment shows what is the sensitiveness of this particular plate to the various regions of the spectrum with this particular apparatus, and with a normal exposure and development. So far, this teaches very little; it merely indicates that this particular plate is sensitive or insensitive to certain rays of coloured light. To make this teaching of any value, we must institute comparisons. Accordingly, instead of simply exposing one plate, suppose we cut a strip from two, three, four, or even half-a-dozen different plates, and arrange them side by side, horizontally, in the dark slide, so that the spectrum falls upon the whole when they are placed in the camera and exposed. There is really no difficulty in cutting strips a quarter of an inch wide, the lengthway of a quarter-plate. Lay the gelatine plate film up, and hold a straight-edge on it firmly, so that when we use a suitable diamond we can plough through the film and cut a strip which will break off easily between the thumb and finger. A quarter-plate can thus be cut up into strips to yield about a dozen comparative experiments. When cut and snapped off, mark each with pencil with such a distinguishing mark as shall be clearly seen after fixing. The cut-up strips can be kept in the maker's plate-box.

Before going further into this subject I should advise a careful perusal of Schumann's paper, as well as the leader thereon on page 51 f the current volume.

G. F. WILLIAMS.

THOUGHTS ON "PROPER" EXPOSURES.

Is "proper" exposure a kind of *ignis fatuus* that eludes the sharpest attempts at definition and lures its scientific victims into unfathomable quagmires? What is it, can anybody say? Is it anything definite, or merely an expression? Most experienced photographers know what a good negative is when they see it, although each may have a somewhat different standard of excellence—one may prefer a stronger or a softer image than another, an opinion influenced by the class of work to which each has been accustomed and the methods of reproduction to be afterwards used; any way a good negative retains its character whatever exposure might have been made to secure it. If a good negative is the result aimed at, every portion of the process must work harmoniously. Every practical photographer would at once assume that a *perfect* negative had received a proper exposure *for the treatment it afterwards received*, whatever that might have been, reckoned either in fractions of seconds or numbers of hours. This granted, any exposure, so long as it is sufficient, is a proper exposure. Till recently, we naturally concluded such was the accepted and unassailable position assured by years of practice and corroborated in innumerable ways.

Messrs. Hurter & Driffield, careful experimentalists as they may be, seem to form their iconoclastic ideas on much too narrow a basis and, in the opinion of many experienced photographers, inconclusive experiments. Their published opinions, that photographers have been wrong from the beginning with regard to the question of exposure, and at the same time assume their conclusions to be the only right ones. By-the-by, I very much doubt if these gentlemen are practical photographers, because in that case, and acting on their own published convictions, we may assume that, when by chance they had made a good negative, it was one of those fortuitous occurrences that occasionally happen in the practice of the inexperienced. "Proper" exposure necessitates uniformity, and is entirely dependent on several other "proper" things—proper light, proper sensitive surface, and proper development. Given all these propers, a proper exposure may be a definite quantity; but, vary any of them in a material degree, the proper exposure becomes an improper one. Suppose we leave out the restraining element, varying nothing else in one case, and add much more of it in another, how will the exposure fare then? It is to be supposed that the resulting negative supplies the information—at least, this is the only

source and evidence of which photographers can avail themselves, whatever experimental chemists can.

We may ring numberless changes on light, plates, and development, and get all sorts of results, good, bad, and indifferent, the exposure being dependent on its treatment, the proper ratio of density being expressed in ordinary photographic terms by a plucky negative with plenty of half-tone. I suppose the march of education makes us get ultra-scientific in our phraseology and definitions, and perhaps, after all, proper exposure means nothing more or less than it always has done. Be this as it may, providing there is such a thing as one particular time, irrespective of everything else, that will produce the only perfect negatives, it would be extremely useful to know how to secure it—practice will not, and experience fails. The opinion of the late Professor Hunt was that the merest instantaneous impact of light on the film effected the change, and, as such, should be the proper exposure; but at that time no sufficiently active and suitable developer was known, nor is it yet. So there are still laurels to be won by the discoverer of a developer that will make a properly exposed negative with the very shortest possible exposure to light.

At present, if we mean to obtain a good negative, the exposure more often than not must be some easily appreciable time reckoned in numbers of seconds rather than in fractions of them. The carefully conducted and elaborate experiments of the reduction of silver from its haloids are exceedingly interesting, and may open up useful questions, and produce unexpected results without, so far as I can see, being necessarily confined to the production of photographic negatives that chiefly empirical practice has brought to as great a perfection as is ever likely to be attained. If we look back to the earlier years of photography, we find wet collodion negatives as perfect as they can possibly be, and in this matter, save in orthochromatic photography, we have never been able to advance one single step. With all the difficulties and want of knowledge attached to negative-making in those days, the result of some of our best workers would put to shame a great deal of the work of the present day. The opinion expressed of a successful negative has always been that it has had sufficient exposure. Then, as now, exposure and development went hand-in-hand dependent on each other, development being the corrective and support, so to say, of exposure, and the rule then, as now, in order to produce good work, was always to err on the side of over-exposure, if erring at all, letting the light do its work thoroughly, and leaving a little margin that judicious development could carefully trim off. In conclusion, I believe I echo the opinion of most photographers that *any* exposure that will produce the highest class of negative under the circumstances in which it is taken is the proper exposure for that particular subject, whatever it may be. EDWARD DUNMORE.

ON THE UTILITY OF MODERN PHOTOGRAPHIC APPARATUS.

"MAN, I ha'e a gran' new whole-plate camera, an' it jist weighs four pund the whole thing!" Such was the greeting I met with on a recent occasion when meeting in with a most enthusiastic beginner in photography; and, although my friend had in a sense put in a slight amount of experience with the aid of a smaller size, he was so bent on the pleasure of a contemplated trip amongst the fiords of Norway in his yacht that, of course, money being no object, everything of the very latest pattern must be provided in the new and larger sets of apparatus that he had made up his mind to take with him on his tour; and, not wishing to damp his ardour all of a heap, I mildly suggested, "Are you quite sure it is not too light?" "Man, I'll let you see it the morn;" and sure enough he did, but not with the amount of delight or satisfaction he had anticipated. It so happened that at the time, "*the morn*" as he called it, I had an engagement among some of our grand Scotch hills and glens, and, on my mildly suggesting I should be pleased to see him with me, he jumped at the offer, and early the next morning saw us steaming out of St. Mungo, he with his gran' new four-pund outfit, me with my heavy old-fashioned twelve by ten. Of course, the temptation to unlimber and show off this new toy was present, and who among the numerous workers in photography would not under similar circumstances do the same, I wonder? So, before long, the vaunted article was spread before my gaze. I at once saw it was a modern expensive camera, re-modernised, if I may be allowed such an expression, and surely none but an ingenious workman could have put such a monument of nonsense together. My friend, as may be supposed, was not slow in pointing out wherein the celebrated article was in advance of anything yet offered to the public, and, being a clever mechanic himself, doubtless he could enter fully into the cleverness of the manufacture, and so I was soon entertained to the wonders of an invisible spring here, instead of the good old-fashioned milled head screw, for supporting the rising front, and how half an ounce was gained in weight here by the substitution of some other new-fangled nonsensical screw, &c. Somehow or other my friend did not find me go into the raptures he had expected I would over his new purchase; I simply said, Too light, for my fancy.

Now I have from time to time seen a good many light cameras, but the one in question took the bun entirely, as a butterfly light-weight, and I there and then said to myself, I wonder where this sort of thing is going to end, and if it were not high time some warning voice should be raised against the production of such high-priced toys.

For a good many years this sort of thing has been going on; 1885 saw about the first of it, and since then, on down through every season, each maker seems to have striven to outdo his neighbour in the production of such cameras, as have something new about them, and some part of which it is claimed are protected by letters patent, which on investigation are no more entitled to protection than the caller air we breathe. No doubt these highly polished butterfly toys look quite the correct thing when trotted out by a clever salesman, and the advantage of having a camera which weighs just half an ounce less than another frequently, no doubt, weighs materially with those who think of the ease and comfort of carrying a light camera on foot; but in nine cases out of ten these tailless abominations require some other heavier form of cases to protect them from damage, and where half an ounce is gained by the sacrifice of utility in the working of the camera and freedom from damage; very frequently a pound is lost by the necessity of employing some heavier camera case than is necessary, when a good tailboard forms a protection to the focussing screen; but at the start, when a beginner is buying an outfit, this sort of thing does not happen to strike him, it is the camera alone that is taken into consideration, and in nine cases out of ten no thought is given to the case or carrying outfits until all is settled and purchased, when, of course, the usual leather case is trotted out as the correct thing. Then, there is no thought about the weight. Now, I am quite aware that a few, very few, alas, of our really first-class makers and houses who supply photographic outfits, do not encourage the manufacture of, or at least recommend, the purchase of these expensive toys, and instead place before their customers a good sensible square bellows camera with tailboard and reversing back, of fairly heavy weight and construction, a form which any first-class house can with confidence recommend as a thing that will not blow about with every gust of wind, or whose invisible springs will not quietly take it into its head to let the lens down in the middle of an exposure. Some of my kind readers may say, Oh, Armstrong's laying the paint on too thick now. Well, really, I saw this happen with the identical outfit in question, and it was just the very last straw that caused my friend to consign his "four-pund" outfit to the lumber closet, and purchase a sensible old square camera to replace same for his Norway trip.

But it is in many other points besides weight that the new form of camera falls short of the good old standard pattern. The tapering bellows is not an improvement when wide-angle lenses have to be employed. True, I am aware that one celebrated maker from over the pond has by a clever contrivance endeavoured to buckle back the narrow end of the bellows when such lenses are being used; but this is a makeshift at best, and, in my opinion, does not compensate for the good old square shape. Here, again, in the matter of the bellows, utility is sacrificed to weight. Then, again, how seldom do we find nowadays the adoption of the good, sensible, old plan of the fore and aft screw for focussing purposes fitted to cameras. And, doubtless, it is not generally known that the now almost universally adopted rack and pinion form of focussing adjustment has a good deal to answer for in the way of failures. Over and over again I have met in with pupils, who are at a loss to understand how certain out-of-focus negatives have resulted, because, so far as they know, the utmost care was taken to focus carefully before exposing. I could nearly always, however, detect the cause by knowing the character of the pupil, or who had made the exposure, and almost invariably trace this cause back to the rack and pinion of their camera having run slack and easy, the result of this being that, on the insertion of the double-back in the camera, the plane of the ground glass was moved forward slightly, but quite sufficient to throw the picture out of focus. I am aware in some cases the rack and pinion form is very useful, such as when a camera has to be utilised for copying purposes on a copying board or table; but then, when proper arrangements are made for copying work, the old form of fine screw adjustment is quite as applicable, provided the camera be raised on a sliding block, as it should be. The rack and pinion is not an advance over the good old form of focussing, and has to account for failures that with the screw adjustment are simply impossible.

In instantaneous work this moving of the focussing plane is very prone to happen. I have known a whole series of pictures lost through

it, for, in the excitement to rapidly insert an unexposed plate for an exposed one, the slide is taken firmly in hand, and very little movement suffices to throw it out of focus, and this without any suspicion at the time. Any one, therefore, whose cameras are so fitted should carefully see that the rack movement is not working too slack, and so avoid the failures which are sure to follow such a state of matters. Were I ordering a new camera to-morrow, I should certainly not have a rack and pinion focussing arrangement. Then, again, in the matter of woodwork, to save weight and bulk, undoubtedly utility is sacrificed, and some of the *gimcrack* things that are now offered to the public are quite useless for all-round general work. But, then, they are highly finished in brass work and polish, and look so portable. I met in with a case the other day where one of the good old veterans in the way of photographic dealers is concerned, who for nearly half a century has made and sold cameras, that actually could not open out or explain the numerous new-fangled movements of the very newest pattern, and who actually called one of his assistants to explain this fool of a thing, as he properly termed it. But, then, he is one of the old school.

The question comes to be, How far is this sort of thing to be carried, and what steps can be taken to handicap the production of such useless trash? Sometimes I think, were the judges at our various exhibitions to show decided firmness in approving only of such articles photographic as were purely in the sphere of utility, and on no account approve in any way of such form of apparatus as were classed ornamental, or where utility was in any way sacrificed, something would be done in the way of checking the production of such toys. Then, again, we frequently see our worthy editors taking notice of this and that new thing, and, where such is really an advance, rightly too. All praise to them; but, when such notices are inserted from other motives, such, in my opinion, does not tend to benefit the poor beginner, or the public either, for that matter.

But it is not only in cameras that this sort of thing is rampant, it extends to nearly every article in a photographic outfit, and at an early date I hope to return to the subject, and deal with some of these.

T. N. Armstrong.

LETTER FROM GERMANY.

Measuring the Speed of Instantaneous Shutters—Mat Varnish with Toluol—The Sensitometer Question—Zeiss's New Lenses.

Professor L. Weber, in Kiel, has published recently an entirely new method of determining the speed of instantaneous shutters. A test hitherto in general use was to let some bright object swing in a circle in front of the camera, and to take an instantaneous picture of it. The swinging object will describe upon the plate a circle, increasing in size the slower the movement of the shutter.

Londe had a different way. He writes the vibrations of a tuning-fork upon a movable plate. A piece of tin with a hole is fastened to a tuning-fork, behind which a strong light source is burning. The focus is taken upon this illuminated hole, and the instantaneous shutter is mounted. The plate rests in a sliding holder, which by weights and rollers is moved in one direction during exposure. If the shining opening in the tin is at rest, it will depict a line upon the plate in consequence of the movement of the same. If the tuning-fork vibrates with the opening, the latter will draw a wave line; if the tuning-fork vibrates 1000 times a second, each wave which is seen on the plate will signify a second. The number of waves that can be counted will, of course, increase according to the duration of exposing the instantaneous shutter, and these can be obtained by Londe's arrangement in exactly $\frac{1}{1000}$ of a second. Londe has shown how unreliable the publications of the tradesmen are about the duration of exposures of instantaneous shutters. Thus the actual time of exposure of different shutters was:

$\frac{1}{20}$	second,	that is	$\frac{7}{12}$	of that published.
$\frac{1}{40}$	,,	,,	$\frac{4}{5}$	,,
$\frac{1}{100}$	,,	,,	$\frac{2}{5}$	,,
$\frac{1}{25}$	,,	,,	$\frac{1}{4}$	,,
$\frac{1}{100}$	,,	,,	$\frac{1}{6}$	,,
$\frac{1}{35}$	,,	,,	$\frac{5}{9}$	,,
$\frac{1}{40}$	,,	,,	$\frac{2}{5}$	,,
$\frac{1}{110}$	,,	,,	$\frac{7}{11}$	,,

Therefore only one figure is correct ($\frac{4}{5}$); all others are nearly twice to four times too high. Londe says there are very few instantaneous shutters which have only $\frac{1}{100}$ second time of exposure; the quickest made according to his order having $\frac{1}{250}$ second.

Londe's method appears now the most complete one. But, notwithstanding all its complications, it is not free from defects. As soon as the shutter opens, the edge of the objective is first of all only exposed, and this acts only in a lens with very small diaphragm.

In consequence of this the picture will lack light, and only when the objective opens more the light point will be sufficiently clear to act. Londe obtained, therefore, with a strong light twenty-four, and with a weak light only twenty-one waves. The defect is, therefore, $\frac{3}{1000}$ of a second. This defect is not very great. Still, Londe's very complicated arrangement will be purchased only for physical laboratories. Weber's new method will be so much more welcome to professionals and amateurs. The principle of it is that one-half of a plate is exposed free for one second against a bright screen uniformly illuminated, the other half by means of the shutter to be tested is directed upon the same screen. The slide is first drawn about one-eighth of its length, after which ten exposures take place; then another one-eighth of the slide is drawn to give again ten exposures. This is continued to the end, and divisions are thus obtained which have experienced 80, 70, 60, 50, 40, &c., instantaneous exposures.

If the plate is then developed, the one half will blacken uniformly; the other half, according to the number of instantaneous exposures, will not be uniform. The place is easily recognised which corresponds in intensity of blackening with the other uniform half. If this required fifty exposures, the exposure of the instantaneous shutter would be only $\frac{1}{50}$ second.

We have to remark, of course, that the exact comparison of the blackenings requires an experienced eye, and the beginner will easily make mistakes. But the eye will soon become used to it.

Lainer, in Vienna, gives in the following a very good formula for mat varnish with toluol:—

Ether	100	c.c.
Sandarac	10	,,
Toluol	34·50	,,

The sandarac is finely powdered, put into the ether, and, after being dissolved, the toluol is added. It is not very easy to coat plates uniformly with this mat varnish, but it takes the pencil very well.

The photometer question prevails again in the minds of a good many photographers. It has been determined, by manifold experiences, that the favourite Warnerke photometer does not deserve its reputation. The degrees rise too slow, and then they do not rise as mentioned in the table. My Warnerke's photometer shows very slight differences in the transparency between seventeen, eighteen, and nineteen. Then the light source (the phosphorescence plate) is quite an unreliable thing, whose brightness sinks rapidly after irradiation, so that time differences of a few seconds may cause the greatest mistakes.

In Warnerke's sensitometer the degrees rise just as they do on my older one for carbon printing, in geometrical proportion, that is, if the light quantity necessary for the production of the commencement action is for degree $1 = n$, it is for degree $2 = n^2$, for degree $3 = n^3$, for degree $x = n^x$.

Taylor and myself constructed another photometer, which, in place of the transparent scale, has a number of tubes (pipes) over the sensitive plate. These are closed with tin, into which one, two, three, four, five, to twenty-five equal openings are bored. The brightness in these pipes under three openings is, of course, three times as great, under four openings four times as great as under one opening; it is therefore proportional to the number of openings. I considered this instrument, whose degrees are not in a geometrical but in an arithmetical proportion, formerly a decided success; but I must asknowledge now that I am obliged to drop this opinion, for the following reasons:—

The brightness of the single degrees of the pipe-photometer is in proportion to the number of holes in each pipe under which the plate to be tested is exposed. Thus under No. 1 (one hole) the brightness is twenty-four times as weak as under No. 24 (twenty-four holes); if, therefore, two plates are exposed an equally long time to the same light under the photometer, and the number ten appears for the one in the developments and for the other one No. 24, it means that the brightness under ten, which is only $\frac{10}{24}$ of the brightness under twenty-four, makes just as strong an impression as the brightness under twenty-four; the first plate will, therefore, be in the proportion of 10:24, therefore nearly two and a half times more sensitive.

Here we get, therefore, the proportion of sensitiveness direct from the proportion of the number of holes under which the first impression becomes visible; this is an essential advantage in comparison with the scale photometer, whose degrees advanced according to geometrical proportion, and by no means are in the same condition as the degree numbers.

But, aside from these advantages, there is also a great disadvantage —the unequal intervals between two degrees. Thus the light strength under one hole is half as great as under two holes. If the light quantity under two holes is called one hundred, the light

strength must therefore increase one hundred times to produce under one hole the same commencement action as under two.

The conclusion is, that if, for instance, one plate shows No. 2, a plate twice as sensitive would bring forth in the same time the No. 1; but a plate one and three-quarter times as sensitive would not bring forth No. 1, but also No. 2, even if more intense, so that under such circumstances plates will prove equal according to the degree number whose sensitiveness is in proportion of 4:7.

The brightness H is proportional to the number of holes m. Thus the brightness increases from n to $n+1$ as 1×100 by per cent., it differs therefore at every degree; very much if m is small, very little if m is large. It has therefore to increase at degree 10 to ten per cent. if the initial action is likewise to be produced under degree 11. An increase from five to eight per cent. remained therefore certainly without action; just so great is the defect. If in this manner degrees 19 and 20 are compared, differences of five per cent. will be observed, and then at least three per cent. mistakes can be made.

With regard to the initial action there are also again defects, which make the instrument as good as useless with regard to the degrees 1–20. Only from 20 to 25 they will keep within the limits of defect of ordinary photometry; but they are different for each interval. The question, in how far differences of five per cent. will show by the initial action, we consider yet an open one.

It is different with the scale photometer. If the number of scales is x, and the brightness under one scale $\frac{1}{n}$, the brightness under x scales will be $\frac{1.}{n^x}$. n^x times as much light has therefore to fall upon the x scales to exercise the same action (initial action) under x scales, as the light power 1 under 1 scale. The degree $x+1$ requires therefore n^{x+1} times as much light.

The light quantity increases, therefore, if after degree x degree $x+1$ is to become visible, by $n^{x+1}-n^x$. If we calculate this by per cent., beginning by n^x, we obtain—

$$\frac{n^{x+1}}{n^x} \times 100 = (n-1) \times 100$$

1. This demonstrates that the increase of light by per cent. from one degree to the other is equal with all degrees of the scale photometer.

2. That this increase is equal to the one of a reduced absorption-coefficient for one scale multiplied by 100.*

The conclusion herefrom is, that the scale photometer has indeed advantages which the pipe photometer does not possess.

In my photometer the increase amounts to 0_{27} from one degree to the other ($n-1.=1._{27}-1.=0._{27}$), this multiplied by hundred gives twenty-seven per cent.

But by the selection of a less strong absorbing material, in which n is smaller, a more moderate growth of the degrees can be obtained. If, for instance, $n=1_1$, then $n-1$ will be $0_{\cdot 1}$, the addition from degree to degree will therefore be only ten per cent. Then the defects remain within this number, ten per cent.; if $n=1_{05}$, they remain within five per cent. Thereby it is in one's power to make the scale photometer rise quicker, that is, to make it more sensitive.

It is therefore necessary that the scale photometer is exactly constructed from uniform layers, and that the scale is not too large. Warnerke's scale has too large an absorption coefficient, the single degrees rise by 34·7 per cent. of the next lower ones, admitting thereby mistakes to thirty per cent. This should not be.

About the Zeiss objectives I have reported already last year. All the experience gained in the mean time confirms that they are the most excellent instruments that have been placed upon the market lately. Evenness of the visual field, great angle, finely cut sharpness demonstrate their excellency. No trace of light spots can be seen.

I make frequent enlargements with them. All other objectives will produce a red or blue edge around the picture-field, and only the Zeiss objective shows this edge absolutely white.

—*Anthony's Photographic Bulletin.* Dr. H. W. Vogel.

* By absorption-coefficient is understood the number with which the original light power has to be divided, to obtain the light power reduced by absorption after passage through one scale layer.

WHY BUSINESS IS DULL WITH SOME PHOTOGRAPHERS.

Among professional photographers the question is frequently asked, "What makes business so dull?" During the early spring, when the dull, rainy weather prevailed, the stagnation was universal and easily to be accounted for; the blame was laid to causes beyond human control, and justly so. But with the change of seasons came the clear days, with a good light and balmy, spring weather, crowding our thoroughfares with pedestrians and shoppers, which naturally had a good effect upon the professional photographer. Yet while this improved condition of affairs gladdened the hearts of many by a rush of business, and brought money to their purses, there are others who still wear long faces, while they pace their empty studios and wonder where the money is to come from to pay their idle hands and accumulating bills. It is this latter class who find consolation by blaming the advent of the amateur photographer for the stagnation, and end by heaping maledictions upon his head.

Now there is always a cause for an effect; for instance, where two men are engaged in business, be it whatever it may, all circumstances being equal, one will often prosper and make money, while the other, with equal facilities, will fail. The question naturally arises, Why is this? The object of our paper is to try to solve this problem, from a commercial as well as a common-sense standpoint, with particular reference to a few facts which bear closely unto the professional photographer.

We will give the illustration from our own experience. A short time ago we were passing along one of the main streets of Philadelphia; within one of the most prominent blocks or squares there were probably half a dozen photographic studios. We went into one; the proprietor was old and skilful at the business, well known as prompt and reliable, and whose portraits a decade ago were held second to none in the City of Brotherly Love. After asking the time of day, we ventured the usual question as to business. The answer was that it was bad, worse this spring than ever; that he was making few or no new negatives, and, if it were not for occasional duplicates from the thousands of his old negatives, he would have to close the gallery and go into another business. When asked how he accounted for this falling-off of his business, the reply was (if we may be pardoned for the expression) the old, threadbare, wormy chestnut about the amateur and his first cousin, the Cheap John. He further ventured the opinion that photography as a business had gone to the dogs, and no one was making a living at it any more.

Now, as a matter of fact, we knew from our own knowledge that the competitor of this despondent camera adjuster, but a few doors above him, was a doing a good business, with a clientage increasing from day to day, and with orders far ahead of his capacity. This latter artist made no better pictures than the first-quoted operator, his facilities were no greater, his expenses much less, and his prices were even in advance of his older competitor. Yet the public passed the entrance of the old and formerly busy artist, as they hurried along the street, while at the entrance of the newer man they were apt to stop, enter, and patronise the latter.

Now, the question naturally arises, Why is this? It is easily answered. The show-case of the older photographer, an old affair reaching from floor to ceiling, had been "fixed" a year or two ago; cabinets, panels, boudoirs, with a few cartes, many from negatives made twenty years ago, had been crammed in the back promiscuously, without regard to subjects. It is true all the prints were fine specimens of his handiwork, and every mount had his name embossed in gold; yet the arrangement was without that taste or harmony which is apt to attract the eye of the passer-by; then, the glass was dingy and the silver tarnished. It is true that the case was cleaned on the outside once a week, but the rest of the time it was left to shift for itself. No matter how dirty the glass was, Thursday was the cleaning day. The same rule applied to the vestibule and entrance. Every Monday it was wiped up, no matter what was the condition of the streets; the stairs were swept down every day, that was all. To return to the show-case, upon which everything depended to attract new trade, it is doubtful whether it had been opened for a year; and yet this photographer bewailed his ill-luck, brought about by the falling-off of new customers, and could not see why the general public flocked to his rival a few doors above.

Now, how was it with his competitor? His show-case did not reach up to the ceiling, and was much smaller than the one just described. It did not contain a quarter of the specimens displayed in the former, but what were exhibited were tastefully arranged, so as to attract the eye of the passer. The proprietor also kept a boy expressly to keep the entrance and show-case clean. No matter how often in the day it was wiped off, it was always bright and clean inside and outside; while the specimens, always from negatives of the day, were frequently changed daily, so as to continually represent new faces to the regular passers. Especial care was also taken to make the entrance inviting and the vestibule attractive.

Here was a partial solution of the problem. In the first case it was the adhering to the old provincial methods of conducting business which were in vogue a quarter of a century ago. The result was a dwindling business and despondency.

In the other case, where modern business method, such as an attractive entrance, with a clean, well-kept show-case, polite reception after the

stranger enters, comfortable surroundings, conveniences for ladies and children, and modern accessories in the operating room, were coupled with good work at remunerative prices, the result was plenty of new sitters and a surplus of work, which swells the bank account of the intelligent proprietor.

At the present day, dingy studios, narrow, steep stairs, dirty, bad-smelling, operating-rooms, and dilapidated accessories are things to be avoided by the professional who wants to make money by his profession. The general public upon which he depends for patronage are sure to avoid photographic fossils. It should also be borne in mind that what went in early wet-plate days and war times will not go now.

Why should not the same means applied by the successful merchant to insure success hold good with the photographer? What merchant nowadays crams his window full of goods promiscuously, then locks it up, and leaves it for a year or two without change, regardless of accumulated dirt upon the glass and exposed fabric, or the effect of the light upon the displayed samples, which plainly show to the passer-by how easily the goods fade and discolour? yet this is exactly the course which the average professional photographer pursues, and then wonders why his trade falls off.

What merchant displays summer goods in his window in mid-winter, or *vice versâ?* yet look in the photographic show-case, and you will be surprised to see in how many the incongruity will appear.

Two cases in point. During the winter just passed we stopped before the show-case of a leading photographer in an inland city; every group displayed was a summer scene, the most prominent being an 11 × 14, which showed a young lady in a *décoletté* dress without sleeves, in a boat accessory; a summer hat was upon her lap, and a tennis racket was placed in her hand as an oar.

Another case, on one of the main streets in Philadelphia, was where a photographer kept his show-case filled all summer with snow-storm and winter portraits, which had been fixed up before Christmas, and was then left to shift for itself.

Now, what merchant would conduct his business in that manner? How the mercantile community at large has realised the importance of attracting the attention of the casual passer is shown by the fact that regular window-dressers are employed by all first-class establishments, whose aim it is to display as few goods as possible in the window, but to do it in such a manner that it attracts the attention of the public, and excites their interest enough to enter the establishment, and possibly become purchasers.

Interested parties will easily notice that frequent, if not daily, changes are made in these displays, so as to be noticeable to such as were attracted the day before. Another noteworthy fact is that an experienced window-dresser always tries to mass the effect upon the eye-line—say about four and a half to five feet from the footway of the street.

These same points hold good with the photographer. Nothing so soon becomes stale to the regular passers as a case of photographs, and nothing so quickly attracts their attention as a new face or picture properly displayed.

Upon new sitters depends the success of the professional photographer, A stylishly dressed portrait often attracts dozens of lady passers, where one two seasons old would be passed by with a smile. The same holds good with child studies. No one can tell the age of a picture better than the average woman, no matter how good the portrait. A last season's bonnet or hat kills it all the time.

Let the photographic fossil who is not equal to the demands of modern times fix up his show-case with portraits from old negatives and celebrities taken two decades ago. He won't attract new custom; all he will have to depend upon will be a few duplicates. What cares the present generation for a picture of Edwin Cushman as "Metamora," or Charlotte Forrest as one of the witches in "Macbeth?" Nothing. It is, however, the other man, who keeps abreast with the times, and who has the faculty of displaying his specimens and attracting the general public, who has no time to growl about the hard times and dull business.

—*American Journal of Photography.* JULIUS F. SACHSE.

PARAMIDOPHENOL AND ALLIED DEVELOPERS.

DR. M. ANDRESEN, of Berlin, who claims to be the original discoverer of the developing properties possessed by paramido-phenol, contributes a valuable article to the *Photographische Nachrichten*, which we give herewith in a somewhat shortened form.

After pointing out at length his claims to priority in the matter, Dr. Andresen proceeds to describe a series of experiments, the result of which is to show that it is only the di-substitution products of benzol and naphthaline which act as developers, the mono-substitution derivatives being inert. It will thus be seen that from the amido group NH_2 and from the hydroxyl group OH three types of developers may be derived, namely—

1. Diamido-benzol (phenylene-diamine) $C_6H_4\{^{NH_2}_{NH_2}$.
2. Amido-oxy-benzol (amido-phenol) $C_6H_4\{^{NH_2}_{OH}$.
3. Dioxy-benzol $C_6H_4\{^{OH}_{OH}$.

Each of these compounds is, as we know, represented by three isomers, and this fact was taken into account in the experiments. The results have gone to show that the para and ortho series are universally the more energetic developers, while the meta compounds are completely without action. One member of the para series, hydroquinone (para-dioxy-benzol), has been highly prized for a great number of years. Para-phenyl-diamine (para-diamido-benzol) does not act energetically with alkaline carbonates, and with the caustic alkalies gives green fog.

The member of the ortho series, pyro-catechine (ortho-dioxy-benzol), has been repeatedly recommended by Eder and Toth. Experiments have shown that this substance is at least equal to hydroquinone; it gives clearness and density, and is rapid in its action.

Ortho-amido-phenol (ortho-amido-oxy-benzol) is a good developer.

Ortho-phylene-diamine (ortho-diamido-benzol) will also develop, but its isomer para-phenyl-diamine, in regard to density and rapidity, is its superior.

Eder and Toth have already shown that resorcin (meta-dioxy-benzol) will not develop bromide plates. In fact, resorcin, when free from its isomers, appears to have no developing action at all. The same was found true of meta-amidophenol and meta-phenylene-diamine.

Dr. Andresen then proceeded to examine into the progress of oxidation during development, with a view to ascertaining the products finally formed. "The para-compounds," he says, "as has been known for a considerable time, are converted by oxidation into quinone $C_6H_4O_2$, or allied. That the oxidation takes place in this manner is a conclusion, I think, I may draw from the fact that para-amido-phenol $C_6H_4\{^{NH_2}_{OC_2H_5}$ does not develop the latent image." This, however, is a point in regard to which much obscurity prevails, and Dr. Andresen intends to study it further.

The developing powers of the ortho-derivatives of benzol are to be attributed to the fact, recently pointed out by Zincke and Küster (*Berichte der Deutschen Chemischen Gesellschaft*, xxi. 2719), that these bodies on oxidation form quinones, and this also occurs in the case of the ortho-derivatives of naphthaline, chief among which is eikonogen.

Paramido-phenol, which is much more easily soluble in hot water than cold, forms two series of salts. In the presence of acids salts are formed, which are, as a rule, easily soluble—*e.g.*, the nitric acid salt of paramido-phenol, and they also crystallise well. Alkaline carbonates precipitate para-mido-phenol from concentrated solutions of the nitric salt.

With caustic alkalies salts are formed in which the hydrogen of the hydroxyl is replaced by the metal of the alkali, *e.g.*, $C_6H_4\{^{NH_2}_{ONa}$

From these considerations it will be seen that from paramido-phenol two series of developers may be obtained, *i.e.*, those which may be employed with alkaline carbonates, and others for use with caustic alkalies in which the alkaline salt of paramido-phenol is the active principle. Both classes are extremely serviceable.

The sodium compound of paramido-phenol develops with great rapidity and gives considerable density, and its general properties are very similar to those of hydroquinone.

Messrs. Lumière's formula is, in Dr. Andresen's opinion, too concentrated.

It thus appears that paramido-phenol is allied to other developers—hydroquinone and eikonogen—of recognised position; but the variety of ways in which eikonogen may be employed give it a certain amount of superiority.

Foreign Notes and News.

IT is with regret that we learn that the summer outing of the "Friends of Photography" at Wernigerode in the Harz was not accompanied by favourable weather. Those who know that extremely picturesque spot, equalling, as it does, some of the most romantic situations in the south of Germany, and running Heidelberg very close, will understand the disappointment caused. It may be of interest to know that Wernigerode is

the seat of Count Stollberg-Wernigerode, about whose differences with the Court of Berlin confused rumours have reached us. His ancestral castle frowns above the lovely valley in truly medieval style.

A GIGANTIC projection-microscope is at present being 'built' for the approaching exhibition at Chicago, by Messrs. Poeller, of Munich. The light employed is to be of 11,000 candle-power, and a parabolic aluminium reflector will be used. The peculiarity of the apparatus is that there is attached to it a regulator, worked by a shunt current, which serves to keep the lower carbon always in focus. A special arrangement is also to be employed for lowering the temperature of the interior of the lanterns, which, with the amount of heat given off (1·43 calories per second), would be dangerously high. This consists of a Helmholtz centrifugal regulator, which supplies all the lenses of both condenser and polariscope with a fine spray of liquid carbonic acid, the efficiency of which arrangement is so perfect that a consumption of ·0007 grm. of carbonic acid suffices to keep the apparatus perfectly cool.

DR. MEYDENBAUER has recently been engaged in taking an extensive series of photogrammes of the Acropolis of Athens, from which an extensive series of drawings to scale will ultimately be produced. The celebrated tomb of Theodoric, at Vienna, to which some authorities trace the origin of Gothic ornamentation, has also occupied Dr. Meydenbauer in a similar manner.

IT has become so customary lately for all kinds of excuses to be found for *not* distributing medals at exhibitions that we are not at all surprised to find that the Committee of the Vienna Exhibition have found all the exhibitors so equal that to bestow these rewards would be invidious. They will be consoled, however, by receiving a diploma, signed by the Archduchess Maria Theresa!

WE have both seen and heard so much of the German Emperor during the last few days, that it may not be without interest to our readers to learn something of his doings in Düsseldorf on his way hither, and the reception that was accorded him in that ancient home of art and artists The artists arranged to give him a reception of an artistic kind, which consisted in a number of *tableaux vivants*, illustrating German history from the time of Barbarossa to 1870–71, in which the old Emperor is said by the enthusiasts of unified Germany to have awakened from his magic sleep. The *tableaux* appear to have been particularly successful, both from an artistic and scenic point of view, and we read of fairy-like female forms (presumably of mediæval ladies) and other things calculated to make the mouth water. The Emperor was so pleased that he expressed a wish to obtain photographs of the different scenes, and the performance was accordingly repeated a few days later, and a number of views taken by flashlight, ten lamps being simultaneously ignited by electricity. The results obtained were all highly satisfactory, more especially the view of "Barbarossa's awaking."

WE regret having to report the recent death of two well-known members of the Berlin Photographic Society—Herr August Schulz, of Charlottenburg, and Herr Carl Friedrich Gustav Neumann. The former gentleman had been for many years a member of the Society, and the latter, who was a collotypist of distinction, displayed his interest in photography by frequently supplying the illustrated supplements of the *Nachrichten* gratis.

CAPTAIN PIZZIGHELLI, who has been subjecting the relative advantages of hydroquinone and eikonogen to exhaustive experiment, has come to the conclusion that the former is much the more effective developer. The energy of 8 parts of hydroquinone he finds to correspond to that of 33 parts of eikonogen, and, while in the first case only 40 parts of sodium sulphite are required to make the developer keep, in the latter 330 parts are necessary. This amount of sulphite in the eikonogen developer may be considerably diminished, as is the case with many ordinary receipts. But, if this be done, the capacity of the solution for keeping is very seriously diminished. The eikonogen developer given below produced, it is true, its effect quicker than the hydroquinone, but does not in this respect appear to be superior to the newly introduced rapid hydroquinone developer. The following are the developers with which Captain Pizzighelli's experiments were made:—

Hydroquinone Developer.

Hydroquinone	8	parts.
Carbonate of potash	40	,,
Sodium sulphite	40	,,
Distilled water	1000	,,

Eikonogen Developer.

Eikonogen	33	parts.
Carbonate of potash	40	,,
Sodium sulphite	330	,,
Distilled water	1000	,,

Our Editorial Table.

THE July issue of the *Figaro Illustré* (Boussod, Valadon, & Co.) is well up to the high average of this firm's work. On the first page we have a very perfect specimen of phototype; it is a 10×8 picture of Mademoiselle Félicia Mullet in *Figaro-Revue*, from a negative by Camus. All the delicacy and detail of the original is perfectly preserved, from the highest lights to the deepest shadows. Another fine specimen of this class of work is a miniature phototype of the world-famed picture by De Neuville, *The Last Cartridge*. There is a series of phototypes of the Tzar and Tzarina of Russia, with their palaces and general surroundings. One being exceptionally clear and bright is a group of the entire Imperial family. As ever, the coloured work is well represented. There is a bright and vivid series depicting the various flags and ensigns of France, accompanied with a short description, which is most interesting. The gem, however, of the coloured work is a picture representing a soldier of the 20th Regiment climbing over a wall on the look-out for the enemy, called, *Where are They?* It is full of colour and "go."

PHOTOGRAPHIC QUARTERLY, AND PHOTOGRAPHIC REPORTER.

IN the *Quarterly* are, *inter alia*, a paper on the lantern, by C. H. Bothamley, F.I.C., &c.; "In Holland with a Camera" (E. H. Jeffrey); "The Toning of Images" (Clement J. Leaper); "Shall We Renounce?" (Geo. Davison). It has two nice illustrations—one of them a flash-light by the Countess Loredana.

The *Photographic Reporter*, July number, contains a *résumé* of the transactions of various societies.

THE BELGIUM EXHIBITION.

THE following comprise the awards made to British exhibitors:—

Grand Diploma d'Honneur: J. Pattison Gibson, Hexham.

Silver-gilt Medals: F. P. Cembrano; Lyd. Sawyer, Newcastle-on-Tyne; Colonel Waterhouse, Calcutta; Walter Colls, London; Windam & Grove, London.

Silver Medals: Wilson & Co., Aberdeen; Werner & Son, Dublin; W. Clement Williams, Halifax.

Bronze Medals: T. Carpenter, London; T. Martin Harding, Shrewsbury; Morgan & Kidd, London; W. Winter, Derby; York & Son, London; T. Suders, Cape Town; T. W. Ross, Cape Town; A. Hendrey, Godmanchester.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,900.—"Improvements in and Relating to Photographic Shutters." G. MESSAGER.—*Dated July* 13, 1891.

No. 11,915.—"Photo Half-tone Rubber Stamp." E. J. BROWNE.—*Dated July* 14, 1891.

No. 12,114.—"Improvements in Photographic Apparatus." Communicated by R. Hüttig. Complete specification. N. BROWNE.—*Dated July* 16, 1891.

No. 12,218.—"Improvements in Detective Cameras." Communicated by F. A. Fichtner. Complete specification. N. BROWNE.—*Dated July* 18, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 13,055.—"Photographic Cameras." FRANKS.—Price 6*d.*

No. 13,395.—"Photographic Frames." TAUNT.—Price 4*d.*

No. 13,455.—"Photographic Vignettes." PALMER.—Price 8*d.*

No. 13,631.—"Photographic Cameras." RAMSPERGER.—Price 11*d.*

PATENTS COMPLETED.

IMPROVEMENTS IN DETECTIVE HAND AND OTHER CAMERAS.

No. 12,189. WALTER GRIFFITHS, Highgate-square, Birmingham, Warwickshire, and JOSIAH PUMPHREY, 160, Angelina-street, Birmingham, Warwickshire.—*June* 20, 1891.

OUR invention has for its object improvements in de tective hand and other cameras by which we are able to apply a magazine ar rangement of plates to

such cameras in a particularly simple and efficient manner, and so that the said plates may be easily and quickly changed in the open field without fear of being damaged by light, while at the same time we form our magazines so as to be interchangeable, by which means the magazine containing the plates in its complete state can be readily renewed in the open field, and thus the operator may carry dozens of plates for use without the necessity of a dark room for changing, and thus we do without in any way enlarging the camera.

In carrying our invention into effect, we form a magazine of zinc, or other suitable material, in the shape of a box, of the size required to receive the particular plates to be used, one side being open to allow of the sensitised face of the plate being exposed to the lens, and deep enough to contain any required number of plates.

This magazine we pivot within the camera, so that it may oscillate and be turned with the sensitised face of the plate opposite the lens in the position required for a picture, or the magazine may be so turned that the edges of the plates are facing the back of the camera, for the purpose of enabling the plate used to be readily taken from the front side of the magazine and placed in the back side, thus leaving the next plate in the magazine ready for another object.

The magazine when in the position in which the plates face the lens is secured by a catch, which is released by the hand when it is required to turn the magazine upon its pivot. For the purpose of allowing the position of the plates to be altered in the magazine when in the open, we form an aperture in the back of the camera to which we attach one end of a dark sleeve, having at the other end an elastic band so placed as to draw the end of the sleeve closely together, another elastic band being provided some little distance along the sleeve for the purpose of double security from light, and this arrangement also allows of the hand being inserted through the first band which fits tightly round the coat wrist while the hand is being inserted within the second band for the purpose of allowing the removal of the front plate to the back of the magazine, and this sleeve when not in use may be tucked in the aperture at the rear of the camera, which aperture may be formed in the lid of the camera.

Another part of our invention consists in forming the magazine so as to slide into a frame, which frame is pivoted within the camera as before described with regard to the magazine itself, thus allowing the magazine containing the plates to be removed when the whole of the plates have been used, and for effecting this in the open field we provide a dark case containing a magazine full of unused plates, which magazine is made to slide in or otherwise fit the pivoted frame within the camera, where it is secured by a spring catch. By placing the case within the afore-described sleeve we are enabled to exchange the magazine full of used plates for that of the magazine full of unused plates, the used plates being then placed in the dark case and removed, by which means there is hardly any limit to the number of plates which may be carried and used without the necessity of a dark room and without fear of damage to the plates.

The pivoting of the magazine, or the frame which contains it, renders it a simple matter to adjust the inclination of the plates with regard to the camera, this being effected by a lever pivoted in the centre, and having a screw pin acting upon one end to incline it, and upon this lever are two projections, which act upon the pivoted magazine or frame, and thereby retain the plate in an inclined position, which may at times be desirable in the case of certain objects to be taken.

The plates are backed in any suitable manner when in the magazine, but when metal backs are used we turn the flange over the plate at the ends, thus covering only that portion of the plate which does not come within the focus of the lens.

We do not confine ourselves to the exact details, as we may vary these without departing from the nature of our said invention, as, for instance, we may make the dark sleeve separate, and so arranged that the one end may be stretched over the back of the camera for use, where it may be secured by a metal clip.

The claims are:—1. The improvements in detective, hand, and other cameras, consisting of a magazine frame for containing the plates pivoted substantially as and for the purpose herein set forth and shown upon the drawings. 2. The improvements in detective, hand, and other cameras, consisting of separate cases for containing the plates in combination with the pivoted frame made to receive it within the camera, and the box H to receive them when out, substantially as and for the purpose herein set forth and shown. 3. The improvements in detective, hand, and other cameras substantially as and for the purpose herein set forth and shown upon the accompanying drawings.

Improvements in Panoramic Cameras.

No. 21,154. Wilhelm Pinkernelle, Hamburg.—*June* 20, 1891.

It is well known that, in taking large photographic pictures of landscapes and groups of objects, the parts of the picture near the border appear indistinct and hazy or distorted. This invention has for its object to obviate this drawback and enable photographs of large size to be produced of uniform clearness and sharpness. This object is attained by suitably lengthening the objective tube, and forming its inner end with a slit of a form suitable for the view to be taken; and by causing this tube, with its lengthened portion, to turn about the optical centre of the lens in front of the sensitive film, which is so arranged as to be at a uniform distance from the said centre, and corresponding, or approximately so, to the focal length of the lens or objective.

In order to be able to arrange the sensitive paper, or the emulsion film, in such a manner that all parts thereof shall be equally distant from the objective, there are arranged within the camera, and at the top and bottom thereof, fillets having convex rear edges, and on the rear or back wall of the camera are fillets having concave edges. Within the camera are also vertical fillets, and carried by the rear or back wall are vertical fillets. The sensitive paper or film, when arranged between these fillets, will, by these means, be caused to form a portion of a cylindrical surface, the centre of which corresponds with the optical centre of the lens or objective.

Improvements in Roller Holders for Photographic Cameras.

No. 13,631. Hermann Gustave Ramsperger, 180, Pearl-street, New York United States of America.—*June* 27, 1891.

My invention has reference to improvements in roller holders for exposing sensitive photographic films, and has for its object to improve the construction of such devices by providing novel means for facilitating the insertion and removal of the several rolls, also by providing improved means for perforating or slitting the film, as a guide for its subsequent division, and means for measuring off the proper length for exposure, and for arresting the motion of the receiving roll after the proper length of the film for exposure has been reeled off. Furthermore, my invention consists in certain novel means for indicating the number of exposures made, also in new constructions for the receiving roll and the friction devices for straining the film upon its support.

For this purpose a case is arranged so adapted as to contain the supply and receiving rolls, the film support, and the operating mechanism, said case being provided with a cover removably secured thereto by any suitable means. The front of the case, as usual, is open and provided with a closing slide fitted into grooves or ways in the case.

A supply roll and a receiving roll are located on opposite sides of the case. The film passes from the supply roll in front of the film support and to the receiving roll. The said film support is removably secured to the case by means of turn-buckles, and forms a base for the several devices for slitting the film, for measuring the film, for arresting the motion of the receiving roll, and for the device for actuating the counter—all said devices being arranged and secured thereon and removed therewith.

A device is arranged for perforating or slitting the film, which may consist of a sharp blade or knife arranged in proximity to the edge of the film, supported and pivoted so as to swing across the path of the film directly above the said support, when turned about its pivot. The knife is provided with an arm adapted to be engaged by one arm of a tumbler pivoted to the film support. When the tumbler is turned in a certain direction, the knife is caused to slit the paper from point to point. A spring returns the tumbler to its normal position, and another spring returns the knife to its position against a stop.

In proximity to the opposite edge of the film support a measuring device is arranged, which may be in the form of a lever pivoted to the film support and provided with a blunt blade arranged in line with the slits formed in the film by the knife, and is constantly pressed against the film by a spring. When a slit is brought opposite the blade of the measuring device—*i.e.*, when the film has been advanced by the proper length for an exposure, the blade passes through the perforation or slit until its motion is arrested by a stop, and locks the film from further movement. The lever, by its contact with a metallic stop, gives audible evidence of such locking or measurement; a visible indication of the position of the measuring device is also given, as will be subsequently explained.

To prevent the film from being torn by inadvertently turning the receiving roll after the film is locked by the measuring device, I provide an additional device which locks the receiving roll, said locking device being actuated by the movement of the film-measuring device, and acting to lock the receiving roll simultaneously with the passage of the measuring device through the perforation in the film. To this end a slide is mounted upon the film support, and provided with a tooth arranged to engage with a toothed wheel connected with the receiving rolls, and rotating in unison therewith. The slide is engaged by an arm of the measuring lever, said arm playing between two pins on the said slide. When the lever is in a certain position it has moved the slide to bring a tooth out of contact with a toothed wheel; when, however, the lever snaps into the perforation in the film, the slide is drawn forward to cause the tooth thereof to engage with the toothed wheel, thereby checking the motion of the receiving roll until the lever has been withdrawn from the slit by turning the tumbler in the proper direction.

It will be seen that the measuring device co-operates with the perforating device to set off in each instance a determined length of film for exposure, thereby dispensing with the use of the usual measuring roll or rolls.

To indicate the number of exposures made, I make use of a counter, located advantageously at the top of the case, and consisting of a gear wheel, having thereon a concentric series of numbers, arranged to be brought successively in line with an opening in the case. The gear wheel is engaged by a small pinion, mounted upon a common shaft with a toothed wheel. This latter wheel is engaged by a star wheel, or other suitable spring-pressed pawl, carried by a lever pivoted to the film support, and having its opposite end in a pin and slot connexion with an arm projecting from the knife, so that whenever the latter is oscillated to cut the film, the lever is turned about its pivot to actuate the counter.

To actuate the tumbler from the exterior of the case, it is provided with a hub, having a slot, into which enters a key secured to the cover. The key is permanently secured, so as to be capable of rotation and a movement in the direction of its length in the cover, and is supported upon a spiral spring encircling its shank. The lower end of the key is provided with a flat extension, which enters a slot in the tumbler, it being guided to enter said slot by the cam-shaped walls of the hub, no matter what position it may be in when the cover is applied. The upper end of the key has a head, playing within a suitable recess in the cover of the case.

I will now proceed to describe the means for supporting the rolls, and for inserting and removing the same.

In the top and bottom of the case, in the correct position to correspond to the ultimate position of the supply rolls, are formed guide ways, into which are fitted bearing plates, which can slide freely in the same, and are provided with suitable heads for moving them in and out. These bearing plates are provided with centres adapted to enter suitable sockets in the opposite ends of the roll, and a centre is, in addition, provided with a sliding follower acted upon by a spring. On one of the centres a disc is loosely mounted, provided with a pin which enters a slot in the roll for turning the latter to adjust the film. Between the said disc and the interior face of a bearing plate are located two rubber friction discs, one of which is attached by a pin to one of the discs and the other to the said bearing plate by a pin.

The bearing plates are hinged to followers moving in the same guide ways as

the former, so that, by drawing the bearing plates outward until the hinges are on a level with the edge of the case, said plates can be swung outward about their hinges for the removal or insertion of the roll. Suitable stops limit the outward movement of the followers.

The receiving roll is mounted in similar bearing plates, and is rotated by means of a handle which passes through one wall of the casing and the bearing plate, and is provided with a threaded portion engaging with a nut secured in the roll.

It will be observed that the rubber friction discs subject to the pressure of springs have a tendency to rotate the rolls in a direction opposite to that in which they are rotated when the film is shifted for a new exposure, thereby causing the film to be drawn taut.

To secure the free end of the film to the receiving roll a longitudinal groove is formed in the latter, and to one end of the same is secured the head of a spring clip which extends throughout the length of the groove, its opposite head being secured by a pin.

The end of the roll where the clip is permanently fastened is cut away to facilitate the introduction of the film, and the opposite end of the roll is cut away to permit the clip to be depressed for its insertion in the fastening pin. To secure the roll to the toothed wheel the head of the clip is provided with a narrow portion or neck which fits between two cheeks formed on the face of the wheel.

In larger cameras where the friction of the film in passing over the edges of the film support might be excessive, I make use of guide rolls, said rolls being advantageously equal in diameter to the thickness of the film support, so that the perforating and measuring levers can pass over the same in their operation. When the rolls are larger in diameter, they are cut away to afford clearance for the perforating and measuring devices.

In the operation of the roll holder, assuming their parts to be in the normal position, the film being perforated by turning the key to the right. The key is then turned to the left to the full extent of its motion, thereby causing the measuring device to be withdrawn from the film, and the locking device to free the receiving roll. The receiving roll is now turned to move the film to bring the perforation behind the lever of the measuring device, whereupon the key may be released and the roll turned until again locked by the locking device to set off a new length of film for exposure.

It will be seen that, when several operating devices are in their normal positions, when the receiving roll is locked the head of the key is vertically disposed, and when the measuring device is bearing upon the film it is in an oblique position. When the measuring device snaps into a perforation, the key is again turned into the vertical position, thereby giving visible indication of the locking of the film.

It is evident that the measuring and perforating devices could be arranged to slide toward and from the film, instead of oscillating about a pivot, and that the general details could be changed without departing from the spirit of the invention.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 28	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
„ 29	Burnley	Bank Chambers, Hargreaves-street.
„ 29	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 30	Halifax Photographic Club	Mechanics' Hall.
„ 30	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
„ 30	Oldham	The Lyceum, Union-st., Oldham.
„ 30	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 16,—Mr. J. J. Briginshaw in the chair.

Mr. P. EVERITT said that during a recent discussion on perspective he had drawn a diagram to show that the field of vision did not exceed sixty degrees. He now produced a diagram of the eye taken from Helmholtz, and the position of the nodal points proved, he considered, that when the diaphragm of the iris was contracted to the one-tenth of an inch, the field of vision was less than sixty degrees.

Mr. A. HADDON said that he would look up the original diagram in Helmholtz's work, and reply on a future evening.

Mr. T. E. FRESHWATER showed a head for camera stand, containing a semi-globe sliding in a cavity, fitting it so as to form the equivalent of a ball-and-socket joint, for altering the level of the camera without shifting the legs of the stand. The metal work was of aluminium. He also showed some instantaneous views taken in Fleet-street at five o'clock in the afternoon on the occasion of the Kaiser's visit to the City.

The discussion on *Orthochromatic Photography* was carried on by Mr. COOKE, who said that he had used methyl violet in the proportion of one in the thousand of water, and found that it gave the reds and yellows, while erythrosine gave the yellow and green alone, and in no way improved the reds. He found the use of a screen absolutely necessary with whatever sensitiser or plates. The screen he used was made of two pieces of plate glass with the coloured surfaces cemented between them by Canada balsam. In some cases the screen had not been quite vertical, but he could not find that it had made any difference to the picture.

Mr. WEIR BROWN agreed that, using commercial orthochromatic and ordinary plate on a flower subject, he could find no difference between them unless a yellow screen was used.

A short discussion then took place on the effect of small diaphragms, a member saying that he had seen it stated that small diaphragms caused the image to be weak, and other members mentioned statements to the effect that cutting down the size of the diaphragm did not involve lengthening the exposure in the proportion of the mathematical ratio of the size of the opening.

Mr. A. COWAN said that he had in consequence of such statements some time since made a set of experiments in which the times of exposures were strictly in accordance with the apertures as arranged on the uniform system. He could not find that there was any difference either in the brightness of the image or in the apparent exposure.

Mr. W. E. DEBENHAM then opened the discussion on *Means of Obtaining Better Gradation in Photography*. The problem was, he thought, the most important one for experimentalists to attack, as the insufficient rendering of gradation at the two ends of the scale was the principal defect in photographic processes. His own observations, and those of others induced him to think that Messrs. Hurter & Driffield's proposition, that the ratio of gradation was unalterable by development, was a mistaken one. He would not speak at all positively, as careful comparative experiments under strict conditions would be necessary to determine the question. He intended to make an extended set of experiments in that direction. Then, when what gradation was obtainable was secured in the negative, some of it was lost in printing, and here there was a decided difference according to the process used.

Mr. EVERITT asked whether Mr. Debenham would exclude intensification as a means of obtaining gradation.

Mr. DEBENHAM replied that some ten years since he had put forward the view that in some cases more gradation could be obtained by developing a thin image, and subsequently intensifying, than could be got by developing the image in the usual way up to full density.

Mr. BECKETT said that Captain Abney had recommended for Alpine work, where the contrasts were very strong, that a thin image should be developed and intensified afterwards.

Mr. TEAPE said that, when experimenting with caramel as a backing, the only drawback he had met with was that it remained somewhat tacky. Mr. Debenham had given him a sample of caramel which was free from this inconvenience. He showed plates backed by a solution recommended by that gentleman consisting of thirty grains of gelatine swelled in water, drained off and melted, and one ounce of the caramel added. This coating dried quite satisfactorily. He also showed a negative of a church interior, the windows of which were remarkably free from halation, although the backing had consisted of only a very thin coating of caramel and gelatine.

HOLBORN CAMERA CLUB.

THE usual weekly meeting of the Holborn Camera Club was held on Friday last, Mr. R. D. Lowe in the chair, when Mr. R. Luxton gave a lecture on *Photo-mechanical Work*. He made special mention of the method of copying the picture, and spoke of the various stages through which the plate passes, beginning with the development and subsequent intensification of the wet plate, varnishing, the preparation of the zinc plate, the printing, washing, rolling up, and biting in. He gave various formulæ and numerous hints during his lecture. He showed a wet plate after intensification, and zinc plates in the various stages of the process. A vote of thanks was passed to Mr. Luxton and the meeting separated.

RICHMOND CAMERA CLUB.

JULY 17,—Mr. F. P. Cembrano in the chair.

Mr. Ardaseer showed Adams' whole-view printing frame.

The subject for discussion was *Cloud Photography*, and the CHAIRMAN, in summing up, remarked on the fine results obtained by reflecting the clouds by means of a mirror of black glass worked optically true. He also referred to the well-known cloud photographs taken at Kew under the direction of Mr. Whipple.

ON Saturday, July 18, the Club outing to Windsor took place. There was only an attendance of *three*, who, however, enjoyed their afternoon, and secured some good views of the Castle and Eton.

MANCHESTER PHOTOGRAPHIC SOCIETY.

JULY 9,—The President (Mr. A. Garnett) in the chair.

After the general business had been despatched, a number of interesting matters were brought forward, amongst them being a specimen of the Lippmann colour photograph of the spectrum kindly sent by Dr. Johnson. This, the President remarked, was not quite as good a specimen as those shown to him by M. Lippmann ; still, it gave an idea of the results obtained. Later in the evening another specimen, brought by Mr. Hartog, was shown. This was a more perfect example, but, unfortunately, could not be seen to very great advantage in the gaslight.

The meeting expressed its thanks to the gentlemen who had so kindly sent the specimens for exhibition.

Mr. COBLEY then read some notes on the development of Ilford Ordinary plates, this being the plate he used for all purposes, though, no doubt, his remarks would apply generally to most makes. He thought the first mistake made was over-exposure, and recommended a short exposure for this plate, as he had found that they would not stand over-exposure, and were much more sensitive than the makers claimed. He gave particulars of experiments to bear this out. His normal developer for accurately exposed plates was: Pyro, two grains ; ammonia, two drops ; and bromide of ammonium, one grain to the ounce. When over-exposure is feared, he kept the ammonia back, and added bromide. For under-exposure, he increased the pyro considerably, the other constituents being restrained until all detail is out, and then added to grain density. If, from prolonged development or other cause, an iridescent stain appears, it can be removed by using a very weak solution of ferricyanide of potassium and hypo—say, half a drachm of a ten per cent. solution of

ferricyanide to each ounce of the ordinary fixing bath. This must be used with care, as it is both a clearer and reducer. The ordinary mercurial intensifier works well with these plates, and does not injure their printing qualities. To sum up, he considered that short—that is, in this instance, correct—exposure and plenty of bromide were the secrets of success with Ilford plates.

This paper opened up a discussion, which was joined in by many of the members.

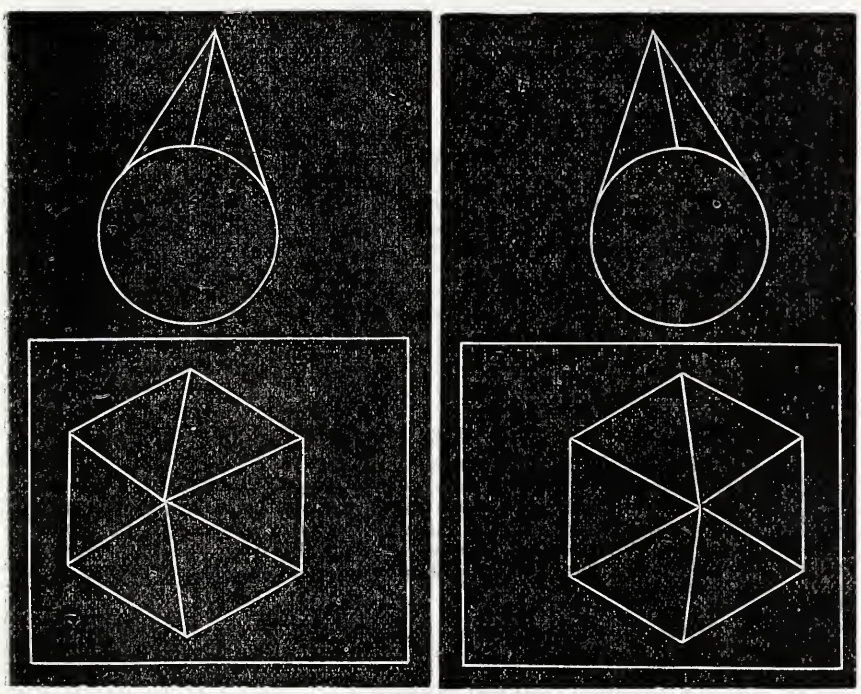
The PRESIDENT next proceeded to give what he called *Photographic Odds-and-Ends*, comprising arrangements he found advantageous in the dark room, &c. He described and demonstrated a simple method of mounting prints on large mounts, so as to always get the print central and square. The paste he add eight and a half ounces of boiling water and fifty grains of gelatine, reboil and used in mounting, when prepared as follows, kept indefinately :—Four drachms of starch, one and three-quarter ounces of water well mixed into a paste, then stir until jelly (or blue colour), and add twenty drops of carbolic acid. Another wrinkle not generally known was how to keep iron solution for ferrous oxalate in a good condition. It should be prepared as a saturated solution, which will be very green in colour, with distilled water, and have half a grain of tartaric acid to every one hundred cubic centimetres of water. But the secret of keeping it good was to always leave it fully exposed to daylight—full sunlight, if possible.

The meeting then became informal for conversation and showing of holiday work.

THE STEREOSCOPIC CLUB.

MEETING Monday last, at the Brooklands Hotel, near Manchester,—Mr. W. J. Cunliffe (President) in the chair.

The Hon. Secretary exhibited a highly interesting and historical collection of stereoscopic slides, kindly lent for the occasion by Mr. J. H. Lynde, C.E.



Amongst them were some of the finest Daguerreotypes and a few transparencies on glass. In several of these it was noticed that the objects in the foreground of the dual pictures were as much as half an inch nearer together than other objects in the more distant parts of the view ; and in one—a view of the interior of the 1851 Exhibition—packing-cases, &c., were shown on one side which were not to be found in the companion picture, proving that the negative must have been taken by a single lens camera, and a considerable interval of time had elapsed between the first and second exposure. Another interesting slide was that of the total eclipse of the sun ; the black disc of the moon was shown standing in bold relief, approaching the observer, with the corona far away in the distance. This, Mr. Chadwick explained, was not a genuine photograph of the solar eclipse, but one which anybody could easily make by first mounting on a card two similar drawings of the corona, at, say, two and seven-eighths centres, and attaching a suitable size black paper disc, representing the moon, nearly in the centre of each at two and three-quarters centres. Thus we should see the moon by a greater convergence of the optic axis than would be necessary when viewing the picture of the corona, and thus the moon would appear a considerable distance in front. But by far the most interesting slides in the collection were about twenty or thirty very cleverly drawn geometrical designs, in white lines on a black ground. One of these is here reproduced.* In other slides the complementary and subjective colours were illustrated ; thus, one slide, representing a cross, was not only seen in relief as a solid, but of a light grey colour, whilst the pictures were coloured—one red, and the other blue.

A cordial vote of thanks was passed to Mr. Lynde for the loan of his interesting collection, and, on the assurance of the Hon. Secretary that permission could be obtained to copy the slides, it was resolved that a few specimen copies be reproduced, and to forward a mounted copy to any person interested in the subject (application to be made to the Hon. Secretary, W. I. Chadwick, Brooklands, near Manchester).

Referring to the enjoyable rambles of the Club, and the groups that had been taken on each occasion, Mr. J. VOS, in a neat little speech, presented to the Club a fine album in which to mount these *souvenirs*, and any other matters of interest to the members.

The remainder of the evening was agreeably spent with some stereoscopic transparencies by Mr. Bowman and other members, most of them having been taken on the last Club ramble. Mr. F. Whitelegg exhibited some interesting slides of animal studies. The Chairman exhibited a few slides taken at Gawsworth, a delightful place for any photographer, and particularly so for stereoscopic work.

* Preserving the drawings of each half accurately, we have been compelled to bring the halves rather closer together than in the drawing sent. The centres of each, we need scarcely say, should be, as these were, about three inches apart.—ED.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third of the half-day photographic rambles organized by this Society this season came off on Saturday, July 18, and was well attended, nearly two score of the members having found it convenient to attend. The place selected was Dalkeith House and its extensive policies. It is one of the Scotch mansions of the Duke of Buccleuch, by whose favour the members were free to wander all around by the banks of the North and South Esk, which unite with each other within the beautifully wooded grounds about half a mile below the house. The entire demesne, which extends to over eight thousand Scotch acres (about nine thousand English), are beautifully laid out, and well stocked with sheep, cattle, and deer. At one time a herd of the native wild cattle of Scotland was preserved in the parks, but one day some of the bulls made an injudicious attack upon the Duke and his son, not knowing their masters, and so frightened the bold Buccleuchs that they ordered the beautiful and rare animals to be destroyed, an irreparable loss, which would not have been the case had it been either or both of the bold Buccleuchs. The town of Dalkeith itself is about six miles from Edinburgh by rail, and has many quaint, picturesque bits of old Scottish rustic architecture, but these must be sought for in the lanes, closes, and back streets. It has one fine bit of Early Pointed architecture of the period of James V. in ruins—the old Dalkeith Church ; it was damaged at the Reformation time, and is now so hemmed in by buildings that not much of a picture can be made of it. In these days of careful restoration this is a fine opening for the very wealthy to show their appreciation of ancient art, more especially as the present Dowager Duchess belongs to the ancient faith, and has built a new and not ungraceful chapel in the town for those who worship after her form. Dalkeith House has little pretension to architectural beauty, but in point of situation is picturesquely enough seated above the North Esk, and it comes in well enough as a distant bit among the foliage. The day was well adapted for photographing, having cleared up, after a rather boisterous forenoon, to a very perfect afternoon, which, with its "half sunshine, half shade," lent itself admirably to the purpose. The party, on arrival, dispersed themselves in various directions as the spirit moved them, and, on the whole, spent a most enjoyable afternoon, most of them returning to Edinburgh tired enough with the half-day's work and ramble, but all hopeful of good effects from the advice of one of the veterans to give full exposures, and on no account to risk anything with under-exposure. The results will not, of course, be made known until the first meeting of the Society.

Correspondence.

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

THE VALUE OF COLOURED SCREENS.

To the EDITOR.

SIR,—In your last number Mr. Birt Acres writes with the apparent intention of controverting something I said the week before, but I am at a loss to see exactly what he aims at. What I said was that, in my opinion, neither the orthochromatic film nor the coloured screen will give the full colour effect alone; and if, as it seems, he wishes now to assert that a transparent yellow medium is capable of doing all the work of the colour sensitive plate, he must have very recently seen reason to renounce the doctrine he so strenously preached a little while back.

I am quite aware that "a *pure* transparent yellow medium" (I am glad he has italicised the first adjective) absorbs *a portion of* the blue rays and allows the yellow to pass with comparative impunity; but I have yet to learn that a screen sufficiently intense in colour to stop the whole, or even any considerable, proportion of the blue will transmit the yellow with "only a very slight loss." If Mr. Birt Acres would think again upon the matter, even he would recognise the fatuity of his newer statement when placed side by side with the opinions he enunciated in his paper before the Photographic Society.

Mr. Birt Acres appears to have some slight knowledge of the theory of the colour question, and can therefore estimate what he thinks ought to take place when photographing *pure* colours—say the spectrum itself—with

the aid of a *pure* yellow screen; but even then I object to his "only very slight loss," &c. His reference to the development of an "ordinary moderately rapid plate"—gelatine, I presume—by yellow light is singularly unfortunate, for every one who has tried knows that it is quite impossible to "successfully develop" even a slow plate if it be *freely* exposed to a yellow light many, many times deeper than the tint of the colour screens that any practical person would use. The result of such an attempt would amply prove my statement that "the blue would have the best of it in the long run"—the best of the screen in this case, in spite of its wonderful "stopping" powers.

When Mr. Birt Acres alludes to "misleading statements," it would greatly strengthen his hand if he would tell us the secret of the preparation of his "*pure* transparent yellow medium," and by what magic it transforms the ordinary reflected tints as they reach the eye, or plate in nature, into "pure" colours. But, until he can do that, I anticipate that most people—except, of course, the "merest tyro"—will class *his* remarks as very decidly misleading. He has indeed happily but unconsciously rebuked himself.

The last sentence in his first paragraph leaves me undecided whether his "merest tyro" is going to upset me or "the colours," or whether I myself am the "tyro." I can only say that I used, or attempted to use, both yellow and green screens in landscape work over twenty-five years ago

Curiously enough, too, contrary to the experience of Mr. Acres as detailed in his recent paper, the green screen produced the better results; but, it is true, the colours of nature in those days were not spectrum colours, as our newest teacher would have us believe.—I am, yours, &c.,

W. B. Bolton.

THE KALLITYPE.

To the Editor.

Sir,—Your very full and appreciative articles on *Kallitype*, the printing process for which I am responsible, lead me to think that you and your readers may feel interested in a short account of the improvements recently introduced, and of some of the difficulties that beset an unfortunate inventor of a printing process.

For years I had believed that it ought to be possible to discover a silver printing process, which in point of simplicity and artistic effect would rival the expensive platinotype, and be able to claim for its results a degree of permanence higher than that possessed by ordinary silver prints. For many months at various times I rang the changes with salts of iron and uranium with but indifferent success; at last, after a long-continued series of experiments in which the effect of each ingredient was systematically studied, I was advanced far enough in 1889 to take out provisional protection. Some months afterwards the process was taken up by a firm of manufacturers, and it was then that my woes as an inventor began in earnest. Results that satisfied me failed to please them, and from week to week the process was altered and changed in detail though not in principle, until, from a comparatively slow printing process requiring only a developer and a single washing bath, it became a rapid one, involving the use of no less than four baths, a fact which, as you justly point out, forms a serious drawback to the process as you know it.

At the same time a serious misfortune occurred—a paper was chosen for the process which the makers stated to be pure, but hardly had it been put on the market than it was found that the prints on this paper faded, sometimes in a few days. This was traced to the paper, and another make had to be found; but the mischief had been done. Such an occurrence would have been a serious blow to any process, and it very nearly proved fatal to kallitype at the very start. Slowly, however, it has recovered from the effects of this first false step, and now it has, owing to constant improvements in detail, completely rallied.

Early in this year, the desire on the part of many users of the paper for a process which is capable of yielding warmer tones, and which does not involve the use of a silver bath, with consequent stainings of the fingers, as in No. 1 Kallitype, lead me to make further experiments, with the result known as No. 2 Kallitype.

In this modification of the original process, the silver is present in the paper. The developer consists simply of Rochelle salt, with or without the addition of borax or other salts. A ten per cent. solution of Rochelle salt gives yellow prints, which become darker and darker as more borax is added, until equal parts of the two salts are present, when the tone is a cold black. I have much pleasure in sending you specimen prints illustrating three of the tones thus obtained. The washing is much simplified. As the developer is very cheap, it is used as the first washer. The prints are left in it for fifteen to twenty minutes, and then washed in dilute ammonium, one ounce to the gallon of water. One bath of this will do, but two are better. A slight rinse in plain water follows, and the prints are ready for drying.

Kallitype No. 2 is also applicable to albumenised paper. This, I believe, is an entirely new departure in iron printing, and such a paper will be on the market in a few days. All the details of development, &c., are the same as given above, the only difference is that the paper is even more sensitive. I may add that I have not yet attained my ideal paper by this process, which is one that prints out in the frame and requires only washing in dilute ammonia. I have nearly reached it, however, and hope soon to perfect it.

In conclusion, no one realises more fully than I do how much I am indebted to former experimenters—Herschel, Hunt, and, later, Willis, laid the foundation of all iron processes. I have done little more than use reactions known to all chemists, but it is the very use of what is old in a new way that is the essence of an invention.—I am, yours, &c.,

Birmingham, July 14, 1891. W. W. J. Nicol.

[Accompanying this letter is an admirable and most instructive collection of specimens. The influence of the presence of borax is shown by three sets of examples. With the full amount of this salt the prints are a rich warm black; with a small amount, the tone is a good dark purple; while when the borax is omitted, the tone is a pronounced brownish red, which for many purposes is very pleasing. We congratulate Dr. Nicol on the high state of perfection to which he has brought his process in so short a time.—Ed.]

DELAYED FOREIGN EXHIBITS AT THE RECENT NEW YORK EXHIBITION.

To the Editor.

Sir,—Some misapprehension having arisen as to the appearance in the catalogue of the Fourth Annual Exhibition of the names of one or two foreign exhibitors whose exhibits were not hung when the exhibition opened, an explanation is now deemed necessary in order to show that no injustice was done to such exhibitors.

It should be mentioned that the entry forms filled out for catalogue purposes were received by mail some time in advance of the exhibits sent by express; the Committee, expecting they would arrive in time, favoured the exhibitor, as it thought, by inserting in the catalogue his name and description of exhibit.

In the case of Mr. Lyddell Sawyer, of Newcastle-on-the-Tyne, whose entry form was received ten days before his exhibit, which was delivered three days after the exhibition opened and after the awards had been made, there was no chance, under the rules, for his exhibit to be framed and judged. It was accordingly hung for "exhibition only," by consent of the Committee. It took twenty-one days from the time they were sent till received in New York.

His work was admired by the many visitors, and would doubtless have taken a medal, as at many other exhibitions, had it come in time.

In the case of Mr. J. E. Austen, of Maidstone, whose work has invariably taken a medal wherever exhibited, it should be stated that, while his entry form reached the Committee in time for the catalogue, his exhibits never came to hand, and at the time, though diligent inquiry was made about them of the forwarding agents, no trace of them could be found. This explanation should prevent Mr. Austen from being put in any false position.

A third case is that of Colonel R. W. Stewart, of Devonport, who, instead of sending his entry form by mail, sent it by express, with the photographs, which were received the third day after the exhibition opened, too late for entrance in the catalogue and for judging. He had excellent platinotype prints of Westminster Abbey. They were hung for exhibition, and were much liked.

Few foreigners can imagine the delay even in getting the simplest article through the United States Custom House. In some parts of it one man has to do the work of two; then the articles have to be appraised, and must wait their turn. Usually ten days to two weeks are required, hence in sending articles to America this delay must be allowed for. It was for this reason that the Committee urged all intending foreign exhibitors to send their pictures unmounted by mail. Those that did so had their exhibits here in ample time. Until our laws are changed the present hindrance to a free interchange of photographs is likely to continue.—I am, yours, &c.,

F. C. Beach,

Chairman of Committee of Arrangements of the Society of Amateur Photographers.

New York, July 10, 1891.

A CAMERA-STAND ATTACHMENT.

To the Editor.

Sir,—In your issue of the 17th inst. you mention this as a novelty. I beg to say that in the year 1860 I used this same invention for keeping my camera stand from slipping when photographing Hereford Cathedral in that year, which was suggested by a very simple plan of iron bars with which Messrs. W. & W. Rouch used on their stand to support their tents; afterwards, wanting a longer stretch than the double brass bar with a slot and screw gave me, I had iron rods with notches in them, so that with two sets, *i.e.*, six bars, I could get either high or low, wide or narrow bases at pleasure. But I never thought of patenting the invention. It was immensely useful, but was superseded by three flat discs of cork, and afterwards by three rubber crutch legs, which, to my mind, are best of all. Of all camera stands I consider Ashford's the best.—I am, yours, &c.,

Harding Warner.

Rugby, July 20, 1891.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

R. C. Hughes, Birkenhead.—*Photograph of Eastham locks, Manchester Ship Canal.*

J. Thompson, Liverpool.—*Photograph of steam yacht* "*Norseman*," *in Eastham docks, Manchester Ship Canal.*

L. F. HOWITT.—It has tended to greater accuracy.

BEACH.—Cornelissen, of Great Queen-street, supplies sheet gelatine.

SILVER BATH.—Add one or two ounces of kaolin to the pint of solution.

H. W. ALLEN.—Apply to Mr. Redmond Barrett, 50, Kellett-road, Brixton, S.W.

J. REYNOLDS.—The firm of J. A. Forrest, Liverpool, can probably supply the black glass wanted.

J. H. ANLEY.—From your description it is evident that the mounts are at fault. The specimens sent are excellent.

C. B. V.—If none of the ordinary clearing solutions will remove the stain we can suggest nothing else. With care there ought to be no yellowness.

C. FORBES.—To prove delivery of the specimens write to the Post Office to ascertain if the parcel was duly delivered, and at the same time write to the police.

N. W.—The best, and probably the cheapest, method of producing pictures on opal glass is by the carbon process. In this way the majority of those you refer to are made.

R. B. asks: "What should the receipts of a photographic business amount to before the payment of income tax is compulsory?"—Assessment for the income tax is not made on the receipts of any business, but upon the nett profits. There is no distinction between photographic and other businesses.

R. WILSHIRE.—We cannot supply you with the discounts that certain dealers and manufacturers allow. Why not write to those in whom you are interested, enclosing your business card, and ask their terms? If, as we gather from your letter, you are an amateur, you ought not to expect any discount at all.

W. HALES—Orthoscopic lenses are not made now, but they may often be met with second-hand. They are very good lenses for certain work. Their chief fault is that they yield lines slightly curved at the margin of the picture, the curvature being the reverse of that given by a single lens with the stop in front.

M. O. BRIEN asks the cause of some marks on the plates forwarded. He says they show before the plates are placed in the developer.—The defects are what are known as "drying marks," and are caused by the film drying unevenly. In all probability the drying received a check after the edges had dried.

HYPO writes: "I would advise all troubled with comet-like markings on negatives to look to the casks used for packing hypo. They often have long nails driven into the hypo, which nails get rusty, and particles of rust are by this means conveyed to the fixing bath, and will cause the spots referred to. I always filter."

T. BAKER.—The rector cannot prevent you from taking the church from the public roadway. It is all nonsense his saying that he has given the sole right of photographing it to a certain photographer. You can take the church from any point you like, provided you do not trespass on the rector's private grounds.

J. T. ALTY writes: "A friend of mine has a photograph of a landscape of which I should like a copy, but the only address or anything of the photographer is 'Firth' on the photograph; so will you kindly, if possible, insert me their address?"—No doubt Frith, not "Firth," is the name of the firm. Their address is Reigate, Surrey.

F. S. says: "I generally use hot water to facilitate the dissolving of photographic chemicals. Does this weaken their subsequent strength, and are the solutions made up in this manner weaker than the same chemicals made up in cold water?"—Hot water will do quite well; but if any volatile substances such as ammonia, alcohol, &c., they should not be added till the solutions are cold.

LIVERPOOL writes: "How can I make a thick film of collodion and strip it from the glass? I find, however thick the collodion may be, that when it is flowed off the plate, dried, and stripped off, it is too thin for my purpose."—Place the plate on a perfectly levelled stand, and pour on a thick coating of collodion, and allow the plate to remain in a horizontal position until it has set, or, better still, till it is dry.

TEMPO says: "I am obliged to you for your reply through your JOURNAL; but, unfortunately, you have not understood my query. We have not a Corporation; if we had, I need not have troubled you. What I want to know is, how near can a pig-house be built to a dwelling-house according to law? If you can oblige me with this information you may save me trouble."—We believe there is an Act that prohibits pigstyes being built within a certain distance from a dwelling-house in towns and villages. We understood from your previous letter that you had a Corporation in your place. If not, apply to the Rural Sanitary authorities or the Inspector of Nuisances.

G. WALKER puts the following queries: "1. Is home-prepared paper better and more permanent than the ready sensitised? It is more convenient for me to use the ready sensitised, but if there was any great difference I would rather prepare it myself. 2. What is the exact amount of ammonia to use in the fixing bath to prevent blisters? I have used different quantities, and still they come. I am using 'cross swords' double albumenised paper. 3. Is there any harm done by the addition of ammonia, as I am afraid to use it to excess? 4. Could you inform me the price, and where I could procure, the book on the *Lighting in Photographic Studios*, by P. C. Duchochois, New York, mentioned in JOURNAL for June 20, 1890?"—In reply: 1. There is no difference as regards the permanence of the results of the two. Most professionals prefer to sensitise their own paper, they say it yields better tones. 2 and 3. A matter of little importance. An excess does no harm. 4. The work may be obtained through any foreign bookseller. Mr. J. J. Atkinson, of Liverpool, will get you a copy if he has not one in stock. For the moment we forget the price."

INQUISITIVE writes: "In your issue for September 21, 1888, page 595, speaking about Photographic Society exhibitions, you refer to certain professionals who seek medals for trade purposes. We are not quite clear about your meaning, and should feel obliged if you could answer or give some information on the following questions:—1. By 'trade purposes' do you mean inserting them in their shop windows, printing them on the back of their mounts, &c., as a sort of testimonial that they can supply good work to their customers? 2. You say, 'Professionals have turned them to good account.' Are we correct when we infer that the exhibiting of medals in the window, &c., is the means of obtaining more customers? 3. Suppose a professional exhibits in his window only medals which have not been gained for professional work, is this turning them to good account, or what?"—Most professional photographers who obtain medals turn them to business purposes as an advertisement. For example, Smith may say when advertising that so many medals have been awarded to him in different exhibitions. Whether or not the exhibition of a number of medals in a window obtains more customers, the exhibitor certainly shows them with that intent. If a professional man gains medals for photographs, what does it matter if they are for what you call "professional work" or not?

LOOKING FOR FAIR PLAY writes condemning the article on the size of cabinet mounts in our last issue, and says: "There is a real grievance that I have long since expected to see ventilated in your valuable JOURNAL, and I will now ask your indulgence for my referring to it. I find that most of the firms of dry-plate manufacturers allow a discount to chemists and other dealers far in excess to what they allow the professional photographer, though the latter may buy in much larger parcels than the former. I have had a considerable experience in general trades, and have found that those who bought the largest, 'paying prompt,' got the largest discounts, and, I think, rightly so. Is it fair that a chemist or dealer can obtain from 17½ to 20 per cent., and 2½ for prompt, and the professional photographer, though he buys same size parcel, and sends his cash with order, can only get 10 per cent.? This is actually the daily experience of many, and I very much wonder they so generally submit to it. If no other way to redress this hardship can be found, surely there are enough professionals able and willing to help themselves by establishing one more manufactory for dry plates. Hoping to see further opinion on this subject expressed."—Surely our correspondent, as a consumer, does not expect the same terms as a dealer who has to sell again, and then often allow a discount.

ERRATUM.—In Mr. Debenham's paper on *The Cult of Indistinctness* in last week's issue, the word "promising" before "characteristic," in the second paragraph, should read "prominent."

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The subject for discussion at the Technical Meeting on July 28 is *Photographic Optics and Perspective*. The rooms will be closed from July 29 to August 24, 1891.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 29, *Developing en route*. August 5, *Dark-room Appliances and Photographic Dishes*. Outing, Saturday, July 25, to Wanstead Park; train leaves Liverpool-street at thirty-five minutes past two for Snaresbrook.

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MEMBERS OF THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

HELD AT BATH, JULY 6–11, 1891.

Negative by W. MIDDLETON ASHMAN.

Phototype by F. THEVOZ & CO., *Geneva.*

A SUGGESTION FOR THE POSSIBLE METHOD OF IDENTIFYING THE COLORS PHOTOGRAPHED.

ILLUSTRATING A PAPER READ BEFORE THE PHILADELPHIA PHOTOGRAPHIC SOCIETY, APRIL 8, 1891, BY JULIUS F. SACHSE.

NEGATIVE BY JULIUS F. SACHSE.

IVES' PROCESS, ENGRAVED BY CROSSCUP & WEST.

PHOTOGRAPHED ON A CARBUTT ORTHOCHROMATIC PLATE, ***WITHOUT*** COLOR SCREEN.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1630. Vol. XXXVIII.—JULY 31, 1891.

CONSERVATISM IN PHOTOGRAPHY.

Our readers need not be alarmed, we are not about to introduce politics into our pages; they are, and always have been, foreign to the spirit we write in, hence it is to be noted we discuss that tendency to conserve existing processes and styles of art that it is exhibited to a very considerable degree in the practice of our art. Photography offers a strikingly conspicuous example of people always striving after a new thing, and at the same time strenuously holding on to the old, clinging to its habits with tenacity, and parting with it only under stress of circumstances. In many respects this is a valuable quality; but it may be, and has been, strained too far, and, under such circumstances as petitions, such complaints of the state of business as now exist, there is danger of its being persisted in to too great an extent.

It is not a long way to carry the mind back to the introduction of the gelatino-bromide process. Long before it became at all popular the material was easily purchasable, yet it required continual iteration before more than a very small circle could be brought to believe that it possessed any practical qualities whatever that would fit it for general use, while the claims for a sensitiveness superior to that of wet collodion were only dismissed with a smile of pity. Demand is usually said to create supply; but in this case we believe the conditions were reversed. Emulsion was purchasable; dried emulsion—quick—was purchasable; plates ready prepared were purchasable; still the demand lingered, and there was for a long time every appearance of indifference and apathy in regard to a process that has since revolutionised the practice of photography. And it must be placed on record, the greatest impetus was given by the amateur. The professional photographer would, content with the old way, till the ardent, experimentalising amateur had cleared the ground and almost compelled him into the employment of the new tool.

The one process of apparent importance exploited for the professional, and by the professional—the chromotype—a mere outcome from, and variation of, the carbon process, was an example of the contrary rule. It was eagerly snapped at; a considerable number of professionals threw aside their silver plant, *impedimenta*, and rushed into the new style. Many were influenced by an honest desire to furnish unfading prints to their clients; but others, we shrewdly suspect, took up the new method simply to steal a march on their neighbours, for exclusive rights were granted by the patentee. Now, however, how many workers are there left who adopt chromotype for all their work, to the exclusion of silver?

What a long battle had platinotype to fight before it became popular; and how many studios are there not in existence where a few sheets of platinotype still form the whole year's consumption, if it be used at all?

We will not now stay to name processes that have apparently been of real value, but which a short-sighted conservatism has allowed to drop out of sight. We just name one—the stannotype—a simple, yet valuable, mode of mechanically producing prints in a permanent form; yet where are the workers in it? What has the inventor gained? It should be remembered that the preliminary trials of a new process react upon the process itself; increased commercial facilities are obtainable, and improvements follow in their wake. Few inventions are given to the world in such a complete and finished form as to be beyond the reach of improvement; yet it cannot be doubted that many ideas of value and interest have been given to an indifferent audience, to languish and fall to the ground. We are fully cognisant of the difficulty the busy professional experiences in leaving the beaten track, in trying new methods requiring expenditure of time and money, and, possibly, involving the rendering useless of valuable implements and apparatus. At the same time, we cannot but urge him to do a little violence to his conservative instincts, and, while not dabbling in every fad that the uninformed would thrust before him, let him use his trained intelligence to endeavour to discover some grains of wheat in the admittedly large amount of chaff annually presented to him, be it in mechanical, be it in chemical, be it in artistic directions. By so doing he will discharge some of the debt he owes to the amateur, and materially assist deserving workers in the cause of progress. We desire to cast no stones, but we do earnestly say that such a debt exists; such a debt should not remain unpaid.

MATT VARNISH AND ITS APPLICATIONS IN PHOTOGRAPHY.

Many amateurs and even professionals do not know the value of matt varnish, and the purposes to which it may be applied in photography. Some novices, and to whom especially it would often prove most useful, do not even know of its existence; although, of course, it is stocked by all the leading dealers, yet it often cannot be obtained from those druggists, particularly in country towns, who have recently taken to supplying the more commonly used photographic materials. Matt varnish is sometimes termed ground-glass varnish, but it is one and the same thing.

We are frequently applied to for a formula for making the varnish when it cannot be obtained from the local stock dealer. When given, the varnish is sometimes found not to work so

satisfactorily as could be desired; therefore, before directing attention to some of its applications, it may be well to say something of the nature and composition of the varnish itself.

Of course, we are not in the secrets of the manufacturers of commercial matt varnish, but the one we use ourselves is compounded according to the formula given annually for many years past in the ALMANAC, and we find that it answers all requirements. It was originally published by the late Mr. Alfred Hughes. In round figures—for the quantity we always prepare at a time—it stands thus:

Sandarac	2 ounces.
Mastic	½ ounce.
Sulphuric ether	1 pint.
Benzol rect., *quantum suf.*	5 to 10 ounces according to the grain required.

The larger the proportion of benzol, the coarser will be the texture. The varnish improves rather than otherwise by keeping.

It is tolerably well known that several resins when dissolved in alcohol will, if poured on a cold glass, dry with a matt surface—chilled, as it is termed. But if the glass be warmed the same varnish will dry perfectly transparent. But the rough surface left with a varnish of this description is usually not sufficiently uniform for our present purpose. Now the varnish made by the above formula, the matt effect, is not due to "chilling," for, if the plate be warmed before it is applied, it will still dry with the ground-glass-like surface.

The principle of this varnish may be explained thus: Both the resins are freely soluble in ether, but not in benzol. If the ether be, so to speak, diluted with an excess of benzol, it will no longer hold the resins in solution; therefore they would be precipitated to the bottom of the bottle. Bearing this fact in mind, it will readily be seen that the property of the varnish is this: so long as there is sufficient ether present, the resins remain in solution, but no longer. Now, as ether is considerably more volatile than benzol, it follows that when the varnish is poured upon the place the ether is quickly volatilised, and the benzol becomes in excess; hence, as a consequence, the resins become thrown down on the plate in a granular form, in the same way that they would be precipitated to the bottom of the bottle were an excess of benzol added to the solution in the first instance.

So much for the varnish itself. Now for some of its uses.

Matt varnish can be used alike for increasing the contrasts in a negative, or for reducing them, or adding to the detail. Supposing, for example, we have a negative that is too flat, and of such a character that ordinary intensification would not add to the contrasts, but simply render the image uniformly denser in all portions. Now, if a coating of matt varnish be applied to the back of such a negative, it will necessarily acquire a uniform increase in density, though, if a print be taken at this stage, it will show a slight increase in contrast over one made before the treatment. The effect, however, is but trifling. To obtain more, we take an etching point, or a penknife, and scrape away the varnish from the deepest shadows of the picture. If the negative be now examined, it will be found that considerable increase of contrast has been obtained, though not possibly to the extent required. To obtain more, we next proceed to strengthen the lighter portions by going over them with a paper stump very slightly charged with plumbago. The scrapings from a black-lead pencil will do quite well. Then the extreme high lights may, if necessary, be lightly touched in with a pencil. But, generally, sufficient density will be obtained with the stump alone. By this simple means an otherwise worthless negative, which it may be impossible t take again, can often be converted into a fairly good printing one

Supposing we desire to reduce the contrasts in a negative then we proceed conversely. Thus, after the varnish is applied we proceed to scrape it away from the stronger portion, while i is left on the weaker ones, and, if necessary—say, if the shadow are very clear—a little plumbago may be stumped over them and the weak detail strengthened with the pencil. As all th work is done on the back of the negative, no excessive care o skill is requisite. Indeed, the entire character of a negativ can be changed in a very few minutes. In some instances th varnish may, with advantage, be *slightly* tinted with any of th coal-tar colours soluble in ether to increase its non-actini quality. One thing the tyro must bear in mind when usin the stump, which is, that even the most delicate application o the plumbago has a marked effect—very much greater, indeed than would be anticipated.

Glass coated with matt varnish is excellent for backing trans parencies, as it can be made by using a minimum of benzol so as to yield a much finer grain than that of the finest ground glass now to be met with commercially. Furthermore, it may be tinted with any desired colour, so as to obtain a great variety of effects. For focussing screens, where a very delicate grain is necessary, matt varnish can be made to give one much finer than that of ground glass.

WASHING PLATES.

AN incident that came to our notice a few days ago suggested a topic that may be seasonably discussed at the present time when it may be said that we are, or soon shall be, in the midst of troubles arising from the combined effects of heat and moisture upon gelatine films in development and more especially in washing.

An amateur of some years' experience had been at no little trouble in exposing a number of plates on the occasion of one of the appearances in public of the German Emperor during his recent visit, and, as the result, secured on development a many fine negatives of scenes not frequently obtainable.

As the circumstances rendered the negatives more than ordinarily interesting, and possibly valuable, he resolved to take a little more than the usual care in assuring their permanency by a very thorough washing after fixing, he being one of those who rely more upon washing, pure and simple, than upon chemical eliminators. Accordingly, with that end in view, and as being the readiest means at hand, he suspended the plates in a rack in the rain water-butt at the rear of his house, intending to allow them to soak during the night. Unfortunately, as it turned out, he went off to business in the morning, forgetting the negatives, and only remembered them when too late to return home; but no misgiving arose in his mind that anything more would happen to them than an unnecessarily long and complete washing.

But on returning home in the evening, when the rack was recovered from its bath of the past twenty hours or so, it was found to contain nothing more than a number of squares of glass, that would have been "clean" but for a certain greasy sliminess that represented all that was left of his pictures, the films having been completely decomposed and dissolved. At first his suspicions ran in the direction of outside interference, but careful examination, as well as inquiry, showed that the rack had not been touched during the interval of its immersion

and he was compelled to lay the blame entirely on his own carelessness and the "vagaries of gelatine."

After all, however, the occurrence is, perhaps, not greatly to be wondered at. Soft water is known, or is alleged, to have a greater softening and disintegrating action upon gelatine, under even normal conditions, than hard or tap water; but when, as may be well imagined in this case, the contents of the water-butt had most probably been raised, by a succession of close and "thundery" days, to a dangerously warm temperature, and when, moreover, the quantity of microscopic life, to say nothing of larger organisms, existing in the average rain-water cask is taken into consideration, it is not very surprising that some such result should accrue. The occurrence, though sufficiently annoying to the individual chiefly concerned, is not without its instructive and, perhaps, also amusing side.

As has been already mentioned, soft water is supposed to have an injurious tendency in connexion with gelatine films, and in the earlier days of emulsion plates Epsom salts and similar additions were made to the water employed in development and washing in order to give it a fictitious "hardness," and thus reduce the chances of "frilling" and similar troubles. More recent improvements in the preparation of the plates have, however, done much to render such troubles things of the past under ordinary circumstances; and though few, we imagine, use soft water in the manipulation of their plates, it is questionable whether many now follow the habitual practice of using the alum bath, as was once the case. At specially trying seasons it is, therefore, not improbable that some of the old failings of gelatine films may occasionally crop up in an unexpected and vexatious manner.

During the prevalence of such weather as we have in a comparatively mild form at present, but which is certain to be more trying next month, it will be well to take some special precautions to meet the danger likely to arise. In the first place, the temperature of the water supply should be looked to. When this is derived from a well or spring, or even when drawn direct from the main, it is not likely to cause trouble from excessive temperature, even in the hottest weather; but in districts and localities where the intermittent supply system prevails, as is too frequently the case, and the supply cistern is placed in a position where it becomes "sun-heated," it will be almost impossible to work successfully without the adoption of some means of cooling the water. Naturally we assume that in large establishments the necessary arrangements will be made on a sufficient scale to render the adoption of temporary measures unnecessary; our succeeding suggestions must then be taken to apply only in those instances where, as in the case of amateurs or small professionals, the circumstances do not permit of any but makeshifts.

It is well known that in Eastern and other countries, where high temperatures prevail, the water for drinking purposes is kept in a state of delicious coolness by storing it in porous earthenware vessels, the evaporation from the outer surfaces of which reduces the temperature of the contents. Failing such porous vessels, an efficient substitute may be found here by wrapping two or three folds of linen or other material round any suitable vessel of earthenware or metal; and, by keeping the linen saturated with moisture, evaporation from the outer surface is set up in the same manner, or perhaps more vigorously, and water may thus be rapidly cooled in the hottest weather. It is a comparatively easy matter to set aside a jar or can of three or four gallons' capacity, or larger if necessary, and kept swathed in a damp sheet, to hold the supply of water to be used in developing and washing, and, if systematic economy be observed, a small quantity of water will go a long way.

Where ice is easily and regularly obtainable, which is only in large towns, a few pence per day will enable the photographer to keep up a good supply of water at as low a temperature as he may desire. Freezing mixtures as a substitute for ice are here scarcely available, on account of the large quantities that would be required, since they could only be applied outwardly, and not added to the contents of the vessel. For development alone, however, the addition of sal-ammoniac, as recently recommended in these columns, will be found capable of producing the desired result, if added to the developer in crystals immediately before use, since by the mere act of solution it lowers the temperature. This is, however, of little use if the negative be transferred immediately after development into water of a considerably higher temperature. There are many similar salts—acetate of soda and nitrate of ammonia, for instance—which might possibly be used with advantage to cool the water with which the bulk of the washing is performed, as, while lowering the temperature, they would exert no injurious action upon the gelatine films, or on the image. Sal-ammoniac would most probably, indeed, exert a beneficial influence in assisting in the removal of the hyposulphites, though we cannot recommend this method of cooling as a practical one except under very special circumstances.

After the temperature of the water we may look at methods of artificially hardening the film, to enable it to resist the effects of temperature. Foremost amongst these is, of course, the use of the alum bath, which, however, is not without its disadvantages. When it is employed, it should be used immediately after development, or after the plate has been rinsed, in preference to after fixing. When so applied it serves the double purpose of hardening the film to a certain extent, and of removing the discoloured developing solution from its pores; but, as the alum itself must be removed before the plate can be put into the hypo, it is a question whether most of its effect is not also removed by the necessary washing that must follow its use. Chrome alum seems to us a preferable agent to common alum for the purpose, for, while its effect is more permanent, it is less likely to cause trouble if not thoroughly removed before the film goes into the fixing bath. But care must be taken that it is not used too strong; otherwise, with some kinds of gelatine, the film will be rendered so hard, that it becomes impossible to fix it or remove the unaltered silver bromide without resorting to measures that will exactly neutralise its benefits.

Other hardening substances have been proposed, notably tannin; but this, again, must be used with care and judgment for similar reasons. Its tanning or hardening effect is so great as to render the gelatine almost or quite impermeable if employed in too great a state of concentration, and it is liable, in addition, to produce a peculiar granulation or reticulation of the gelatine, destructive of definition, as well as considerable discolouration. Another possible action, too, must not be overlooked, if a film containing tannin be introduced into the fixing bath. Tannin, like pyrogallic acid, hydroquinone, and all the rest of the series, is a powerful reducer of silver salts, and its effect would be to throw down the soluble hyposulphite of silver formed in fixing in the form of a more or less dense veil all over the plate. Ferrous sulphate is another salt that has a hardening action upon gelatine; but this, too, is a reducing agent, and, although it has been recommended as an addition direct to the hypo bath, we have never found it beneficial in that capacity, but rather the contrary.

Perhaps the best and safest, if not the only really safe, agent to employ in this manner is alcohol, for, while it has absolutely no injurious effect in conjunction with unremoved hypo, its action in preventing the solution of the gelatine and in counteracting frilling even when it has far advanced is undoubted. It may be used as a bath, mixed with an equal volume of water, after the plate has been fairly well washed to remove the developer, and, if signs of frilling should present themselves, it will quickly dispose of them. After two or three minutes' soaking the plate may be rinsed—not until the "greasy" marks disappear, but merely to remove the bulk of the spirit from the surface of the film—and then placed in the fixing bath, in which it should be kept covered until the whole of the bromide has been removed, as, if the plate be taken from the hypo, the latter will run in the well-known "greasy" lines caused by the imperfect mixture of the solution with the alcohol, and so cause uneven markings that may possibly prove ineradicable.

When the fixing is complete, the plate may with safety be freely washed until the greasiness of the alcohol disappears, and, in all probability, for the period necessary to remove the hypo; and, if at any time signs of frilling make themselves apparent, another dip into the bath of dilute alcohol will stay the evil; in fact, in bad cases of tendency to frilling, the washing may be completed in a more dilute mixture of alcohol and water.

In frequent instances no signs of trouble appear until after the plate has been fixed and the washing is just commenced. In such cases immersion in alum, even if effective for the purpose of arresting the softening action, would cause a yellowing of the film, and that course is, therefore, not available. But if the plate be at once dropped into dilute alcohol, or, in bad cases, into alcohol of full strength, the film is hardened and frilling arrested, and, if an opalescence be caused by the precipitation of the salts contained in the film, it disappears again on the application of plain water. The opalescence or stain in this case arises not from decomposition of the hyposulphites, but simply from their precipitation in crystalline form on the gelatine, and such opalescence may be easily and perfectly removed without leaving any injurious trace behind, even after the film has been dried, if not allowed to remain too long.

This proves a very useful help in bad cases, as the negative may be removed direct from the fixing bath into the dilute alcohol, and if this is allowed to soak for two or three minutes, or until the frilling is gone, and the plate is then flooded with alcohol of full strength, it will dry in a few minutes. The mere effect of drying, after the action of the developer, is in itself sufficient, in almost every case, to so harden the film, that it becomes past danger, and the washing may be resumed in plain water without fear.

In most cases, where frilling and similar defect appears, it suffices to use the dilute alcohol, and if this be squeezed out of the film by means of pressure with a linen pad, or with a "roller squeegee," and the treatment repeated four or five times, the elimination of the hypo will be found to be practically complete. If, on testing after drying, this be found not so, five minutes' re-immersion in water will effect it without danger.

Though chloroform has not an important place in *Materia Photographica*, it is by no means an infrequent occupant of the photographer's shelves. At one time it was recommended as an addition to collodion to improve its sensitiveness, though our own experience showed its presence to be inoperative in that respect, at any rate for ordinary wet-collodion work, and we apprehend that a similar inertness would characterise its use in collodion emulsion. It is interesting to learn that a new and remarkable method of purifying it has been invented and patented by M. Pictet, and is, of course, applicable to other compounds. It consists in cooling the liquid to a very low temperature. At 70° C. crystals begin to form; the liquid is then drained from them and subjected to a still lower temperature, about 100°, when the chloroform itself crystallises out, and can be separated from an impurity, which remains liquid. The chloroform thus purified is indefinitely permanent in the light, whilst, as is well known, the so-called pure chloroform of commerce quickly changes when exposed to light.

Mr. Norman Lockyer has been contributing to the pages of *Nature* an interesting article on "Physical Science for Artists," his subject being the present Royal Academy examination. It appears to us, from his remarks, that many artists would do well to take to photographing for cloud work alone, for he characterises their painting in some of the pictures as "unlike anything he ever saw in any part of the world." Artists of the brush do not disdain the use of cameras "for making mems.," and surely the forms of clouds are particularly suited for such rapid note-taking. Whether it would be looked upon as "legitimate art" we do not pretend to judge, but certainly pictures done from such *data* would be more valuable than those in which the clouds justify the hard words above quoted.

Apropos of clouds, the value of photography, applied to them in another and novel direction, is incontestable. A considerable amount of attention was directed, last year especially, to the presence, near midnight, of self-luminous clouds at a time of the year approaching midsummer. By the help of a grant from the Prussian Academy of Sciences, Herr O. Jesse, of the Royal Observatory of Berlin, has been able to secure a number of photographs of these phenomena. Nearly two hundred were taken, and they will be available for ascertaining the height, shape, and structure of the luminous masses. Several correspondents in this country write to the editor of *Nature*, stating that they have been lately seen at Sunderland, and also at Kingston, County Dublin. The editor writes: "It is astonishing that no observer seems yet to have had energy and intelligence enough to take spectroscopic photographs of these striking phenomena." We quote his words, that among those who read these lines some may possibly be found who would be inclined to experiment in this direction.

Some of our readers, who have had difficulties with their burnishers with regard to lubrication may possibly find an explanation in the soap they employ. Common hard soap is often recommended, and, if of good quality, cannot be excelled; but, as every one knows, soap is often such almost in name only, the real soap forming a portion only of its constituent parts. Water glass, for instance, which plays another part in legitimate photographic processes, is largely predominant in common soap. Its presence, however, is probably harmless under the burnisher; but there is another soap adulterant that would be very injurious—sugar. This substance is found sometimes to the extent of twenty or thirty per cent. in so-called pure soap. It is added to give a transparent appearance, resembling that obtained when soap is purified by solution in spirit. Moral: Avoid all transparent soaps, good or bad.

As our correspondence columns show, we are often consulted as to the best means of decolourising old engravings and plans before photographing, and the usual method recommended has been the use, under proper precautions, of solution of "chloride of lime." It is quite possible that a method which has been recommended for bleaching cotton, and which would be free from the ultimate danger to the texture of the print from the presence of the chloride not washed out, might be applicable also to engravings. It consists in the use of oxygenated water, to which calcined magnesia has been added. This

liquid is now an ordinary article of commerce, and can be purchased at most large chemists' establishments.

We have on many previous occasions recorded the remarkable work of M. Marey in the direction of series of rapid exposures of moving animal life, executed with the object of analysing the various motions of the organs of locomotion. Men, horses, birds, &c., have all been photographed in extraordinary small periods of time; but the latest achievement of this *savant* is, perhaps, the most wonderful of all—photographs of flying insects taken in rapid succession, each exposure occupying the one twenty-five thousandth of a second of time!

BATH CONVENTION NOTES.—II.*

At this time Talbot was unaware that Nicephore Niepcé, of Chalons, was at work, although in an entirely different direction. What was previously known at this time was that "horn silver," or fused chloride of silver, darkened when exposed to the sun's rays, although it remained white while shielded from light. It was further known that it was the violet rays of the spectrum that effected this change in the most rapid manner. Still further was it known that, when a solution of nitrate of silver was brushed over white leather, the change, when exposed to light, was most rapidly effected. But no means of fixing the images obtained by such means were known, and they had to be kept in drawers, removed from the action of light.

Niepcé's investigations at this time lay in the direction of finding gums which were sensitive to light, such sensitiveness being shown by their becoming insoluble after exposure.

Talbot's first trial was with nitrate of silver brushed over paper. This being found slow, he tried chloride of silver spread whilst moist on the paper. This, too, proved unsatisfactory, and led to his forming the chloride by decomposition, that is, he first washed the paper with common salt, and followed it by a wash of nitrate of silver. He soon found that an excess of silver nitrate was necessary to obtain the highest degree of sensitiveness. Although suitable for obtaining prints by super-position in the printing frame, the paper was much too insensitive to receive images in the camera.

His attention was next directed to iodide of silver, which, as a means of producing a visible image, proved unsatisfactory. But all this while other duties were pressing upon him, and preventing him from devoting all his time to photography. He had entered also into a research into the primeval antiquities of Greece and Rome, for which his education had well fitted him, for his scholastic attainments were of no mean order, he having been a Wrangler in mathematics at Cambridge and a Chancellor's Medallist in classics.

We have said that he engaged with iodide of silver, which produced no visible image; but, at the time Daguerre was bringing out his process upon metallic silver plates, Talbot had, so to speak, thrown off his coat and gone in for success in that particular direction in which he conceived it to lie. Although, during the summers of 1839 and 1840, several large views of buildings were successfully obtained, it was on September 7, 1840, that the great discovery was made, a discovery which entirely changed the aspect of photography. This discovery, in brief—for we are not here writing a detailed account of the history of photography—was this, that when paper was impregnated with iodide of silver plus nitrate of silver, and then exposed in a camera, the latent image thus obtained would, if washed with gallic acid, become developed into visibility and strength, and eventually be strong enough to print from.

By this discovery the process of taking views was accelerated a hundred times—a view which formerly required an exposure of two hours was now reduced to one minute. The development of a clean image caused trouble at first, but all trouble was overcome by the employment of acetic acid to the developer, and also to the sensitiser.

Some other time, not at present, we may go more fully into the details of the preparation of Talbot's sensitive paper. This is only a Convention Note, so we pass on.

The calotype process consisted in sensitising paper by first a coating—if such it may be called—of iodide of silver, followed by gallo-nitrate of silver. After exposure, development by gallic acid, and the fixing of the image, the negative was utilised in the production of proofs in the printing frame, the paper used being the chloride-plus-nitrate of silver paper previously alluded to.

This is the time to introduce the first work executed by photography, *The Pencil of Nature*. It is a good-sized and well-got-up volume. It was published by Longman, Brown, Green, & Longmans, in 1844. The copy which was submitted to the Convention, after the reading of Mr. Lang's paper, has a MS. four-inch attachment on its cover, in the handwriting of the Editor of this Journal, stating that it is "the earliest work on photography. The negatives were taken on paper anterior to 1843. The prints are on plain paper, anterior to the discovery of gold toning. The fading of some is caused by the paste around the margin." This book contains twenty-four photographs, ranging in size from half to whole plates. Many years ago, and when engaged in writing a life of Talbot, we asked the distinguished subject of our remarks by what means they were washed and mounted, for the unalterability of the pictures, all but the margins, had struck us as being something worthy of all admiration. His reply was that, after fixing, they were transferred to a series of six or eight vessels of water, and, after remaining in each for a short time, they were transferred to the other in succession. With regard to the mounting, that, he said, had been done by a bookbinder, with the paste usually employed in the operations peculiar to that craft. As bookbinders' paste contains alum, among other substances, no further explanation of the fading of the prints is here necessary. Moral: Avoid alum in paste.

Pushing a little to one side *The Pencil of Nature*, and going backwards for a year or two, we observe that in 1841 a full-length portrait was sent by Mr. Talbot to M. Biot, to be exhibited to the French Institute at Paris. M. Biot wrote that this excited a great sensation among the members of the Institute, which communicated itself to the public who were present.

(*To be continued.*)

* Continued from page 469.

PHOTOGRAPHING ANIMALS.

Time was when the amateur photographer distinctly refused all the blandishments of his friends when invited to take the portrait of some pet dog, cat, or baby—I place them in the order of difficulty—but that was in the old wet plate days. Now, no amateur who *is* an amateur would make any trouble over photographing the most lively animal that any of his friends could set before him. "It's so easy, you know; just touch the button and I can catch him while he's jumping." Quite so; but how often does an amateur get a recognisable portrait?

A very large proportion of the British public keep dogs, or cats, or poultry, or perhaps rabbits, or "cavies," and a still larger proportion, it seems to me, keep cameras; so cameras and live stock have got so intimately mixed up with one another, that we hear of undoubtedly authenticated cases of "doggy" men or fanciers in other branches taking up photography for no other purpose than to be able to photograph their own animals under the most favourable circumstances. Photography is so easy that, given the camera and the plates, the rest is simply a matter of "touching the button."

From the fancier's point of view, though, perhaps the results of the "button trick" are perhaps not always regarded as so successful as the producers of them may imagine. It is not, for instance, very complimentary to the "artist" when we find, a week or two back, the editor of one of the leading papers devoted to dog lore, in acknowledging the receipt of the photograph of some well-known exhibition dog taken by its owner, who has adopted photography for the special purpose, launching out into words of advice to amateur photographers. Let them give more attention to securing a good position so as to show off the dog's points is the burden of the story; but, good Mr. Dog-editor, don't you imagine the meanest of amateurs would try his best to do that, within his knowledge of course? Don't you think that the expert in dogs, who is a photographer afterwards, would lay more stress on showing his dog in a good position than in making a technically perfect photograph? My dear sir, you have never, evidently, tried to photograph a dog, or for that matter perhaps anything else.

How many articles, how many books, have been written on the

"art of posing" as applied to human beings, who are, at least, amenable to direction if the artist be able to direct them? How many more must we expect before the art of canine portraiture is reduced to the matter of certainty and brought to the state of perfection that the now scientific dog-editor would seem to look for? In his own paper he publishes a portrait of a well-known show dog, that bears on the face of it the *impression* at least of "from a photograph." It is, no doubt, a better likeness of the dog, so far as head and expression are concerned, than would have been produced by any of the few draughtsmen, I cannot call them "artists," who lay themselves out for that class of work; but it is of no earthly use as giving any idea of the dog's other points, and I take it that should be the aim of the portrayer of the canine form for specialist paper. This particular portrait I find, on further reading, is drawn from a photograph taken by the owner.

As a matter of fact, perhaps the owner of a dog, or other animal, is the last person in the world, however skilful with the camera, to produce a characteristic portrait of his pet. He may, and possibly will, catch him in some particular mood or position that is quite familiar to those who know the animal intimately when he is "off duty," so to say—will, in fact, wait to catch such a pose; whereas, the "common or garden" photographer, fetched from the nearest "studio," would have gone for the best he could get, and in ninety-nine cases out of a hundred got a better general picture of the animal from the point of view of the outside judge.

The animal draughtsman—he who lays himself out for this class of work—has to bear in view that he is expected to give a rendering of his subject that will represent the *type* rather than the *individual;* his "sittings," if he ever sees the animal at all, usually take place at one of the shows, and he probably never sees his subject in anything like the position he portrays him. He sketches in the outline, which he knows too well, of what is supposed to be a perfect, say, St Bernard, and fills in the rest of his time in putting in any peculiarities of marking, &c. So it happens we find, even in the specialist paper, such a strongly prevailing likeness between dogs that on the show-bench are as dissimilar as they possibly can be.

The photographer cannot "imagine" his pose and outline, and simply devote himself to the filling in of details; he must make his opportunity and his picture at one and the same time, and, though it may be a portrait, it is at least a hundred to one that it will not be a picture that will satisfactorily represent the animal from the specialist's point of view.

For the last five or six years I have laid myself out to photograph my dogs, cats, poultry, and any other chance animals that have come in my way, and I may safely say, with dogs especially, I have never yet secured a picture that would satisfy a judge of the breed as being a typical representation. I have made many "shots" that have proved admirable portraits—family portraits, I may say—and that have been recognised even by "doggy" men as pictures, but I cannot say that I ever succeeded in producing anything that I should have cared to submit to the editor of the *Field* as a "type," although the originals have been good enough.

The advice given by my friend the "doggy" editor was undoubtedly right, though possibly he was unaware of the many difficulties that surround the work of photographing animals. It may seem an easy matter, with a "snap shutter," to do *anything*, until you try it; and it is only then that you begin to learn how seldom animals are really still, and how still more rarely they pose in anything like the positions that the unacquaintive artist represents them.

A rapid plate, a quick shutter, a long-focus lens, and any amount of patience are the chief requirements for the production of pictures of this class, whether "portraits" or "types," and then the question of accurately rendering the animal remains to be discussed. Muybridge's photographs, good as they are, would never be accepted as typical representations of the horse as he is known. W. B. Bolton.

THE NEW PHOTOGRAPHY.

The historical paper read by Mr. Lang before the Convention the other week has met with general approval, as it deserved to do, and it is such an excellent thing of its kind, being, withal, so instructive in the technical sense as well as interesting from the merely photo-biographical standpoint, that I probably express a general hope that more contributions of the same character may enrich the proceedings of future Conventions. Mr. Lang has before now treated us to several chapters of photographic history which merit the same praise. He is not only dispassionate and impartial, as historians should be, but he has the faculty of ignoring those things that do not bear directly upon his subject, or carry some interest for his listeners or readers. This is as it should be; but, notwithstanding the fact that photography appears to be one of those things about which it might seem to most minds impossible to develop prejudice, partiality, or errors of sentiment, it is not always the case. By the way, Mr. Lang quotes Herschel as saying in 1853 that "a new photography has to be created, of which bromine is the basis." In *The Chemical Effect of the Spectrum*, Eder, one of the most conscientious authors in the verification of his quotations, alludes to the fact that, in 1840 and 1842, Hunt (*Philosophical Transactions*) recommended the sensitising of Daguerreotype plates with bromine, and remarks that he (Hunt) said on the subject "that a new photography ought to be created, the foundation-stone of which would be bromine." Is the repetition a coincidence, or did Herschel unconsciously plagiarise the earlier writer? As a matter of fact, neither Hunt nor Herschel first suggested the bromising of Daguerreotype plates, the idea originating, I believe, with Mr. John Goddard in 1840.

I was much entertained with Mr. Lang's reference to the late Major Russell's reputed saying that photography would be a most interesting subject were it not for the pictures. This, unlike most epigrams, is true in a very large sense. There are numbers of people who, paradoxical as it may look, devote a great deal of time and trouble to photography, but who seldom, if ever, produce a passable photograph—passable, that is, either in the technical or in the artistic meaning of the word. Such people find their greatest pleasure in experimental work, and are always amply rewarded if their labours lead to the improvement of an old process or the introduction of a new one. They are the investigators, the chemists, the students, by whose efforts and researches practical photographers are now enabled to pursue their calling with such comparative ease. To such as these the finished picture, however beautiful it may be, appeals more by reason of the chemical principles involved in its production than by those merits and attributes upon which a popular and sometimes a particular judgment of it is founded. Except in these regards, their interest in photographs *as* photographs is slight, if not fugitive. It is a feeling into which I find myself entering without any effort, and one, moreover, which I very largely share. I have been nominally a photographer for a great many years, and have, I suppose, taken up most processes, new and old, which has occupied a very great deal of the time I could spare from my professional work, and yet the number of photographs I have produced is ridiculously small, and of these the percentage that deserves a corner in an album, much less a place on the walls of the humblest provincial exhibition, is insignificant. Although I am passionately fond of good pictures, be they photographs or not, I have never felt the slightest ambition to snatch the laurels from the brows of Mr. Robinson or Mr. Gale. But if, for example, I could work out an infallible method of restoring faded photographs, I should be as happy as if I had won a hundred medals. I dabble in experimental work, although, so far, I have accomplished little or nothing of an original kind worth publishing. My friends do not understand this; my enemies say that it is a confession of photographic incompetence. The one set is puzzled at my explanations, the other is cordially welcome to its opinions. In the popular sense, I am not a photographer, and do not suppose I ever shall be. Thus I am deprived of the pride of pointing to well-stocked albums, portfolios, and to a small acreage of framework to justify my assumption of the name; but, on the other hand, I have any number of pieces of paper smudged, stained, and otherwise discoloured, which tell me as eloquently as words the results of innumerable reactions and the issue of many, many experiments. I have strips of glass coated with a variety of emulsions in all stages of after-treatment, and forests of bottles filled with divers-coloured liquids, which it would beat anybody but myself to identify. This, to me, is photography—photography without pictures, the sort of thing which Major Russell probably had in his mind's eye.

Yes, photography is interesting enough to some without the pictures; and I suspect that, to many who regard the latter as indispensable accompaniments or adjuncts, it would be more enjoyable were it not for certain little features which have grown up with the art of late years, and entirely changed its being. The faddist and the crank are this moment patronising photography in the Whistlerian fashion, supported by some intellectually small cliquism, and applauded (and financed) by veneered fishmongers,

ginsellers, and kindred tradesfolk aping Pall Mall club manners on a tiny scale, and half persuading themselves that they are benefiting the art upon which they are pleased to expend their superfluous money, energy, and brains. It is curious that the new school of paper spoilers should originate in, and be wholly confined to, one small and insignificant centre. If it remains so, we may safely prophesy its early death. The great army of photographers begins to feel that photography would be more interesting—more tolerable, in fact—were it not for the airs and graces of some half-dozen persons who have misapprehended the use of a photographic objective, and the too-generous adulation of their patrons and admirers. The lowest depths of imbecility in picture production were, it is to be hoped, sounded at Pall Mall last year. Mr. Debenham has done the world of photography—the world of photography that existed and flourished before Mr. Maskell, Mr. Davison, Mr. Pennell, and their friends were moved to take compassion upon us—a great service by giving it a condensation of the three-guineas-a-year heresy out of the mouths of the heretics themselves. This kind of thing has in it so much that is wise, thoughtful, clever, and reasonable, that it requires nothing less than a limited liability company for its due propagation and support. Limited liability companies, however, have a knack of ceasing to exist, and leaving nothing but disappointment and a sense of loss behind them.

Of entirely modern examples of the multiplex art of humbug, I only know one worse than fuzzicism, and that is, shopography. The name is self-explanatory. It is a thing to be detested. Dr. Emerson, who with all his follies is not dishonest, dealt it a justifiably savage blow some years ago in the pages of a contemporary. When camera maker, lens maker, plate maker, chemist, paper coater, and all the rest of the tribe, claim a share in the production of the picture, what credit, he asked in effect, remains to its actual author? Shopography is carried to most absurd lengths. So soon as a picture out of the common is produced, be sure that it will not be long before the immortal advertisement proclaims that it was taken with such-and-such a lens or plate. Nonsense; these things are mere accidents. Pictures are taken by the aid of brains, which are not on the market. There was always a certain amount of this sort of thing about, but of late years it has grown to a prodigious extent. Methinks, however, that at the time of writing it is something taboo. The plate makers are no longer wasting their profits in offering prizes to their clients. The late Mr. William Adcock once pungently proposed the institution of a prize for plate makers, and the satire of the proposal went straight home. But the advertisements are still as amusing to read as of yore. It seems to me that gelatine plates and other things will soon rank with quack medicines, that is, their popularity and value will be measured by the amount of money spent in pushing them.

In passing, I notice that "Ilford" plates are said to enjoy "twelve years' ever-increasing sale and popularity." This is said on July 17, 1891. In January of the same year I read that "ten years' supremacy" is claimed for them. Verily, time flies with a vengeance in some parts of the globe, particularly in the east. Those of us whose knowledge of these matters dates farther back than the early part of 1886 know better than this. I do not think that these statements should be allowed to go forth to the myriads of photographers who newly take up the art year by year without a protest, and I consider it only common fairness to others to challenge their accuracy. I do so all the more readily, because, while having no direct interest in the matter, I am fully aware of the difficulties which some of the older firms had to contend with from 1877–8–9 onwards, difficulties unknown to many more modern makers. "Ilford" plates were not known before 1886, and it is inadmissible to insinuate the contrary.

Not merely in respect of the definition of modern photographs, but also in that of their tone or colour, there is some room to deplore many of the teachings of the new photography. The cold blacks and greys of platinum and developed bromide are in danger of being superseded by warm tones—an elastic term which seems to include everything between brick red and the sickliest brown and rich purple. Will these æsthetic vagaries last? I think not, inasmuch as they seem to me to be the outcome of merely transient whims. Will the modern plethora of developers continue to puzzle, perplex, and disappoint us for long? I hope not. Instantaneous photography represented by its assumed exposures of the one-thousandth, or five-hundredth part of the second, has been killed by the hand camera, which appears to pass an existence of too excited and feverish a nature to warrant one in predicting a long popularity for it. What will follow it? Are we moving in a circle, and will the new photography one day be replaced by the old, with his excellence of detail and crispness of definition, its pre-Davisonian conception of artistic truth, its simplicity of development, its unæsthetic but agreeable tones, and its hatred of shopography and all its works? At the risk of being accused of having reactionary tastes, I will say I believe that photography would not suffer either in public or restricted estimation if some of the things relating to it that are so sedulously inculcated nowadays were unlearnt, once and for ever. I have ventured to string together these few outline reflections on the subject in the hope that you may consider them of sufficient interest to award them the dignity of type. R. E. Chesterman, D.Sc.

ISOCHROMATIC PHOTOGRAPHY.

[A Communication to the London and Provincial Photographic Association.]

Although it has only recently come into general use, isochromatic or orthochromatic photography is not a new idea. Many attempts have been made to sensitise plates so as to utilise the less refrangible rays, and thus represent colours more truthfully in their relative values as they appear to the eye.

In a communication to a French scientific society, dated September 6, 1875, M. Ducos d'Hauron mentions that he had found chlorophyl, which was suggested the year previous by M. Edmond Becquerel, of remarkable value in sensitising for the red rays of the spectrum. Since that time very many substances have been tried for the same purpose, and photographic films have been stained with all kinds of dyes in the hope of sensitising them for the so-called non-actinic rays. Very few of these dyes gave results which were even partially successful, and it was not until eosine was utilised for the purpose that any marked degree of success was obtained. This substance was first suggested by Colonel Waterhouse in 1876, and it is to him we owe the credit of laying the foundation of the present system of isochromatic photography. Colonel Waterhouse, however, did not complete the process. He states, in a letter to the British Journal of Photography, that other important work prevented him following up the research; and it was left for others to work out the discovery, and turn it to really practical account

The following letter is the one referred to by Mr. Edwards:—

"Gentlemen,—I observe that in several letters in recent numbers of The British Journal of Photography reference has been made to me as discoverer of the properties of eosine as a colour-sensitiser for orthochromatic plates. It may be as well, therefore, to state that I cannot consider myself to have any claim in connexion with the practical use of eosine as a colour-sensitiser in the preparation of so-called iso or orthochromatic plates.

"I believe I was the first to experiment in 1875 with the dye in this direction, and to discover that bromo-iodised or bromised collodion plates—wet or dry—stained with it were very much more sensitive to the green and yellow rays of the solar spectrum than unstained plates. This discovery naturally led me to experiment with the stained collodion plates in photographing coloured objects and landscapes, but I *failed* to produce the desired results. Other important work prevented my following up the research, either with collodion or gelatine plates, and it was left for others to work out the discovery in these directions and turn it to really practical account.

"From the information I have at hand, I believe the first to practically apply eosine in collodion plates were the brothers Ducos du Hauron, and in gelatine work Messrs. Attout Tailfer & Clayton, whose plates have been in the market for some years, and successfully fulfil all requirements. These gentlemen are, I think, fairly entitled to all credit and substantial benefit in the way of patents they can legally claim.—I am, yours, &c., "J. Waterhouse, *Lieut.-Colonel, B.S.C.*

"*Survey of India Office, Calcutta, February* 1, 1887."

It was not long before practical men began to use the new power in the *collodion* process, and turn it to account commercially. It was used by Messrs. Braun & Co. in their reproduction of pictures in the various galleries in Europe, and it was their unprecedented success in copying the pictures in our own National Gallery that first aroused the interest of English photographers in colour-sensitive processes. I remember being present at a meeting of the Photographic Society of Great Britain when the matter was under discussion. Mr. Bird had just returned from Paris, and had brought with him examples of the new process. The results shown were far superior to anything of the kind which had previously been done; but Mr. Bird could give no particulars of the method employed, except that it was worked as a secret process.

Just about this time, or rather shortly before, the gelatine process was brought prominently before the photographic world, and emulsion-making was the all-absorbing topic of interest. Colour-sensitive photography had to wait, and during this time M. Tailfer, of Paris, who had already experimented largely with eosine and other colour-sensitisers in collodion, turned his attention to applying the same to

gelatine process, and after several years of work he eventually succeeded in producing colour-sensitive gelatine bromide plates.

He showed his results at the Inventions Exhibition in London in 1885, for which he was awarded a medal, Captain Abney being one of the judges. It is curious, in the face of these facts, how little credit has been given to Tailfer as the practical inventor, and how persistently he has been ignored, notwithstanding the letter by Colonel Waterhouse which has just been read. In the following year Messrs. Dixon & Gray were awarded a medal by the Photographic Society of Great Britain for results produced by what turned out eventually to be the Tailfer process, although not at the time acknowledged by the gentlemen named. From that time isochromatic photography has advanced with rapid strides, and is now used exclusively for reproduction of pictures, and also very largely for ordinary work in the studio and for landscape photography.

It has been questioned by some whether any advantage is gained by using colour-sensitive plates over those of the ordinary kind. In every instance where careful tests have been made the result has been in favour of the isochromatic plates. Even the most conservative of the old school acknowledge that there is some advantage. The difference in opinion may, perhaps, be accounted for by the fact that at the first trial too much is expected. It reminds me of a letter received from an amateur in the North who wrote to congratulate us on the issue of the plates, saying that he was tired of taking pictures in black and white, and was glad to find that in future he could take them in colours; but he could not see the use of taking coloured negatives unless he could also obtain paper that would yield coloured prints.

The only conclusive test for colour-sensitive plates is to try them on a subject which contains the colours which are not truthfully rendered by the ordinary process. If this be done, a marked advantage will at once be seen.

Very much has been written and said relative to the use of the coloured screen, which seems to be imperfectly understood, and on which there is much difference of opinion, probably arising from the fact that in many instances the screens used have been quite unsuited for the purpose. Many have the idea that isochromatic plates will not work at all without the screen; others seem to imagine that any piece of coloured glass will answer. As a matter of fact, with pure colours, such as some natural flowers, no screen at all is required. Where a screen is used, it is essential that the right tint be employed. Screens of coloured glass were used many years ago, and they answer the purpose well, provided the glass be optically worked with both sides perfectly plane and parallel, so as not to interfere with the definition working of the lens. It happens, unfortunately, that no glass can be obtained quite of the right colour, the nearest approach being a brownish orange, which has the effect of degrading the more luminous rays and unnecessarily prolonging the exposure, besides lessening the brilliance of the image.

As a remedy, we some time ago devised and introduced a screen to fit into the diaphragm slot, in which the medium is composed of a very thin film of gelatine of a pure yellow tint. The film is perfectly structureless, and, owing to its extreme thinness, does not interfere with the definition of the lens. This screen is much used, and answers every purpose. The film of gelatine is enclosed and protected by the metal leaves of the double stop, which is formed of thin folded brass.

I should like to say a few words relative to the patent under which we work.

It has been stated that this patent, which was taken out in 1883, has acted as a hindrance to orthochromatic photography in this country. Very little unbiassed reflection will show that exactly the reverse has been the case; the fact that the process is worked commercially under the protection afforded by the patent gives every photographer an opportunity of availing himself of this undoubted improvement without the trouble of preparing his own plates.

And further, as it is a fact that the most successful results can only be obtained when the emulsion is rendered colour-sensitive in the first instance, it would have been impossible for photographers who were not also experienced emulsion-makers to have worked the process to advantage.

With regard to the assertion that the patent has hindered British research and investigation, there is not a word of truth in it. We have, in fact, in several instances, assisted experimentalists, both by valuable information and gratuitous supplies of the necessary materials. It is, nevertheless, a fact that most of those who have written on the subject have simply appropriated the process without a word of acknowledgment; but it will be found, by any one who cares to study the subject, that up to the present moment every workable process of any value that has been published is a more or less perfect copy of that described in Tailfer's specification.

B. J. EDWARDS.

PHOTOGRAPHIC CONVENTION AT BATH.

REPORT OF THE DELEGATES.*

"VERY sorry, sir, but we are quite full," was the reception accorded to your junior delegate on alighting at the doors of the headquarters of the Photographic Convention, the Castle Hotel, in the ancient city of Bath, on Monday afternoon, July 6. Reluctantly mounting the vehicle again, a quiet whisper from the "boots" was heard, "Try the Christopher, sir," and the Christopher Hotel was tried with very great satisfaction, thanks to the genial landlord and his charming daughter. After religiously taking the waters of Bath, which on this occasion were tempered with some very fine whisky, the Guildhall was reached, where we found our indefatigable secretary distributing buttons, without which no member of the Convention was complete, and thenceforward the men with the buttons were the attraction for all the brightest eyes of Bath, to say nothing of Salisbury, Glastonbury, and Wells.

A large collection of apparatus was on view under the superintendence of Mr. Andrew Pringle, consisting of some very fine cloud pictures sent by the Meteorological Society, and platinotypes on wood panels sent by Mr. S. G. B. Wollaston, besides a number of other specialities.

At seven o'clock we assembled in our war paint to be presented to his Worship the Mayor of Bath, who by his kindly welcome made us all feel very much at home. Our retiring president then gave his valedictory address, vacating the presidential chair to his successor, Mr. William Bedford, who was received with acclamation, and whose masterly address was listened to with very great interest.

At eight o'clock a collection of slides, illustrating scenes visited during the Chester Convention, was passed through the lantern by Mr. F. A. Bridge, affording interest to a large audience of ladies and gentlemen. All went off very well till the last four slides, illustrating different views of Mr. Gladstone's residence, Hawarden Castle, when, as if in protest against anything approaching to politics in a photographic meeting, part of the woodwork of the lantern caught fire, and, notwithstanding the spirited efforts of the lanternist, who charmed us all with his noble endeavours to blow out the flames, while constant requests to "Put out that yaller light!" were heard all over the hall, Hawarden Castle was doomed not to be shown; and the audience separated amid great amusement, owing to this unexpected addition to the programme.

A very lively "Post-Convention" meeting at the Castle Hotel terminated our first day at Bath.

On Tuesday morning, about fifty of us, including many ladies, left Bath for Chepstow and Tintern. Tintern was reached during heavy rain, and lunch was, therefore, the primary question. After fortifying the inner man, your two delegates heroically ventured out, and might have been seen, up to their knees in wet grass, sheltered by one umbrella, and surrounded by inquisitive cows, while patiently waiting for a gleam of sunshine over Tintern Abbey. "Everything comes to him who waits," and the sun came, and, though wet, we were happy after making sundry exposures in the interior of the Abbey. We took train back to Chepstow, where many plates were exposed on the fine old Castle, Marten's Tower being the particular view most favoured. After a capital tea at the Beaumont Arms Hotel at Chepstow, the train was regained. Among other subjects of conversation on the Bath-ward route, a member remarked on the stumpiness of the trees in that part, which another member put down to the tendency of trees about there and on the Welsh borders to grow laterally; a gentleman from Wales remarked on the lateral tendency of the Welsh ladies; another clever member noticed the lateral tendency of the Welsh locomotives; and, somehow, everything seemed to grow more and more *lateral*, till we reached Bath.

The general meeting on Wednesday morning had a large attendance, it being again very wet. After the Council meeting the members adjourned to the Sydney Gardens, where the Convention group was taken during a drizzling rain. The afternoon turned out fine, and many members took advantage of it to take their cameras out for a walk. A great many, however—among whom were your delegates—religiously heard the papers read through, that by Mr. Lang being specially interesting on *The Photographic Work of Herschel and Fox Talbot*. Mr. Bothamley's demonstrations of *The Primuline Process and the Improved Kallitype Paper* were also very clever, the lecturer making a strong point that a black print is not necessarily more artistic than a brown print merely because it is black and the other is brown; pointing out, also, that most famous etchers have brought out their productions in very warm brown tones, and he ridiculed the black tone, as being one of the artistic cants from which photography periodically suffers.

A paper by Mr. W. E. Debenham, on the *Cult of Indistinctness*, read by Mr. Traill Taylor, made a very good impression, and was considered to

*Read before the members of the London and Provincial Photographic Association.

deal a heavy blow on the Fuzziness party, no one of whom, if any such were present, was found brave enough to speak a word in defence of his favourite fallacy, although proper opportunity was offered.

In the evening, Mr. A. Taylor, in the absence of Mr. Common, lectured before a large audience on *Recent Astronomical Photography*, illustrated by the lantern.

Thursday was a splendid day, of which every photographer took advantage. Many went to Salisbury, including your senior delegate. Your junior delegate went to Bristol, where he found the clergy were exceedingly attentive, thanks to the exertions of the Bath Local Committee. At the Cathedral one of the principal points of interest was the old gatehouse, the residence of the Rev. Precentor Mann, our leader, the staircases of which were so narrow that the furniture had to be taken up in pieces and put together in the rooms. It had the reputation, also, of being haunted; but, none the less, the Rev. Precentor Mann is very proud of his beautiful old residence.

The fine old church of St. Mary Redcliffe was next visited, and many plates exposed on the interior. Two of the clergy were in attendance to guide us for an hour and a half before the party arrived, and altogether were most kind. Some of the party also visited Clifton before returning to Bath.

In the evening your senior delegate read the supplementary report to the report given at the last Convention meeting on the lens standard question, and which may now be considered to be satisfactorily settled, as he will, no doubt, tell you.

Friday was a glorious day. Some went by brakes to the Bath stone mines, and thence to Lacock Abbey, the residence of the late Fox Talbot, where they were kindly received; but the majority took train to Glastonbury and Wells, to the number of thirty-five. The magnificent ruins at both places were well accounted for when it is stated that 370 plates were exposed on the excursion. On the journey there, which was made in a comfortable saloon carriage, Mr. Henderson, our esteemed honorary member, took several pictures of the carriage full of photographers when the train stopped at the intermediate stations. The trip both there and back took place in perfect safety, owing to the presence on the engine of prominent members of the London and Provincial Photographic Association. They relieved one another with great regularity about every ten miles, generally coming in as black as tinkers, but proud of the duty they had performed, and gladly receiving their fellow members' approbation. Mr. Cembrano, taking advantage of the somnolence of Mr. Henderson, took a picture of that gentleman nodding while in the railway carriage. Mr. Henderson, discovering the attention which had been paid to him, insisted on Mr. York's picture being taken as well, as he also was nodding; so the two heads were placed together, and a very striking picture resulted, to be called *The Sleeping Beauties*, and will most probably be shown on the screen at an early date.

The Convention dinner in the evening was a very enjoyable affair. His Worship the Mayor was our honoured guest; a smoking concert followed, and was kept up till a late hour. At the Council meeting on Saturday morning, Mr. H. P. Robinson was proposed as president for the next Convention meeting, which will be held at Edinburgh in 1892. Mr. Briginshaw's resignation of his position as Hon. Secretary was received with very great regret, as it was considered by very many that he had been throughout, practically, the head and front of the Convention. However, in Mr. Cembrano the Council considered they would secure a very promising successor.

The Bath Convention of 1891 was a great success, socially and financially; the presence of a larger number of ladies at the outings than in former years added to the enjoyment of all. It may be noted that the majority of the cameras present were quarter-plate and hand cameras; there were only three whole-plates, about nine half-plates and 7½ by 5; nothing larger than whole-plate, and it is a grave question for consideration whether this predominance of small cameras will not be productive of inferior results to those which have been produced at former Convention meetings, when the hand camera was practically unknown.

In conclusion, most of us will look back on the Bath meeting as having been a most enjoyable outing; everything was well arranged, and our best thanks are due to the local committee for the evident pains they had taken to ensure our enjoyment.

A. Haddon.
R. P. Drage.

OUR PHOTOGRAPHIC TRIP AND ITS LESSONS.

We were two, and one of us had just recovered from a severe attack of the aristocratic malady, influenza; and as there were three regattas to come off—one at Rothesay (an annual one), one at Wemyss Bay, and the other at Hunter's Quay—therefore we determined to take a few days "down the water," as the Glasgow folks call it, pick up a little health exclaiming, as Miss Sinclair puts it, "Oh, what would I not give for a single gasp of Rothesay air!" and at the same time have a photographic shy at "the ships a-sailing, a-sailing on the sea." A very early breakfast helped us to catch the first express at the Waverley, which took us rapidly across the country, and down Clyde-side to Wemyss Bay, in time to catch the fast steamer *Columbia*, which quickly transported us across the Firth to the island of Bute, to Rothesay and its beautiful bay. One of us happened to be acquainted with an old ship captain, who had chosen to make this his home; and, like most old salts, he was happy to be of service, and by his aid we were shortly installed in comfortable lodgment; and, having lunched, we unpacked our traps, and started by eleven o'clock for the harbour, to prepare for the coming regatta, and with the design also of picking up any stray picture that might be floating about.

We both had half-plate apparatus of Meagher's latest and best make, but with whole-plate Dallmeyer rectilinear lenses, fitted to work instantaneously with full aperture. The shutters were, in the one case, the Thornton-Pickard time and instantaneous; and, in the other, one on Mr. Knollys' model, which, after inventing, he brought before the Edinburgh Photographic Society, and made it free to all. The Meagher folding tripod was what we used. Both shutters were arranged for the most rapid instantaneous exposures.

The day was not the most promising, but the first plates exposed have proved very fair. On trying the second, however, that Thornton-Pickard shutter—which had been tested and used successfully many times, and had always proved itself a perfect bit of mechanism—in fact, we called it a prince of shutters; but the wise man hath said, "Put not your trust in princes!" and on this occasion the click was not so clearly sharp as usual, and, upon examination, lo! it had stopped half-way—to the worker's great consternation and annoyance, to the spoiling of a plate, which is not at any time much, but in this case the spoliation of the expected picture was indeed a grievance. What was it? how could it have happened? And those vessels just getting ready for the start! It was indeed annoying. The most careful examination failed to detect anything wrong with it. A small crowd gathered, and one of the number, a canny Scotch mechanic, a-out-for-a-holiday-looking sort of chap, asked permission to look at it, on the ground that "*We* deal in those things in the shop, and I know all about them." After careful examination he pronounced the tension to be wrong, and put the tension screw or mechanism right; and it worked again quite satisfactorily, he having put the catch out of the nick which holds it.

By this time, however, the yachts had started, and, as a better vantage ground could be got at Craymore Pier, we turned our steps round the bay till we arrived there. The weather was now a little overcast, but clear enough for getting good pictures; so, everything seeming right, the shutter was timed, and the plate exposed—yes, *exposed* to broad daylight, the slide having stopped half-way just as before. Thoroughly dejected, and a sharp shower coming on, shelter was taken under an archway, where a number of people had gathered, and our talk was, of course, about that exasperating shutter. One of the crowd overheard us, and sympathised. He was a Glasgow photographer, who used the Thornton-Pickard, and said he thought he knew all about it. With great care was it examined, and he also pronounced the tension gear as being in fault, and after sorting it said that for such a day as this was he would set it at *seventeen* turns of the tension screw, although he frequently worked it up to *twenty-five;* and, being so put, it worked *there* quite well. As the weather had now cleared we started for the pier-head to make another try, but, to be sure, before putting in the slide, tried it several times with quite satisfactory results. The effect of the cloud scenery, with the water and the distant mountains, was by this time something superb, and tempted a shot, although the boats were now too far off for them specially, and another plate was tried, when—oh, horror!—another breakdown. It seemed as if that Thornton-Pickard shutter was a thing of life, and had a pique either at that particular brand of plates being used, or at its owner, or both, and took this way of showing it. All the time the Knollys shutter was working as sweetly as could be, which made it all the more distressful; 'tis so pleasant to have a comrade even in misfortune.

When the regatta had finished, we called on Mr. Adamson, the well-known Rothesay photographer, who had also been out in his own craft, making the most of the opportunities. He was most kind and considerate, but, as he was about to develop his day's work, would see us later on, and be of what service he could. That unfortunate shutter was again overhauled, but to all appearance seemed quite right. He also used the same class of shutter, deeming it the best, but said that, on one occasion, he had been taught a similar lesson, and now never went out without a duplicate in case of an accident. He freely offered the use of any of his entire stock; but not one was found to fit, all being too large, which may be taken as another argument in favour of the uniformity schemes now under consideration.

Nothing remained but a run up to Glasgow the following morning—an eighty miles' journey by land and water there and back, with forty-five minutes between trains to get fitted with a new shutter, or that fateful one repaired. On arrival, drove to Messrs. McGhie & Co., in St. Vincent-street, and in a very few minutes got served with a new Thornton-Pickard, one having the speed indicator, leaving the other to be put in proper order. The new arrangement has been found of great advantage, principally in

the direction of first having found the speed suited for a certain class of subject and light that becomes constant, *cæteris paribus*, thus aiding the memory and helping the judgment at critical times.

Arrived back at Wemyss Bay in time for the opening race, thanks to the promptitude of train and steamer, we secured several fairly good pictures. The Clyde is here about five miles across, and the course about forty miles, being twice round and a distance, thus affording grand scope for securing the best choice of effects; but, as one race is so much like another, a noticeable example only will be mentioned, as yacht-racing is very slow work to the onlooker. In this race there were but three starters—two of the crack Clyde racer kind, and one owned and sailed by a Captain Popham, from Wales, who has, for many years, attended, started, and hitherto invariably lost; but the *White Slave* played them a trick on this eventful day. The weather was of the finest, the water clear bright, with but a slight ripple, caused by the light breeze. The clouds were as fine and as changeful as on an April day; but our pictorial difficulty was to get the fine sky, the beautifully clear distance, its clearly marked mountain sides with every corrie and crag telling with singularly sharp definition, and the yachts in one alignment, so as to catch them all on one plate. When the clouds were at their best, the yachts and other craft attending them would be miles away; and so it went on, we catching a stray good thing now and again, until the first round of the course had been run, and the two Clyde clippers had, as usual, apparently hopelessly beaten the Welsh boat. They were in midstream, seemingly like winning, when, all at once, the wind fell off, leaving them in a huge ellipse of water as clear and nearly as flat as a mirror; the canvas heretofore bending and bellying like huge balloons, flapping, or hardly even that, against the spars, hopelessly, helplessly becalmed, while, on all sides of the smooth water the ripple showed the presence of a goodly breeze. Close in shore, but far behind, and in the current of the wind, came the *White Slave*, speeding along gaily, and she gradually passed the speedy ones, who were lying "jolly as a painted ship upon a painted ocean." Onward and still onward she swept, and at a good speed too, till she passed the Commodore's barge, the winner for the first time. This was about the prettiest illustration of the fable of the "Hare and the Tortoise" that could be imagined, and it allowed us to get several of our best pictures.

The peculiar weather effect which produced this result must have been of the nature of a miniature cyclone, for the wind was blowing close in on the north and on the south shores, and the *White Slave*, keeping the wind, struck straight across, and sailed round the becalmed ones.

On the following day the Firth was crossed to Hunter's Quay, where another day of a similar kind was spent, and several good pictures got; but, being on the north shore, and hence working against the light, they were not quite so satisfactory. Among the general lessons learnt, even by old stagers as we are, was, for such work, if first-class results are wanted, the necessity of using very long-focus lenses, and in this instance we tried the single lens of the rectilinear, which would be about twenty-two inches in focus; but from the construction of the camera, and the front lens being used with the stop behind it (which ought not to be), the result was unsatisfactory. Without a stop, a capital quarter-plate picture of distant objects as well as foreground can be got with the eleven-inch rectilinear; but, for the best on a half-plate at this type of work a lens of from fourten to sixteen inches should be used with full aperture. Short-focus lenses barely covering the plate are of little use. Another was the value of Rothesay air in giving a tone, and adding to the physique of a recovering invalid, and the determination to do it again for the coming Lantern season.

DUO IN UNO.

SPECTROSCOPIC DETERMINATION OF THE SENSITIVENESS OF PLATES.*

IN my last article I pointed out how any one, with very simple appliances, could secure a spectrum photograph of sufficient accuracy to enable a judgment to be made of the sensitiveness of any plate to the various colours of the spectrum. It might be supposed that with such extremely simple apparatus no reliable results could be obtained, but Schumann relates how he has been able to produce most satisfactory spectrum photographs with the simplest appliances, and my view is that the less complex the apparatus the better, as complexity introduces factors which have to be allowed for. By the employment of a very cheap form of direct-vision spectroscope, many might be induced to experiment in this direction, but would be deterred if costly apparatus was required. Of course, extreme simplicity has some disadvantage; the collimator of the small pocket spectroscope is non-achromatic, although this is not much detriment; the spectrum is cramped, especially in the red, orange, and yellow, which are squeezed up into one-fourth of the entire length, whilst the green, blue, and violet are unduly spread out. As it is sensitiveness in the green and yellow we usually desire to investigate, it would be better if our spectrum could be more distended in those regions, for in a cramped spectrum it is difficult to judge *exactly* how far into the green or yellow sensitiveness extends, no such difficulty being experienced at the violet end. However, we cannot alter that without the use of a different spectroscope and other optical arrangements, which only complicate matters, especially as regards the issue. In photographing the spectrum it is usual to interpose a photographic lens between the prism, or spectroscope, and the plate, whereby the lines are obtained of greater sharpness; but this again introduces complications, not the least of which is the amount of absorption that may occur in the glass of the lens itself, whereby certain rays may be reduced in their chemical action on the plate. Altogether I prefer to put up with the dumpy spectrum, and the indistinct lines, and the taunt of apparently inefficient appliances, so long as I can get an image of the spectrum pure and simple, just as it leaves the back of the prism of the spectroscope.

To assist in accurately determining how far sensitiveness of plates extends into the desirable regions—green and yellow—the way I proceed is this:—With the apparatus all *in situ*, as described in my last, I place the dark slide in camera, and in lieu of a plate I put a piece of very finely ground glass; on this I focus, and when I can discern the D, E, F, &c., lines, I make marks on the glass corresponding to where these lines fall. I then remove the dark slide, and take six pins, and cut them an eighth of an inch long at the head ends, and drive them into the front of the plate-carrier, three at top and three at bottom, in such positions that when a thread is wound thereon it will stretch from bottom to top pins, and form three factitious lines, which intercept the rays of light falling on the plate in the positions corresponding with the three principal spectrum lines named. If the three threads do not fall exactly where the spectrum lines should come, it is not much matter, because the true lines will most probably show when developed; and, after all, the three threads are only to act as landmarks, so that when we develop, and see two of them (E and F) sharply crossing the spectrum, and can detect the ghost of the other (D), we know that the parts of the plate affected by the rays correspond with those regions of the spectrum in which we seek the sensitiveness of our plates; the three thread lines serve to "register" the various slips of plates when we come to examine them for comparison.

The disposition of the apparatus for daylight serves equally well for artificial light, but in the latter case it is best to employ a small condensing lens, in between the light and the slit of spectroscope. I use a duplex-burner paraffin lamp, at a distance of four feet from slit, and between it and the lamp I put a lens, which is merely a cheap reading-glass, of eight inches focus, tied to a retort stand; with this I bring the flame to a focus on the slit as a bright spot of light. The spectrum on the focussing screen is fairly bright, but the exposure will need to be much longer than for daylight, and you will not get the spectrum lines with any artificial light, such as gas or oil can yield. The results of exposures to such a steady light as a duplex lamp may easily be more reliable than exposures to daylight, which is ever varying, and the readings more reliable than those of the luminous tablet arrangement, with the added advantage of the fact that the duplex lamp emits all the rays of the spectrum, approximating somewhat to daylight; therefore the general sensitiveness of a sensitive surface has more probability of being correctly estimated by such an illuminant than by the use of the monochromatic light of the luminous tablet.

There is another method I have adopted, which hinges upon the theory of the spectroscope, but entails less labour in its use. I make, with strips of coloured glass, an imitation of the solar spectrum. To do this, having the run of a stained-glass artist's stock, I select such colours of glass as accord, in my estimation, with those of the spectrum; I cut seven of these, and then glaze them in lead, like a small lead-light, building it up of such dimensions as will occupy the place of the focussing screen of a camera, say half-plate. I then extend that camera, and place a quarter-plate camera, with lens, in such a position as one would do if photographing a negative to make a lantern-slide; in fact, if the selfsame arrangement is adopted, that is all that is required. Then I am able to photograph this imitation spectrum, in the manner already indicated, either on one plate or on half-a-dozen strips cut from different plates; thus getting very quickly an indication of colour sensitiveness. It is not pretended that this method can compete in accuracy with that of using the pure spectrum; I mention it to show how one can make colour-sensitive experiments even without a spectroscope. It would prove extremely difficult, if not impossible, to manufacture a number of these coloured glass screens with any degree of accuracy; certainly not with accuracy enough to justify the appellation of a standard instrument. The use of coloured sheet gelatine is still further from scientific accuracy; the colours fade.

Either of these methods of testing plates—by the use of the spectroscope or the coloured screen—leaves untouched the question of the standard light. Seeing that even daylight varies in its composition

* Concluded from p. 469.

according to the season of the year, being weak in blue rays in winter and stronger in summer, it might be argued that, if daylight varies, how can we attain uniformity in artificial illuminants? Those who have followed Messrs. Hurter & Driffield's "investigations" would have observed that the light they make use of in their "measurements" was the duplex-burner oil lamp. From many years' knowledge and use of oil lamps, I could scarcely go so far as to advocate the use of the duplex as the finality of a standard light, although I have alluded to its use for merely experimental purposes. It is true one can, by great individual care and attention, trim such a lamp as to give a very good, steady light, and one can secure very similar results from day to day, but there is no standardising of such a light without complex arrangements only possible in a good laboratory. To be able to express in numbers, or in other terms having relative values, the degree of sensitiveness of plates to daylight, we need a light whose rays assimilate to those of daylight, otherwise we must make allowances for dissimilarity existing between the true and the artificial when estimating degrees of sensitiveness. The methods enumerated above can never be other than comparative, they are tests only of the sensitiveness of one plate or plates in relation to that of some other plate or plates.

Now, after all, the question is, whether any numerical designation of the general sensitiveness of plates is reliable; and, even if reliable, would it be as desirable as information concerning their colour sensitiveness? Would not "sensitive to D" convey more real meaning than "sensitometer No. 24" now does? I have not overlooked the fact that almost any commercial plate is colour sensitive if you give it exposure enough, the *reductio ad absurdum* of which would be the printing of a transparency on a slow plate through a yellow or red glass. The overpowering predominance of the blue rays usually necessitates so brief an exposure (consequent on the plates being sensitive in their maximum to blue rays) that green and yellow have not sufficient time to operate unless the plates are also sensitive to green and yellow; and it is exactly this latter property we desire so much in our plates, the presence of which nothing but spectroscopic examination will enable us to ascertain. From a commercial point of view there may be reasons why it might be deemed unnecessary to increase the sensitiveness of plates any further towards the red end of the spectrum than is to be found in the plates as manufactured at the present day. But my answer to this is, that not many years ago only one grade of sensitiveness was considered sufficient, whilst, now, there are three grades, if not four! Quite apart from the general question of *rapidity*, there is the question of colour sensitiveness in plates, which has a very important bearing upon the subject of the due relation and correct translation—as correctly as ever photography can translate—colours into monochrome, in order to approach somewhere near the luminosities of those colours common in objects around us, from which we are at present very far off in our methods of translation. A plate which under the spectroscope indicates a maximum of sensitiveness between F and H cannot be expected to yield results in translation equal to those of a plate sensitive between E and G, although the former may have double the exposure of the latter; the latter is, then, the more rapid plate as well as the more colour sensitive, and will find employment in such places and for such purposes as preclude the use of the slower plate.

If we submit strips of several makes of plates to exposure to the spectrum or to the coloured-glass screen in the manners indicated, we get a very good idea of their respective values. Either methods are accurate enough for individual information, and to a manufacturer would, perhaps, be much more satisfactory than the method of testing now employed. The opportunity of exposing half a dozen different makes at one exposure furnishes the means of comparison almost impossible of attainment where plates are subjected to sensitometer examination one by one. The spectroscope enables the manufacturer to test his makes against other makes, but it also tells him from day to day, for a week or more, whether his emulsions keep up their standard, or, indeed, whether they vary in the slightest degree. No other known method will do this.

I have carefully abstained from any allusion to the so-called "orthochromatic," or plates treated with sensitisers, as not falling under the immediate scope of this article. G. F. Williams.

ON THE UTILITY OF MODERN PHOTOGRAPHIC APPARATUS.—II.

In my previous article I dealt more particularly with the type of camera commonly known as "The New Form," and instanced a few of the points in which such instruments are faulty; and, perhaps, in no way more than another does the present new form of camera with tapering bellows fall short of the utility of a good old sensible square-shaped camera than in the unsuitability of the conical bellows camera for adapting it to stereoscopic work. Over and over again we hear and read an appeal for the revival of the stereoscopic picture, and many shining lights in photography from time to time express their surprise that more amateurs do not take to the production of this most natural of all classes of pictures; but is the reason far to seek when we see ninety-nine out of every hundred amateurs or beginners go in for a form of camera which is absolutely useless for the work?

A very little consideration will suffice to show that the introduction of these featherweight abominations has done more to keep stereoscopic photography in the background than anything else, for once a beginner has invested his hard-earned savings of ten or twenty pounds in a photographic outfit he thinks twice before launching out into a fresh outlay for this special class of work; but, in the case of those who at the outset go in for a sensible square camera of half or whole-plate size, the thing is very different, and with the extra cost of fitting such an outfit for stereoscopic work, being merely a nominal addition to the original cost, the attraction is at once given serious consideration to, and most likely adopted. So long as we see nothing but conical shape bellows submitted to the amateur, so long will, in my opinion, stereoscopic work drag in the background.

In my last I referred to the liability of cameras with the rack and pinion adjustment for focussing purposes being very liable to throw the sensitive plate out of focus through the liability of the same getting slack, and, therefore, so easily moved; and since the introduction of the new form of slides (I refer to those which are inserted into the camera by a push forward first and then a short slide into the groove) this mode of focussing is more than ever liable to prove faulty, and cannot at all compare for certainty of action with the good old form of tail-board screw for focussing. Most certainly in cameras no real progress in the way of manufacturing only such as are of a distinct advance, so far as utility is concerned, has been made during the last four years or so. The one great aim and object on the part of nearly every manufacturer seems to have been how light can I make them, until such a point has been reached that utility is entirely sacrificed to portability. But it is not only in cameras that this sort of thing has been practised, the same extends to slides also, and with one or two notable exceptions but little real progress has been made in their style of manufacture.

I quite admit the decided improvements which one of our first-class makers has adopted in the shape of the double-hinge thin slides, and all praise to them for this, but the majority of slides of the present day are very far from being what they should. First and foremost, they are too narrow, and result in numerous broken plates. Then, again, within recent years, instead of the good old *real leather*, which was used for the hinges on the doors, it has become pretty general to use instead an abominable prepared cloth for this purpose, doubtless the motive for this being that a narrower slide can be made with a lighter door, because the leather took up more room than the cloth. But what about the cracking of the surface of this villanous stuff? No sooner does the glazed surface of the cloth get worn by an injudicious drawing out of a shutter when the slide is empty, than the points of the plates spring, and begin to scratch the surface of the cloth; or very likely a slide that is frequently used will stand no time before the user will, some fine morning, waken up and find some lovely straight lines right across his negative, caused by the cracking of the surface of this abominable imitation leather, which in itself is so thin as to be absolutely worthless as a material to be used for the hinges of a dark slide; and, until camera-makers discontinue the use of it, so long will these annoying flaws be met in with. No slide is perfect that is made with such, and any one buying an outfit should see it to be their interest to refuse any such imitation stuff. I know I have had all my slides overhauled, and good, sensible leather placed in lieu of the cloth, and now I never get trouble from this cause, but I meet in with plenty of those who do.

Another drawback to the modern-made slide is the frightful stuff that most makers now use for blackening the woodwork of the inside of the doors and tins. Almost every new outfit ruins a sensitive plate, provided it be placed in the cells for any length of time, and with one maker in particular this defect is most marked. Over and over again this matter has been spoken about and ventilated in the photographic press; but the nuisance still exists, and so it will continue until such time as amateurs especially insist on being supplied with such slides and cameras as are blackened only with such preparations as do not injure a sensitive plate. In some respects our friends across the pond are a long way ahead of us, and this seems to be one of them. It has often struck me that but little progress has been made in the way of adopting to dark slides some simple little method of ascertaining when a plate has been exposed, and any one who can invent a real

simple, fair and square arrangement for such, would do a good stroke of business, at the same time be a benefactor to the photographic world at large.

It is, however, in the modern tripod, perhaps, more than any other portion of the photographic outfit, that we find utility entirely sacrificed for portability; so much so, indeed, that ere long I shall not be surprised to find that some enterprising fellow has actually produced a tripod to go into the coat, if not the waistcoat pocket, for the stage of packing the tripod into the camera case has been reached long ago. And, after all, what is the use of these daddy longlegs? Why, nothing but to spoil plates through vibration of the camera during exposure. From time to time, all down through the past at intervals, we have had to listen to various arguments from known writers as to this or that being the best form of tripod, and, doubtless, some well-known workers argue that for some classes of work, such as interiors, a set of legs that will permit of one or more being shortened is an absolute necessity to a photographer's kit; but I quite disapprove of this. In my opinion, a tripod should have no joints or folding or sliding portions at all, and I dare say, in my experience, I have met in with every kind of indoor and outdoor work that ever falls to the lot of a worker, and I never yet met in with a case where it was not possible to use the straight sticks. No, the good old form of tripod, made forty years ago, is still the best, and all the modern slipping and folding trash should be gathered together into one vast monument of folly, and burned; and wouldn't it make a "bonny bleeze?"

We hear so much from time to time about the bother of carrying an unfolding tripod; but this is only ignorance, and I can safely assert that such never emanates from those who know the enormous advantages a good professional tripod affords. Why, as to bother of carrying, I wonder if it takes up more room than a salmon-rod? There is only one form of tripod, and that is six good straight sticks, three of them slightly shorter than the rest, which are hinged to the longer ones about three inches at the bottom, and no tripod ought to have less than a nine-inch top of metal. With such, any camera, from a 15 × 12 down to a quarter-plate, can be used, and no vibration; in fact, you can climb on the top and sit on it yourself if you want. My boy often does on mine, and more—when on tour with a camera my tripod was made to do duty as a ladder, to climb to the top of the caravan when we wanted anything from aloft. And such is not a heavy, cumbersome article either, and is as easily carried as a fishing-rod; and, further, when climbing a steep side to a gully or face of a mountain, it comes in jolly handy as a good alpenstock, or a handy tool to ward off a violent bullock. In my time I have seen a good deal of fnn over a refractory daddy-longlegs. I remember once, when at the seaside, seeing just about as comical a little scene as I ever witnessed. A gentleman had carefully rigged up his camera, and was waiting till his opportunity arrived for a snapshot at some sailing boats. This necessitated the legs of the camera being placed in the water for some time, and when the time came round to pack up again he did not find it an easy matter to get that blooming tripod back into its original bulk, and I guess he never will; for, after pushing and hammering till he was tired, and, doubtless, feeling chagrined at my presence laughing at him, he lost his temper, and soon made short work of the thing by smashing the whole thing over his knee, and leaving it there. I guess he uses straight sticks now.

I hope soon to have something to say about shutters.

T. N. Armstrong.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

We have already stated that Mr. H. P. Robinson was to be requested to act as the president of the Convention for next year. Mr. Robinson, however, having declined the office, Mr. George Davison, Hon. Secretary of the Camera Club, has been elected instead. The Edinburgh meeting will therefore take place under the presidency of Mr. Davison, Mr. F. P. Cembrano being Hon. Secretary.

Our Editorial Table.

The Pocket Changing Bag.

Mr. W. R. Baker, Wallington, Surrey, has just brought out a very handy changing bag, so small as to warrant the name selected for it, and yet sufficiently roomy to enable plates up to 8 × 5 to be readily transferred from package to slides, and *vice versâ*. It is formed of red-coloured fabric with sleeves, which are light-tight. There is an aperture, through which the eyes can see the interior quite plainly, and this without light penetrating to the interior. It is fastened to the head by a rubber band, and can be instantly detached by the user.

The "Lightning" Stand.

Messrs. Adams & Co., Charing Cross-road and Aldersgate, have devised a stand to which, from the lightning-like rapidity with which it can be opened, they have given the above name. The principle of

construction differs from others in respect, first, that the legs are formed of two flat strips, hinged at the edge, so as when opened to be L-shaped, thus ensuring firmness; and secondly, that when folded up, as shown in the cut, it is only necessary to grasp the head, and give it a circular shake, to insure its immediately flying open, with all its joints quite rigid.

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in Photographic Cameras.

No. 13,055. Louis Aubrey Franks, 95 and 97, Deansgate, Manchester, Lancashire.—*June* 27, 1891.

This invention relates principally to that class of portable camera known as "detectives," and consists of a simple arrangement of mechanism for giving either an instantaneous or a "time" exposure.

The shutter, which opens or closes the lens aperture, is made of a plate of metal in the form of a lever, with an elongated head.

This head is provided with a blank part at each end for covering the lens aperture, and a central opening for the exposure, and it works in a slot in a metallic guide attached to the front of the camera close to the lens opening, so as to keep it steady and light-tight.

The lever works upon a central screw, and its tail end is provided with a spring, which has a constant tendency to draw the shutter over the lens aperture.

To the side of the camera, near the front edge thereof, I fix a catch, made of a piece of spring wire, bent so as to form two catches, which just project beyond the front edge.

For a "time" exposure the tail end of the shutter is drawn down until it is held by the top catch, which opens the lens to the full aperture, and after the plate has been exposed long enough the catch is drawn back, and the spring causes the shutter to be closed by the upper blank.

For an instantaneous exposure the tail end of the shutter is drawn down until it is held by the lower catch, which causes the lower blank to close the opening.

On drawing back the catch, the central opening is flashed past the lens aperture, and the instantaneous exposure thus given.

Improvements in Frames for Photographs.

No. 13,395. Henry William Taunt, 9 and 10, Broad-street, Oxford.—*June* 27, 1891.

My invention consists of a new method of making a frame by means of an architectural, landscape, or marine photograph, or photograph by any mechanical process, or combination of any of them, cemented or contact mounted to a glass as an opaline, from which photograph one or more pieces are removed, so as to allow of the exhibition of another photograph or photographs, or of printed matter, as menu cards, almanacks, presentation cards, engravings of every kind, lithographs, and process block prints.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that

what I claim is :—The making of a frame by means of an architectural landscape, or marine photograph, or photograph made by any mechanical process, or a combination of any of them, cemented or contact mounted to a glass as an opaline, from which photograph or photographs one or more pieces are removed, so as to allow of the exhibition of another photograph or photographs, or of any printed matter.

An Improved Method of Producing Photographic Vignettes, and an Appliance to be Used Therefor.

No. 13,455. Arthur George Palmer, Orchard House, Grange-road, Smallheath, Warwickshire.—*June* 27, 1891.

This invention consists, firstly, in an improved method of producing photographic vignettes, and, secondly, in an appliance to be used therefor.

The ordinary well-known method of printing a vignette from a photographic negative is to employ a cardboard or other mask above the negative in the printing frame, which prevents the light acting upon the margin of the positive underneath, this mask having an oval or other shaped aperture of about the size of the photograph required. During the printing process the position of the mask has to be varied several times, so as to soften off the photograph and to produce a graduated shadow.

By my invention I am enabled to produce a negative vignette directly on to the sensitive film whilst the same is being exposed in the camera, so that a mask for obscuring the margin of the negative whilst printing therefrom and for softening off the positive underneath is not required, thus enabling vignette photographs to be produced with much less skill and labour than heretofore.

I obtain the said negative vignette as follows :—I employ a vignette mask of wood, thick cardboard, glass, or other suitable substance of about the size of the sensitised plate or film, having an oval or other shaped aperture corresponding with the photograph required. The said oval or other shaped aperture is by preference rounded or bevelled off on one side of the mask. This side of the mask is covered with phosphorescent or luminous paint or powder or other substance which will absorb light and be luminous in the dark. This luminous mask is placed in the dark slide with the sensitised plate or film so that the light emitted from the mask will obscure the margin of the negative around the photograph, and by the edges of the aperture being bevelled or rounded off as above described a softly graduated negative vignette is produced.

The said mask should be covered with a piece of brown paper or other opaque material until it has been placed on the sensitised plate or film in the dark slide, to prevent the central part of the plate or film being clouded by the light from the mask. This opaque material can then be removed, and the plate or film is ready for exposure in the camera.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 4	North London	Wellington Hall, Islington, N.
,, 4	Holmfirth	
,, 4	Sutton	Sutton Scientific Society's Rooms.
,, 4	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 5	Coventry and Midland	The Dispensary, Coventry.
,, 5	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 6	Leeds	Leeds Mechanics' Institute.
,, 6	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 7	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 7	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

July 28.—Technical meeting.—Mr. H. Chapman Jones in the chair.

The subject announced for the evening was *Photographic Optics and Perspective*, and on the invitation of the Chairman Mr. W. E. Debenham said that he had recently expressed his views on the subject, and they were to the effect that photographic perspective, so far as form went, was the same as mathematical perspective, and was true. As for aerial perspective, it had been said that the special beauty of English landscape painting was due to a certain amount of haze generally present in our atmosphere, which helped to mark out the separation of objects at different distances. The tendency of photography was not to omit, but rather to exaggerate this kind of obscuration by failing to render with true gradation the shades of difference in the lights forming the distant image. There was, however, a beauty in the clearness with which distant objects could be seen in a clear atmosphere, as well as in the haziness which characterised distance where the air was not so clear, and the more accurately photography could be made to register both effects the better. With regard to Messrs. Emerson and Goodall's recently expressed views, he could only repeat what he had said elsewhere, that he thought there was no ground for their assumption that the two halves of the eye, the upper and lower, saw objects of different sizes. If, however, their proposition was true, as the same eyes were used to look at the picture as at Nature, the lower and upper parts of a picture in mathematical perspective would be affected in the same way as the objects in the natural scene, and, therefore, the mathematical perspective would still be, and appear to be, the true perspective. If any one stated that photographic or mathematical perspective made foreground objects appear too large, and that to be a true representation they ought to be drawn smaller than they come out in a photograph, he should like to see a complete system of perspective worked out on that assumption. To do this it would be necessary to show, not a single foreground object made smaller, but a complete circle of foreground objects at an equal distance around the point of sight. How could any one of these be made smaller without making some one or other larger than they would come in the photograph? Artists and draughtsmen had, he thought, been too much limited by conventions. One of these conventions was not to make a perspective view including more than about 60°. If, therefore, an interior had to be shown, as such a limitation would allow only a small portion of the building to be included, it had been the custom to draw the lines as they would appear if the end of the building were removed and the interior viewed from a greater distance. Here, however, the draughtsman would be obliged, in order to give a true representation of what would be seen at the given distance, to omit some objects actually seen in the interior, and to include others that could not be seen from the standpoint in the building at which the drawing might have to be actually made. Photography was breaking down these conventions as it had done others. Photographic perspective was true perspective.

The Chairman thought the expression "photographic perspective" was not a good one, unless defined.

Mr. Debenham added that by photographic perspective he meant such a representation as was given on a vertical plate by a non-distorting lens or a pinhole.

Mr. T. R. Dallmeyer thought that Mr. Debenham had totally mistaken the ideas of Messrs. Emerson and Goodall. He could not say, however, that he was altogether with them. He then drew a diagram on the blackboard, showing two eyes and the duplicate, laterally, of an image not at the point of crossing of the optic axes. All interested in the sensuous impression produced by vision should study Helmholtz and Meissner. At present he did not understand these sensuous impressions. He could produce all the effects set forth by Emerson and Goodall except one. He found that pillars, to look vertical, should not be built inclined inwards at the top, as stated by them, but the other way. If it was intended that they should look upright, they were built out at the top, the reverse of Emerson and Goodall's proposition. There were four kinds of perspective. First, the aerial; and here Mr. Debenham rather made a mistake as to the effect of photography. There was the perspective of light and shade, by which the roundness of a tower could be recognised. Then there was mathematical perspective, and he thought artists ignored too much what they owed to it. He had seen in a paper against Emerson the example quoted of a lamp-post, which, coming in front of a view of St. Paul's, appeared too large. An artist who had to sketch such a view would say, "I won't fix my standpoint here, where the lamp-post comes so large in proportion; but will draw the whole subject as it would be seen from a greater distance, where the lamp-post would assume a more natural proportion. It was to be deplored that photography could not do this.

Mr. G. L. Addenbrooke said that an artist would select a point of sight at such a distance as he thought best to avoid exaggerating near objects, and, if the surrounding did not enable him to do that when actually making his drawing, he would, by the rules of perspective, make his lines in the desired direction.

Mr. Debenham drew on the blackboard plan and sections of a building, showing certain objects that could be seen from the the farthest possible standpoint of the camera and the spectator, and showing that when the draughtsman's imaginary distant standpoint was selected some objects not visible in the one case would be visible in the other, and *vice versâ*. Could that be a true drawing which showed objects that would not be visible with the distant perspective assumed for the direction of the lines? and how, with the distant perspective assumed, could objects that would, with such perspective, come into view, be introduced into the picture when, from the actual standpoint from which the drawing had to be made, they were invisible?

Mr. Dallmeyer said that the artist would make two or three drawings from different points of sight and combine them.

Mr. Debenham replied that not two or three, but a great number of different points of sight would be necessary in order for this to be truly done. The fact was, however, that this convention of artists of limiting the perspective angle was yielding to the instructive influence of photography as other conventions had done. As an illustration of that statement there was in that day's *Daily Graphic* an interior view of Westminster Abbey, in which the pillars and roof near at hand were represented in a way that would probably not have been done thirty or forty years ago. We had been so much accustomed to see pictorial representations of limited angular perspective that wide-angle photographs were said to exaggerate foreground objects. People judge of the truthfulness of representations not so much by comparison with the actual scene, as with other representations of the kind to which they had been accustomed. As to the introduction of the question of binocular vision, he thought that only tended to confuse matters. Messrs. Emerson and Goodall had set out by denouncing the accepted laws of monocular perspective, and it was sufficient to reply to their argument on that line. Binocular vision did not affect height magnitude, and lateral duplication was as much on one side as the other.

Mr. A. Cowen could not agree that it could be right to alter the direction of lines to indicate a certain distance without altering the drawing to include such parts of the subject as would come into view at the distance, and how could that be done when the artist from the only accessible standpoint would not be able to see them?

Mr. Dallmeyer said that from where he sat the heads of two of the members, one very near and the other at some distance, came of very different sizes, and if photographed from there with a short-focussed lens would appear very disproportionate in size.

The Chairman said that that raised the question of the physiological effect of our knowledge of size as distinct from the size due to perspective.

Mr. Dallmeyer said that he should like to insist upon the effect of short-focus lenses in giving violent perspective.

Mr. Debenham maintained the length of focus of the lens had absolutely nothing to do with it. It was the selection of the standpoint that settled the perspective.

Mr. W. Bedford would say that if, as Mr. Dallmeyer contended, photography lost anything from not being able to paint a picture from an impossible point of view, that would be a very doubtful advantage. He quite agreed with Mr. Debenham that photography had broken down many conventions. Painters like Prout and David Roberts, however, had not submitted to these conventions, but given true representations of pictures painted from possible points of view. It would be absurd to paint a picture of a cathedral, and

show as much of the subject as was required to give a general idea of it, bnt of such proportions as could only be seen from an impossible point of sight.

Mr. E. CLIFTON said that he was acquainted with an artist who had only one eye, and he was the bitterest opponent of photographic perspective that he had met.

Mr. BEDFORD said that in illustration of the effect of photography on artists' work the drawings of mountain scenery by Turner, beautiful as they were, were not such as would now be made. He agreed with Mr. Debenham as to the marked change which photography had brought about.

Mr. J. G. Hudson showed a continuous flash magnesium lamp, and took a photograph of the Chairman by its aid.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 23,—Mr. J. Traill Taylor in the chair.

Mr. W. E. DEBENHAM distributed samples (for experimental purposes), of caramel to members who had desired to use it in plate backing, but some of whom had found the commercial article inconveniently tacky. It was explained that this probably arose from its being manufactured from uncrystallisable sugar. The present sample was made from ordinary lump sugar.

Mr. A. HADDON said that the question had been raised at a former meeting of the solubility of caramel in alcohol. When sugar was subjected to high temperature, three substances were formed—caramelaine, which was soluble in alcohol of eighty-four per cent.; caramelene, soluble only in weak alcohol; and caramelin, which was not soluble in any known liquid. Caramel was best produced at a temperature of about 210° centigrade. Over 220° it would char and be useless.

The Chairman then called upon Mr. B. J. EDWARDS to continue the adjourned discussion on orthochromatic photography, and he read a paper [see p. 487]. With regard to colour screens, he said it was at present not possible to find glass of a suitable colour. The best procurable was, as stated, a sort of brown orange (which, however pale the tint, was still the same colour), which, when deep enough to sufficiently lower the blue, also obstructed a good deal of yellow. It was possible to stain collodion the right colour, but he had a great objection to collodion as a colour screen on account of its structure. He found, however, that gelatine, stained with a certain yellow die, answered perfectly.

Mr. DEBENHAM thought that a great deal too much was made of Tailfer in Mr. Edwards's paper. This was, perhaps, natural in the present holder of Tailfer's patent. It was not the time and place to discuss whether the patent was valid or not, from want of sufficient description or other reasons; but it might be inferred from the paper that eosine and erythrosine could not be used except subject to the patent. Now Tailfer, in his specification, expressly says that eosine has no effect in gelatine emulsion except in conjunction with ammonia, and it is this combination that he claims. It had been found, however, by many experimentalists that eosine was quite effective without ammonia when mixed with the emulsion itself, although as to the necessity for ammonia when the bath process was employed opinions were divided. Tailfer did not discover the orthochromatic properties of eosine, but only discovered, or thought he discovered, the necessity for using ammonia with it—a necessity which did not exist with the direct process of manufactnring emulsion.

Mr. EDWARDS said that he had not attempted to widen Tailfer's claim. He should pity any plate maker who attempted to work the process commercially without ammonia. As to plates prepared with cyanine, they would not keep. He believed that a cyanine plate was not the same one hour after preparation as it was when fresh. With regard to the validity of the patent, that was not for Mr. Debenham to decide, it was a question which could only be decided in the law courts. One thing was certain. We had not purchased the patent without first obtaining the highest opinions as to its validity, and it was pretty well known that we were ready to fight it if need be. As to insufficient description, he could only say that he and many others had found no difficulty, provided Mr. Tailfer's instructions were strictly followed. The reason that some failed was probably because they did not follow the instructions, or because they used an impure sample of eosine, which was not fit for the purpose. It was essential that the eosine or erythrosine be pure and not contaminated.

Mr. W. BEDFORD said that as to the historical aspect of the case Mr. Edwards had complained that Tailfer had not received the gratitude due to him. Tailfer had chosen his reward by taking a patent. He thought that Mr. Bird's lecture had opened the eyes somewhat as to the value of orthochromatic processes, and as to Dixon and Grey he thought Mr. Edwards ought to be rather grateful to them than otherwise for directing attention to the improvement that orthochromatising effected when paintings were to be copied. He was one of those who were early experimenting with eosine, but with all the kinds that he could obtain from the first chemical houses he could get no result till Mr. Edwards furnished him with a sample of the blue shade of eosine, although Mr. Spiller had said that there was no difficulty in getting pure eosine, and that his firm made it by the ton. The tetra-iodide of fluoreosine was the kind that had proved to be effective; and any one purchasing that article would probably get the right thing. He should like the discussion to have taken a wider scope, and to have dealt with other orthochromatising agents. Mr. Edwards had given no credit to Vogel. Bothamley, too, had written very usefully on the subject.

Mr. AUSTIN EDWARDS said that he could not understand why there seemed so much anxiety on the part of some of the members of the photographic world to take the credit of Tailfer's invention from him, and give it to some one else. The bitterest opponents of the isochromatic patents had never been able to suggest any one, except Colonel Waterhouse, as having even *experimented* with eosine and gelatine before the date of Tailfer's application in 1883 (after the process was actually completed). So, when Waterhouse's generous letter to THE BRITISH JOURNAL OF PHOTOGRAPHY of February 25, 1884, was published, one might have expected that the mistake would have been rectified. Not so, however. If Colonel Waterhouse would not take the credit which was not his due, then some one—any one—else must be found who would, and since there was no one prior to Tailfer, it was offered in turns—a sort of "giant's robe"—to any one who cared to claim it. However, every one who had followed the progress of isochromatic photography from the beginning knew that the process published by Tailfer in 1883 was the only successful one to this day, and that most of those that had "written usefully" on the subject since had simply annexed that process, or parts of it, and passed it on as their own. This was matter of history, and did not admit of discussion; but it seemed strange that any one who knew the facts of the case should still persist in ignoring the one man who not only saw the shortcomings of the old process, and worked out the more perfect one; but who did so ten years ago, and whose only misfortune was that he was five or six years too soon. At the present time eosine in conjunction with an alkali as described by Tailfer was the only substance known which would produce colour-sensitive plates as *quick* and good in other ways as the best that could be made by the old methods used for making ordinary plates and more. It was also a fact that to obtain the best results it was necessary to form the eosinated bromide of silver in the exact manner described by Tailfer. Yet we are told that because he (Tailfer) claimed the protection which the laws of our country offer him for a few years, in consideration of his invention becoming common property at the expiration of that time, that, therefore, he having "chosen his reward" is not even entitled to justice, and that it is allowable for any one to come forward and appropriate the fruits of the work of his brain. Whether the argument is intended to apply to others who have claimed protection for their inventions, Dr. Vogel, for instance, who some time later patented his system of optically sensitising by means of dyes, or only to Mr. Tailfer, seems open to question, but in any case it seems most unfair and un-English treatment.

Mr. BEDFORD did not wish to discredit Tailfer. He was in sympathy with Mr. Edwards with regard to the insinuations that had been made as to the genuineness of the examples shown of the effect of orthochromatic plates without a screen.

Mr. EDWARDS said that the Chairman could bear witness as to the genuineness of an example of flowers in a vase now shown, as he was present when the negative was taken.

The CHAIRMAN said that it was so.

Mr. AUSTIN EDWARDS said that he would like to thank Mr. Bedford for his expression of sympathy. It was true that some people had implied, if not definitely stated, that the results shown had been "dodged," and this although it was easy for any one who liked to purchase a box of "medium" isochromatic plates and a bunch of yellow and blue, or violet flowers (say, pansies and calceolarias), to get equally startling results as those we show at the first attempt, and without using a yellow screen.

Mr. A. COWEN thought that Dixon & Green had done for orthochromatic photography what Lambert had done for carbon printing—put the result before people's eyes in a way that made its advantages recognised.

Mr. A. HADDON read the report of the delegates from the Convention at Bath [see p. 488], which was received with much interest.

Messrs. G. E. Clarke and J. Barker were elected members.

HACKNEY PHOTOGRAPHIC SOCIETY.

JULY 23,—Dr. Roland Smith in the chair.

The paper and demonstration for the evening was on *Intensification of Silver Paper* by the Assistant Secretary. Prints were handed round showing the different colours obtainable by the process introduced by Mr. Lyonel Clark.

Saturday, July 25. A pleasant afternoon was spent at Hampton Court.

RICHMOND CAMERA CLUB.

JULY 24,—Mr. Ardaseer in the chair.

Mr. Richardson showed a xylonite developing dish, and the Chairman Adams' lantern slide printing-frame.

The subject for discussion was *Dark Rooms*. Mr. Garrett described the Davenport Portable Dark Room; Mr. Cembrano a travelling dark room of black material, and like a mosquito net; Mr. Ramsay an iron building by Boulton & Paul; Mr. Froine an old third-class railway carriage, which he had converted into a dark room and workshop. Other members described makeshifts for the purpose, and the Chairman gave a short account of his adaptation of a wooden shed at the side of his house.

The Burnham Beeches outing was altered to one to Virginia Water, which duly came off on Saturday, and an enjoyable afternoon was spent by the three trippers.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JULY 23,—Mr. W. Jerome Harrison, F.G.S., in the chair.

The Hon. Secretary brought before the meeting Mr. W. T. Stead's "magic lantern mission."

The Hon. Secretary of the Excursion Committee (Mr. J. T. Mousley) read reports of excursions to Compton Winyates, Tamworth, Lapworth, and Packwood, which were well attended.

The question was asked what is the cause of black spots forming on films.

The CHAIRMAN thought it might arise from either undissolved pyro or from town water.

The CHAIRMAN announced the business of the evening—the exhibition of photo-survey prints of the county of Warwick. He hoped all would contribute to the survey and help, if only a little. They were working on the six-inch ordinance map, and should require an average of about fifteen to twenty-five prints from each member of the section. He regretted the weather had so far been so unsuitable, but was glad to see so many prints brought forward, particularly as this was only, as it were, a preliminary exhibition in the middle of the season.

The following gentlemen, amongst others, showed pictures taken by them, and gave explanations and short accounts of the places photographed:—Mr. J. T. Mousley, of Maxtoke Priory; Mr. J. Simkins, of Seccington, Newton Regis, &c.; Mr. T. Taylor, of Leake Wootten; Mr. E. Underwood, of Baddesley Clinton; Mr. A. J. Leeson, of Aston Hall, Fillongley, Corley, &c.; Mr. G. A. Thomason, of Packwood, &c.; the Chairman, who had a very fine collection of prints, of Rowington, Tamworth, Lapworth, Temple Balsall, Coleshill, Knowle, Maxtoke Priory, Compton Winyates, besides examples of the different means of present-day locomotion, street scenes, &c.

The Secretary called attention to the half-day's excursion to Arley and Fillongley on August 8, and exhibited and distributed samples of "Powell's pyro developoids."

PRESTON CAMERA CLUB.

A SOCIETY, under the above name, has been formed for the purpose of bringing together those interested in the art-science of photography. A temporary committee has been appointed to draw up rules, which will be submitted at a meeting to be held at an early date, when members may be enrolled.

BATH PHOTOGRAPHIC SOCIETY.

ON Wednesday, the 22nd inst., the members of the above Society paid a second visit to those well-known and picturesque grounds at Prior Park. The Society is fortunate in having as an active member the President of the College, Canon Williams, and this gentleman, who is an accomplished photographer, takes a good deal of interest in matters pertaining to the art the Society promotes. The day was unfavourable for an outing, but occasional outbursts of sunshine facilitated the work of the party, and it seems that more pictures were obtained than during the visit of the Photographic Convention to the same place. At five o'clock tea was served in the mansion, and after a *recherché* repast and an agreeable chat the party took leave of their hospitable host and returned to the city.

Correspondence.

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

THE VALUE OF COLOURED SCREENS.

To the EDITOR.

SIR,—I have carefully re-read Mr. W. B. Bolton's article on "Orthochromatic Plates and the Coloured Screen," published in your issue of the 10th inst., and still consider that the paragraph to which I referred in my letter in your issue of the 17th inst. is calculated to mislead, immediately preceded, as it is, by his remarks as to the preponderating influence of the blue rays in orthochromatic plates. If Mr. Bolton had intended his remarks anent the screen to apply only to ordinary plates, I quite agree with him; but it is a pity he did not make that clear.

When I spoke of pure yellow, I merely intended to exclude the greenish and orange-tinted media that frequently pass under the name of yellow I am afraid that a discussion as to how much I do or do not know about "the theory of the colour question" would not interest your readers, but, in answer to what Mr. Bolton is pleased to call my "unfortunate reference to the development of an ordinary plate by yellow light," I distinctly assert that, with a little care, it is quite possible to successfully develop a fairly rapid, ordinary, gelatine plate by yellow light—there is, however, no such thing as a *safe* light, it is merely a question of how much light the plate will bear; thus, quite a slow, ordinary plate can be fogged by *freely* exposing it to even *ruby* light.

It may interest Mr. Bolton to know that I have not "seen reason to renounce any of the doctrines I have so strenuously preached," and that my later experiments have fully confirmed my previous opinions, which are diametrically opposed to Mr. Bolton's, so far as the necessity for using a screen in all cases is concerned.

I regret that I have left Mr. Bolton in the state of fog he appears throughout his letter to be floundering in. He seems to have got badly mixed over the spectrum. I did not mention it in my letter, and never have considered it a satisfactory test of the colour sensitiveness of plates. Most of my experiments have been made by photographing natural objects, such as flowers, foliage, &c.

Doubtless Mr. Bolton speaks truly when he says that he has much to learn about orthochromatic plates and yellow screens; his article on the subject certainly gave me that impression.—I am, yours, &c.,

July 27, 1891. BIRT ACRES.

DEODORISING ALBUMEN PAPER.

To the EDITOR.

SIR,—The following method will be found a useful and simple means of removing the bad smell from the sensitised paper when printing. I have a square box to place the paper in when cut to the required size. At the bottom of the box is a partition of wire netting. Under this wire netting is placed two ounces of coffee-beans, which have been ground and placed in a very hot oven for five minutes. The paper is placed in the box, and is kept separate from the coffee by the wire netting, and in one hour, if the paper has been separated as much as possible to let the fumes rising from the coffee get well mixed with the paper, all smell of the albumen will have vanished. Let the coffee cool before placing in the box.—I am, yours, &c. J. H. AINLEY.

426, *London-road, Sheffield.*

EXAMINING PHOTOGRAPHS.

To the EDITOR.

SIR,—While looking, a few days ago, at a photograph of rather flat appearance, it occurred to me to close one eye. After looking steadily thus for a few seconds, a beautiful transformation took place, the long avenue of trees stretched out before me and the figures and other objects stood out in perfect stereoscopic distinctness. Being rather surprised with this, I examined portraits under the same conditions, and found they were similarly improved by one-eyed inspection, especially those with elaobrate backgrounds, the figures in these standing out as perfectly as if a stereoscope were used. Now, I don't profess to have made an original discovery, and yet I have never heard of the above fact; I think it is probable there are a great many people, as ignorant of the fact as I was, who would thank you for the trouble of telling them.—I am, yours, &c.,

CYCLOPS.

[This principle of monocular vision has long been known and utilised in the examination of pictures.—ED.]

THE VIENNA EXHIBITION.

To the EDITOR.

SIR,—Kindly allow me to state that Mr. W. K. Burton's picture, although it arrived too late, was put before the jury and was accepted. It only could not be mentioned any more like several others, in the first edition of the catalogue.—I am, yours, &c., CHARLES WINKEWANCKY.

P.S.—This was also the drift of the German report in the *Hologr. Correspondenz*, from which the translation was made but not quite correctly.

GLASGOW INTERNATIONAL PHOTOGRAPHIC EXHIBITION, 1891.

To the EDITOR.

SIR,—The special judges in the Photo-mechanical Section will be Mr. Robert Blackie, of Messrs. Blackie & Son, Limited, and Mr. W. B. Blaikie, of Messrs. T. & A. Constable.

We have been very fortunate in securing the services of these gentlemen, who, in their connexion with these large publishing firms, have acquired a very thorough knowledge of photo-mechanical methods of illustration. Mr. Blackie is also widely known as a highly competent art critic.

There is every indication that this section will be both large and interesting.—I am, yours, &c. WM. GOODWIN, *Hon. Sec.*

Exchange Column.

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

Exchange 14 inch burnisher for half- or whole-plate out-door camera.—Address, MORRIS, 104, Lower Audley-street, Blackburn.

1890 Sunbeam safety; balls all over, including head; list price about 19*l.*, for good half-plate double extension set.—Address, F. PRINGLE, 36, Arundel-square, N.

Owner would exchange a Griffith's guinea hand camera, and an Underwood's half-plate rapid landscape lens, for a whole-plate rapid rectilinear lens.—Address, O. SANSOME, 4, South Beach, Blackpool.

Will exchange valuable St. Bernard by Lord Bute, dam Bess, by bitch Plinlimmon, for 12×10 light-pattern camera, whole-plate enlarging lantern, or Dallmeyer's 3 B lens.—Address, J. ASTON, Brigg, Whitby.

Portable bellows camera for plates 7½×7½, slide, stand, and a lot of sundries; will exchange for Lancaster's International or Instantograph half-plate camera and slide.—Address, F. ELLINGWORTH, Northgate Cottage, Oakham.

Will exchange superior 12×10 burnisher, cost 4*l*., little used, also very effective background (in flatted oils), for quarter-plate detective, or cabinet rolling press, in perfect order.—Address, ALFRED D. CLARKE, Pailton, Rugby.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

W. P. ARNOT.—The address is Clifton-villa, Ilfracombe.

CAMERA.—The best lens for geueral work with a 12×10 camera will be one of the "rapid" type.

F. WILLIAMS.—Not that we are aware of. But any work devoted to the subject with other processes will answer every purpose.

G. B., JUN.—You do uot send the man's name and address. Send us these without delay, that his name may be added to the black list. Then we may possibly publish your letter by way of a caution.

A. ADDLESHAW.—Your difficulty in getting anything but foggy negatives in your detective camera no doubt arises from the cause suggested in our last issue. Examine the inside of the camera for reflected light and the lens for cleanliness.

R. E. PAINE.—As a rule, coal-tar colours are not kept at photographic warehouses. They may, however, be obtained from most of the dealers in dyers' requisites. You had better get a manual on dyeing, as the different methods of producing colours on fabrics do not come within the scope of photography.

W. C. B. complains that in dissolving shellac—both the orange and the bleached—he cannot get the whole to dissolve, although he uses the best methylated spirit, and asks the cause. Shellac is not wholly soluble in alcohol, hence there is always a portion left undissolved. This may be separated by allowing it to subside, or by filtration.

LIGHT.—Unless we knew the particular defect in your vision we could not advise as to the kind of spectacles you require. Your best way will be to go to one of the London ophthalmic hospitals and get your eyes examined, at the same time stating your avocation. This will be worth doing, as eyesight is invaluable, and unsitable spectacles often are a sad injury to it.

PRINTER.—The yellowness of the print is due to imperfect fixation. A bath of less than two ounces of hyposulphite of soda is not sufficiently strong to fix prints properly in a quarter of an hour. The fixing bath should not be of less strength than four or five ounces of hypo to the pint of water to render the prints permanent. The weak bath is the cause of the imperfect fixation.

LONDON, E.—We have an idea that certificates gained at public competitions weigh very little with professional photographers when engaging assistants. Employers go more upon the capability of the man in actual practice than what he knows theoretically—that is, they require practical workers rather than theorists. Of course, when practice and theory go together so much the better for all parties.

JOHN WILLIAM DAWSON writes: "1. I am desirous of trying the receipt as given by Professor E. Stebbing (Paris) on page 670 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, but cannot obtain any malachite green, or obtain any information respecting it. I should be greatly obliged if you could give me the address at which I could obtain some. 2. I should also like to know if the plates treated as mentioned are at all impaired as to their keeping qualities."—1. We imagine that there would be no difficulty in obtaining malachite green from any dealer in dyers' materials. It can certainly be obtained in small quantities from Messrs. Hopkins & Williams, Cross-street, Hatton-garden, W.C., or from Barnes, Long Acre. Wholesale from Brook, Simpson, & Spiller. 2. We have had no prolonged experience of the keeping qualities of the plates.

DRYING BOX.—1. Drying boxes are not articles of commerce. Those who employ them usually design their own according to their requirements, and get them constructed by the local carpenter. 2. The principal part, if not all, of the Government photography is done by the military—the Royal Engineers. So far as we know, civilians are not employed at all, except, perhaps, occasionally for casual work.

X. Y. Z. (Doncaster).—The great fault is that the painting was not judiciously lighted when it was copied. It must be borne in mind that orthochromatic plates and a colour screen will not do everything. The picture must be properly illuminated or a good copy will not be obtained. The only advice we can give is to arrange the picture and the light so that all the details—free from reflections—can be seen on the ground glass of the camera.

W. A. HALL.—There is no successful method of restoring faded paper photographs. The yellowness can be taken out by immersing them in a weak solution of bichloride of mercury. By this treatment no lost detail is restored, yet from the yellow tint being removed the print looks brighter and is rendered better adapted for copying. Photographs after being treated with the mercurial salt appear to be permanent, inasmuch as some we have by us, restored twenty-five years ago, have undergone no change.

OUR BUTTERFLY ILLUSTRATION.

WE are pleased to be able to present with this number a page illustration showing the value of colour-correct plates. Mr. Julius F. Sachse recently read a paper before the Photographic Society of Philadelphia entitled *A Suggestion for a Possible Method of Identifying the Colours Photographed*, which he illustrated by entomological and ornithological subjects, selected with reference to the brilliancy of the colours and the difficulties which they presented to the photographer. His suggestion was simply to photograph a colour key along with the subject which shall explain itself. He says, "The colour key was formed of a plain white card, upon which were fastened pieces of tissue paper matching in colour the hues of the moths; two of the shades, the bright blue and the red orange, I unfortunately was not able to match exactly from the resources at my disposal as well as they might have been. However, crude as this experiment is, the result will prove the correctness of the principle as suggested. With the use of a colour screen or light filterer much better results can be obtained, which I trust to show you at a future meeting. Still you will perceive that the four colours can be easily identified in the subjects. The plates used were the regular Carbutt Orthochromatic, Sens. 23. I will also state that plates of the same emulsion, but not orthochromatised, did not prove successful.

"The question may be asked, Of what practical value or extended use is this colour key? In reply I will state first, from a scientific point of view, that any process of reproduction by which the natural colours can be deciphered, or even approximated, must prove of the greatest value. This is especially true in the department of entomology and ornithology. Further, the absolute truthfulness of the photographic processes is far in advance of the laborious and expensive hand productions which are now used in the study of scientific matters. In addition, our present illustrations too often carry with them the individuality or imagination of the artist, to the detriment of nature, notwithstanding the great care taken by scientists to obtain the pictures true to nature. Then we have the great search power of the camera, with, perhaps, its greatest possibilities yet undeveloped, showing the structure of insect life with a fidelity to nature in its most minute parts, unequalled by any other process, which is now supplemented by the simple process brought to your notice this evening, foreshadowing the possibility of distinguishing the various shades of colour in the original."

MR. SHAPOOR N. BHEDWAR, in leaving this country for his native India, writes desiring us to thank his friends for the many courtesies and acts of kindness he has experienced.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 5, *Dark-room Appliances and Photographic Dishes*. August 12, Report of the Delegates to the Convention. Bauk Holiday outing at Penshurst. Train from Charing-cross at twenty-eight minutes past nine; London Bridge at thirty-five minutes past nine. Does not call at Cannon-street.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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SOME "DEFECTS" OF GELATINE PLATES.

Our article of a few months since upon the topic of defective commercial gelatine plates brought us a commendatory letter, which we recently published, from a colonial correspondent, who appears to have a genuine grievance against the home firm from whom he draws his supplies. We need not, however, travel so far in order to multiply such aggravating cases as he describes. They are, we fear, only too frequent at home. The subject of breakages of glass plates, for example, is a constant source of quarrelling which we should be glad for all parties concerned to see removed, or at least minimised. If the universal adoption of film supports produced no other advantage, it would at least destroy a prolific cause of unpleasantness and friction between plate users and plate makers.

Dealing with some phases of this matter exactly a year ago, we drew attention to the fact that many complaints of faults in sensitive surfaces and their supports are often ill-founded, and are usually as often capable of being traced to carelessness, incompetence, or ignorance on the part of those employing them. A thousand-and-one circumstances attendant upon the storage, exposure, and development of gelatine plates by the photographer or his staff may act prejudicially to the production of good results, and apparently defy removal; and yet, perhaps, under fresh conditions, no difficulty is experienced either by another photographer or by the manufacturer himself in demonstrating that the qualities of the plates are all that have been claimed for them. Many photographers have such confidence in their own powers—they are so firmly persuaded that their dark rooms are perfectly safe, that their cameras and slides are above suspicion on the score of light-tightness, that their plan of development is open to no objection—in short, as the saying runs, that they know what they are about better than any one can tell them—that they decline to submit their failures to independent examination, and washing their hands of the make of plates, sometimes, *en évanche*, do not hesitate to utter aloud the most severe opinions of them. Few of our readers, we imagine, are ignorant of individuals who are prone to indulge in wholesale condemnation of a particular make of lens, plate, or camera, upon purely personal, and therefore insufficient, evidence of inferiority.

But now and then much positive injustice is done to the makers by means for which no form of excuse whatever can be alleged. Carelessness and incompetence may be remedied very readily, while ignorance suggests its own cure; but dishonesty on the part of responsible persons is not easily discoverable. Sometimes the selection of a brand of plates or paper, of the chemicals and apparatus, of the cards—indeed, of all the materials required in the business—is left in the hands of a principal operator; and where this is not done it is rare that the person upon whom the duty of development devolves does not have a powerful voice in influencing the choice of the plates. In some of the larger studios this system of departmental responsibility is allowed full play, and is, we believe, found to work well enough—at any rate, so far as the external conduct of affairs is concerned.

The case we are going to quote is one of several of a similar kind that have come under our notice from time to time, and may be regarded as typical of its class. A certain large seaside studio had for a number of years been in the habit of using a particular make of plates which had all along given the greatest satisfaction. Suddenly complaint was made by the new operator in charge that the films of a batch in hand showed on development large insensitive spots. After some correspondence, which failed to mend matters, the plates were exchanged. These, when tested by the maker from an unopened box, were found entirely free from blemish. The second batch in the hands of the operator exhibited the same defects as the first. A third was tried with a like result. Eventually a representative of the firm, himself a skilful photographer, waited upon the complainant house, and devoted several hours to an attempted solution of the mystery. All the plates that had been stored in light-tight boxes had the defect. Those that had not been opened were faultless so long as he himself alone handled, exposed, and developed them; but the operator, curiously enough, always got the same insensitive spots, which refused to develop, and fixed out cleanly, leaving perfectly bare glass. The camera, slides, and lens were carefully examined, plates were scrutinised in daylight both before and after exposure without showing any markings indicating that anything had splashed them; but in the end the maker's representative had to confess himself baffled to account for the cause of the defect, although he was quite convinced that it was not inherent in the films. The operator was sorry, but he could not, in justice to his firm, use any more of the plates, and must perforce give another make a trial, which he did not wish to do, of course, if he could only get plates from the old house as good as hitherto.

By this time the visitor, as a man of the world, had pretty well guessed the real cause of the spots, and before he took his departure he handed the operator an envelope, which contained, he said, a formula for a developer which might put matters right. Would the operator try it and let him know the result? The operator promised to do so, and two days later the result was an order for the season's supply, and a request for the return of the rejected plates. It is wonderful, indeed, how

powerful this formula is for removing not only insensitive spots, but also numerous other faults to which gelatine films are liable.

With this sort of thing to contend against, in addition to the legitimate difficulties to which we have already made reference, the position of a manufacturer will be seen to be far removed from pleasant at times. Still, there is another side to the matter which we do not lose sight of, and which, in common fairness to the photographer, should always be borne in mind. The infallibility implied, if not arrogated, by several plate-makers is absurd. To refuse, when a complaint is made, to consider the possibility of its being due to faulty preparation of the plates, as many makers do, is a proceeding hardly calculated to promote a calm and business like settlement of a difficulty. Plates are just as likely to get broken in a manufactory—the number of hands through which the packages pass being comparatively large—as in transit or in a photographer's studio, and it is a mistake, we believe, on the part of makers to refuse to consider the likelihood of the breakage occurring on their own premises. Again, some of them even decline to take back plates the size of which may have been erroneously expressed—in fact, they will not change plates at all, alleging that it would be unfair to sell them to another client after they had once been out, and this despite the fact that the packages have not been opened. It seems to us that a graceful concession in these small matters would repay itself. As it is, the photographer literally buys in the dark, and, if the plates are really and truly not what he had a right to expect, he does not, unless he is a very large buyer, obtain the slightest redress. Our columns for years past will supply numerous instances where a photographer has been disposed to blame his plates for his failures, but has afterwards found out that he himself was at fault, and has frankly owned his error; but we cannot call to mind a single instance of a dry-plate maker admitting, privately or otherwise, that he had sent out a defective batch of plates. There is a phenomenal unanimity here.

We have roughly indicated some views of a troublesome matter which we suppose will always be a source of misunderstanding and disagreement so long as it is not handled with common sense. We can, indeed, only hope to see it entirely disposed of when photographers, under some system of taking pictures that has yet to be discovered, will be independent of manufacturers for the first and, perhaps, most important necessity of their profession.

TOURISTS' TRAVELLING ARRANGEMENTS.

In no respect, probably, have the last twelve years wrought such an entire change in the practice of photography as in the facilities afforded almost everywhere to the travelling amateur, as well in the matter of obtaining materials as in the changing and developing of the films. In former years a week or two's trip with the camera entailed either something very like a "leap in the dark," or else the provision of a complete travelling laboratory. On the one hand, the dry-plate man, at any rate, had the choice of trusting entirely to development on his return home, or else found himself under the necessity of taking along with him a stock of materials, chemicals, and *impedimenta* generally, that placed him almost on equal terms with his wet-plate *confrère*, compared with whom he still stood at the disadvantage of being under no certainty that he had attained successful results until at least some time after leaving the scene of his labours.

Now this is all changed, for the tourist may leave home i almost absolute certainty that he will be able to procure, no only plates and chemicals, but also dark-room accommodatio wherever his travels may take him; and, although he may stil labour under some slight disadvantage in not being able t develop on the spot, still the generally uniform quality o modern commercial plates renders it comparatively easy t make his exposures with a degree of certainty that was im possible before the advent of gelatine.

Yet, looking back, we are inclined to doubt whether th change is all gain. The convenience of being able to procur chemicals or even plates and other items, in places and under circumstances where such supplies were inaccessible, shoul accident render them necessary, is beyond doubt. Speakin from the point of view of the dry-plate worker, this is mor especially the case since the materials of the professiona photographer, where such existed, were essentially different from and rarely included those of the dry-plate amateur; an even the "local chemist" in small provincial towns was rarely an available source for such requirements as pyro, or hypo, or *strong* ammonia. To men short of one of these usually meant telegraphing or writing to headquarters for a supply, and we have known such a case as an amateur photographer having t send three or four hundred miles for a few pennyworths of bromide of potassium to be posted to him *in ten grain packets*.

Turning to the question of dark-room accommodation, notwithstanding the fact that, in almost any town or village to which the votary of the camera is likely to penetrate, there will be found offered for his convenience a dark room of some sort at the local photographer's, the chemist's, or perhaps at the hotel or inn, we know that there are very many who, like ourselves, would hesitate before availing themselves of the proffered accommodation so long as other arrangements could be made that would leave them in a state of comparative independence. Even when the accommodation is provided on the basis of a business arrangement, as when, as is often the case, a small charge is made, or when a dark room is provided at the hotel where the traveller is staying, there is no telling how soon it may be required by some other individual equally interested and equally entitled to its benefits; and none but the most churlishly disposed would willingly keep another waiting. Even in the matter of changing plates, simply, some considerable time is occupied if the operation is to be duly performed with a prospect of safe packing, and the proper identification of the various exposures afterwards; and this end is scarcely likely to be gained with the knowledge that somebody else is waiting for the "reversion" of the dark room. In the case of the numerous dark rooms generously offered without charge, the mere fact of intruding upon possibly an entire stranger is sufficient to deter very many from availing themselves of the proffered convenience, and the most likely to take advantage of such questionably generous hospitality will too frequently be those who are least deserving of it. It is unfortunately too true that complaints have appeared in this and other papers of the abuse of such kindness, and many dark rooms at one time freely offered to the public have been closed in consequence.

In any case we think it should be understood that in using the accommodation so offered, whether gratuitously or for a consideration, the photographer should prepare himself, before leaving home, to do so with the least possible inconvenience to the proprietor or to any other traveller who may, like himself, want the temporary use of it. He should, in the case of

changing plates, make his arrangements previously so that he can enter the dark room and in as short a time as possible transfer his plates or films, making the necessary marks for future identification, and taking every care that they are repacked to his satisfaction so far as their future protection from injury is concerned. Above all, he should see that he leaves the place in the same state as that in which he found it, and not littered with the wrapping-paper and string, and possibly the *débris* of the box from which he has unpacked his fresh relay of plates. Nothing is more detrimental to comfort in working, especially in a strange place, than the presence of a heap of things which to any one but the proprietor of the place might be of some value and therefore to be respected, whatever opinion may be formed of the unfortunate proprietor's character for tidiness.

The simplest method by which this duty can be performed commences before leaving home, and consists in marking one corner of each plate with a distinguishing number, either with pencil on the film or with a writing diamond on the back. This, of course, entails unpacking and repacking each box of plates; but few, we imagine, with any claim to carefulness would start on a trip of any duration without an examination of their films, to see that they are free from defects, accidental or otherwise. The unpacking has the additional advantage that it enables the plates to be repacked in parcels of any convenient number to suit the number of slides in use or the contents of the plate-box if such be used. This alone will often save a lot of unnecessary unwrapping and repacking.

When the slides or plate-box are just filled, the plates should be put in with the numbers running in proper rotation, so that after each exposure the subject may be entered in the note-book against the proper number *in the whole series*, and not against merely the number of the slide or plate-box. This relieves the operator of all further anxiety in the dark room itself and saves a good deal of straining of the eyes. Each box of plates should have marked on its outside the series number of the films it contains, so that the proper box in consecutive order may be selected before entering the dark room. All that then remains is to provide a piece of wrapping-paper, together with the necessary sheets or strips for separating the films, and to empty the slides one by one. Then, after wrapping up the parcel, to refill the slides from the new box, glancing at the number of each plate to insure their being introduced in proper order for exposure; finally, the parcel of exposed plates is placed on the box from which the new ones have been taken, the *exposed* numbers entered on the label in place of the others, and a prominent mark added, to show that the contents are done with so far as the camera is concerned.

In this manner the actual work to be performed in the dark room is reduced to a minimum, as it should be if only for personal convenience. If the extra trouble of marking and repacking the plates before leaving home be objected to, the former may be performed as the plates are changed, though it is far preferable to do it at home in the comfort and convenience that plenty of time and the accustomed dark room afford. Care will, of course, have to be taken under such circumstances that the "day" and "series" numbers are kept right.

It will often happen that the whole of the plates in the slides or box are not exposed at once, in which case the whole of a packet of unexposed plates will not be used. In such cases it is only necessary to provide, before entering the dark room, an extra sheet of wrapping-paper to keep the exposed and unexposed film separate, to be careful to mark each package with the correct number, and to note on the exterior of the box that it contains so many exposed plates. By the adoption of simple precautions like these, large numbers of plates can be handled with the greatest care, and without the least confusion, while no unnecessary trouble is given to the owner of the dark room.

Personally, we feel a strong repugnance to infringing on the kindness of any one when travelling no less than to imposing unnecessary discomfort on ourselves in development, and therefore we always prefer to make such arrangements before leaving home as will enable us to convert our bedroom into a dark room, in which we can feel sufficiently independent of others to perform the operation of development and fixing in a leisurely manner, the only possible conditions, to our thinking, under which successful results are obtainable; but, where it is preferred to utilise such accommodation as can be secured otherwise, we think it should be an invariable condition that the traveller should provide his own developing solutions, and, after using them, leave the dishes and other appliances provided for him, including the sink and shelves, in as clean and orderly a state as when he commenced to use them.

It is scarcely possible to find in any one dark room all the bottled developing solutions that might be required by the tourists of a season, nor is it feasible to convert the dark room into a chemical laboratory, in which particular formulæ may be dispensed as required. If only on the score of personal comfort, and in the prospect of success, we imagine most sensible photographers will agree with us on this point. Possibly, proprietors of dark rooms may be asked to supply "hypo," but even in that case it is only right to impress upon those using it that it is intended for *fixing*, and not for *washing*, negatives; in other words, that the negative be properly washed before passing into the fixing bath, in order that the latter may not be needlessly discoloured for the next comer.

The developing solutions, themselves, need not occupy a great deal of space amongst the tourist's luggage. A very small package will carry the bottles necessary for a few days' supply, and if more be needed the requisite materials can be carried in weighed packets in the dry state, or, in the case of ammonium, in concentrated solution. A wrapping of tinfoil outside the first paper will help to protect from moisture.

But we conclude by repeating our preference for an independent dark room such as we have described, which can easily be arranged with a few sheets of brown paper to tack over the window, and any one of the numerous simple travelling lamps. An extra can of water and an empty bucket will be all that is then required to make the photographer comfortable for the evening.

THERE is no question that detective cameras and their owners are becoming decidedly obnoxious to many people. A considerable amount of correspondence on the subject has appeared lately in a Scotch contemporary. Some persons strongly object to having their portraits taken at all, and therefore they very naturally resent being photographed surreptitiously. A paragraph has lately been "going the round" that on his recent passage from America Prince George of Greece could not appear on deck without a hundred cameras being pointed towards him, and that for this reason during a great portion of the voyage he spent his time below. The hundred cameras is probably an exaggeration. But half-a-dozen would be quite sufficient to cause considerable annoyance if used objectionably.

QUITE recently two young ladies of our acquaintance were walking in a suburban thoroughfare when they noticed two respectably dressed

young fellows approaching with a camera levelled against them. They, however, managed to get their parasols in front of their faces, and hence spoiled a plate. The fellows then reset the camera, crossed the road, and walked in front of the ladies, recrossed again, meeting them; but by a quick movement of the parasol another plate was spoilt. The ladies regretted, and so did we, that their brothers were not close by at the time. Such conduct as this must necessarily, if often practised—which we hope is not the case—soon bring amateur photography and photographers into contempt.

What do the poor unfortunate shareholders in the Automatic Photographic Company, Limited, think of their prospects of enormous dividends now? This company, it will be remembered, was floated a little over a year ago with a capital of a hundred thousand pounds, and a directorate containing an earl, a lord, an admiral, and a captain. Now it is before the Court on a petition for winding it up. A similar state of affairs exists with the Automatic Photograph (Foreign and Colonial) Company, Limited, while the promoter of the two affairs is before the Bankruptcy Court with heavy liabilities. This is no more than what every practical photographer expected. These are not the only companies, projected to achieve wonders in connexion with photography, that have "come to grief." The public appear to be particularly "gullible" with regard to photography and what it may be made to accomplish—photography in natural colours, to wit.

We are frequently asked if the fixing bath used for plates is worth saving for the silver it contains. This quite depends upon circumstances. With professional photographers, who usually fix a comparatively large number of plates in the same solution, it certainly is; but with the amateur, who seldom fixes many plates in the same bath, it is scarcely worth the trouble unless the residues from the printing operations are systematically saved also, which is rarely the case, the printing being more generally put out to be done. If a bronze coin be immersed in a bath that has fixed several plates or prints, and is allowed to remain a few hours, it will become plated with silver. If the coin be polished before immersion, a very even and perfect coating will be obtained.

Apropos of our leaderette a fortnight ago, in which we stated that some persons, when buying goods, represented themselves as professionals in order to obtain discounts, and amateurs when at work, "An Amateur" writes "indignantly" that this cannot be true, as no gentleman would be guilty of such an act. We quite agree with our correspondent; but unfortunately the fact remains as stated.

The medal question has always been a vexed one, and is still so; but a new phase of it has "cropped out" recently. It is this: several photographers in different provincial towns have written asking if a professional portraitist is justified in exhibiting in his window a number of medals, or advertising in the local press that he has been awarded so many medals, when none of them were given for portraits, but for landscapes and *genre* subjects; thus leading the public to believe they were awarded for portraiture. It is difficult to see any reason why any one winning medals in open competition should not, if he chooses, turn them to business account. Such has always been the rule with some of the oldest photographers. If the medals were awarded for excellence in photography, we can see no objection, though it would certainly be better if the recipient of them were to notify for what they were awarded. It does not follow that a good landscapist is necessarily a good portraitist, or *vice versâ*. However, medals are now so freely awarded at all local exhibitions, that it is easy for any decent photographer to acquire any number of them if he thinks it worth his while to compete.

The thundery weather we experienced during last week has been a source of trouble to more than one dry plate-maker and other workers with gelatine. In what way atmospherical electrical disturbances affect gelatine is a mystery which up to the present has never been explained. Sometimes a thunderstorm, even though it be a heavy one, will be perfectly inert, while a very slight one will sometimes work a deal of mischief. The immediate effect on bromide emulsion, when it is affected, is to destroy its setting powers, or perhaps to cause frilling when the plate is developed. In the manufacture of gelatine it sometimes happens that an entire batch may be quite ruined in quality by a thunderstorm. So indeed may be milk or beer. To the presence of ozone in the atmosphere has, before now, been attributed the evil; but this can scarcely be the cause in the case of beer, as that is usually stowed away in airtight casks in underground cellars. It is a noteworthy fact that it is only when the gelatine is in the fluid condition that it is influenced by thunder, and never when it is in the jellied state or in a dried condition.

Photographers of the olden time, when wet collodion reigned supreme, could often relate some curious facts, in connexion with extemporised dark rooms, such as would be utterly unavailable at the present day with dry plates. At a recent meeting of a suburban society, when the subject of discussion was dark rooms, one gentleman stated that his dark room was part of a third-class railway carriage he had purchased, the other portions being used as workshops. The idea is a capital one, as a railway carriage, though it may be too old for its original use, is still a very substantial building, and can often be purchased for a few pounds. But the unfortunate thing is that it is an unsightly thing in a back garden, of which cantankerous neighbours might complain. Furthermore, it is not every back garden into which it could be got without taking it to pieces. However, when installed, such a structure is invaluable to many others than amateur photographers. After the publicity given to the fact, "retired" railway carriages will probably be at a premium.

The expense of an optically worked glass prism is, as is well known, very considerable, and increases rapidly with each increment of size; but how much photographic experiment can be done with simpler materials Mr. G. F. Williams describes in these pages. Nevertheless, there are purposes, of course, where only the purest kind of prism obtainable is suitable. There are, however, equally exact instruments made in other ways—to wit, hollow and filled with a liquid. It has recently been stated in *Nature* that Herr Wolter recommended, for filling the prism when examining the ultra-violet rays, a liquid *a*-monobomnaphthalene, on account of its high dispersive power and transparency for those rays. But a correspondent points out that Mr. Madan had already published an account of its dispersive and refractive powers, and had recommended it for the purpose; but he, Mr. W. N. Hartley, found it useless, through becoming discoloured after long-continued use. Further, the latter states that, though better than carbon bisulphide, it only transmits half the ultra-violet rays. He recommends *mercuric methide*, which is perfectly colourless, and so dense that flint glass will float upon it. It transmits all the rays of the solar spectrum, but has the drawback of being volatile and its vapour highly poisonous.

ON THINGS IN GENERAL.

From all sources I hear that the Bath Convention was a great success. An interesting town—I beg its pardon—city, from an archæological standpoint, it would afford many opportunities for photographing subjects unknown anywhere else in the country. There are to be seen there, and offering good photographic subjects, numerous remains of Roman baths, showing the complete manner in which building was done in those days; for there is, or was, the last time I was in the city, one large rectangular bath used by the citizens of the present day in almost the same state that the Romans left it. Then, again, there is one panoramic view of the place which the citizens are very proud of. You go up a steep hill, most of the distance through a number of back streets (you are enjoined not once to look behind you), and then down a narrow path opening out upon a terrace whence the view bursts upon you, and you are expected to pass an examination in interjections elicited by its beauty. And, in truth, the view is exceedingly pretty—too wide to be embraced by any but a panoramic camera. The walks around Bath are very beautiful, and every one seemed greatly pleased with what there was to see and how

it was enabled to be seen. Even the evening discussions drew good numbers. Some one, I am told, and *àpropos* of the lantern taking fire, used a classical quotation suited to another occasion, and was applauded highly when he asked, "Please, sir, what is the yellow light?" though I believe the quotation, which runs somewhat as follows, "There ain't no yaller light," was not completed. Every one is sorry to lose the energetic and whole-hearted services of the Secretary, Mr. Brigin-shaw, and good wishes will follow him in his retirement.

There seems to be a very general complaint of lack of business and a desire for something new to give things a fillip. I quote the following, verbatim, from one letter sent to the Editor and published a short time ago:—

"Permit me (speaking as one of the outside public) to say, that I think we are tired of the ordinary photographic portraits that require ponderous albums, or frames, for their keeping. We dislike adding album to album, and filling our rooms with them. If we could have our portraits made like the steel engravings in books—as permanent, as easy to handle, having neat white or tinted margins, requiring no mounting on cardboard, and yet remaining perfectly flat, so that a hundred might be kept loose in a neat, thin portfolio, I think a renewed impetus might be given to the trade. It seems worth a trial."

Somewhat similar remarks are made by other writers. Now, if any one will turn to old volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY of ten or fifteen years ago, he will see a reference to the same state of affairs, and he will further see this very suggestion anticipated, and a very practical means of carrying it out suggested.

It occurs to me that the photographic literature of the past contains a deal of buried treasure—buried rubbish also, I dare say—and many are the wrinkles to be obtained, for example, from back numbers of the BRITISH JOURNAL OF PHOTOGRAPHY. I wonder whether even current literature is sufficiently scanned. I think not, or we should have heard much more of a very characteristic effusion of Dr. Emerson's in *Cassell's Magazine of Art* for July. It is too rich to extract from, it should be read in its entirety. I may just state that I learn from it the probability of photographing soon being reduced to such a purely scientific act that skill and judgment will give place to a machine-like accuracy through the intervention of instrumental appliances; also that "by the researches of Mr. Dallmeyer and myself (Dr. E.) the limitations of the lens have, I think, been fully threshed out." This is really sublime. "Why drag in Dallmeyer?" one can scarcely help saying, if it were not plagiarising a well-known witticism. Of course we must expect to find worked in a reference to his amusing optical experiments, to prove the fallacy of existing methods of perspective representations. It is very unfortunate when a man with the undoubted command of language and power of expression possessed by Dr. Emerson allows himself to present, as valuable mental pabulum, his crude and boyish excogitations upon his excursions in the realms of a science apparently quite new to him. We thus, as one consequence, have exhibited to us his disciples defending his theses in a still more unscientific manner, taking most untenable positions when the matter is discussed. I refer to page 477, BRITISH JOURNAL OF PHOTOGRAPHY, July 24, 1891, and subject to correction, through brief abstracts of a speech not always suggesting the actual sense of the original utterances, I should like to ask if any one with a grain of knowledge of physiological optics could possibly believe that Helmholtz ever said that, when "the diaphragm of the iris was contracted to the one-tenth of an inch, the field of vision was less than sixty degrees?"

Surely something very different was uttered at the meeting of the London and Provincial Photographic Association, for the "diaphragm of the iris" is nonsense; the iris itself is a diaphragm, and it would be interesting to learn how its construction could limit the field of vision. Let any one cut a piece of paper roughly, seven inches in diameter, in a circular form, cut an inch aperture in its centre, hold it in front of a gas-flame (to reduce the iris aperture), and place it six inches from one eye, closing the other, and then say whether it is impossible to see any object outside that circle. Not merely sixty, but far more than sixty, degrees would be shown to be included. Again, speaking of current literature, I should like to draw the attention of those readers who have not already seen it to an article by Mr. G. F. Williams, pp. 469 *et seq. ibid.*) on the *Spectroscopic Determination of the Sensitiveness of Plates*. It is eminently practical throughout, written by one who knows his subject, and can explain how, by comparatively inexpensive means, a non-expert can make a really scientific examination of his plates, and, incidentally, learn a great deal more about them than it is in the slightest degree likely he would learn in any other way. We want such articles to advance the scientific treatment of photographic subjects.

FREE LANCE.

BATH CONVENTION NOTES.—III.*

Two years later, Mr. Talbot, finding that the calotype was but little known in Paris, visited that city in May, 1843, to introduce the art. The artists of Paris, and the amateurs of the Daguerreotype, attended his assemblages or lectures in considerable numbers.

In 1845 the *Pencil of Nature* was published in numbers, but, after six of these had been issued, it was found that the earlier pictures were beginning to show signs of fading, and this led to a discontinuance of this work.

We may here say that on the occasion of our recent visit to Lacock Abbey we were shown prints prepared for the *Pencil of Nature*, which were lying unmounted, and which had not faded in the slightest degree so far as we and others could judge. This, in our estimation, went far towards establishing a connexion between mounting and fading.

The next great discovery of Talbot was one of a reversing order. He desired to take direct positives instead of negatives, and eventually worked out a process of which the following is a synopsis:—A sheet of iodised paper was excited with nitrate of silver, and, when dry, was exposed momentarily to daylight. It was then treated with iodide of potassium and dried. In this state it would still turn black if subjected to the action of the developer. But if this paper were removed from the dark room, and exposed to daylight for one or two seconds, it would be found impossible to develop it. Its character was changed.

It was obvious how such facts might receive a useful application. Let the paper thus treated be placed in the camera and exposed to a well-lighted subject. The paper becomes virtually whitened in the parts upon which most light falls, and, when removed and developed, a *positive* image comes forth.

Here is an experiment performed by Mr. Talbot in the laboratory of the Royal Institution about this time: A printed paper was fastened to a circular disc, which was caused to revolve very rapidly by means of suitable wheels and machinery, and a camera was so placed as to have this paper in its focus. The room was then darkened, and the wheels set in motion, and when the disc was spinning round with the utmost velocity the camera was opened, and the large electric battery belonging to the Institution was discharged. The photograph, on being developed, showed an image of the paper in which the printed matter was quite clear, and not in the least degree blurred or confused. Let it be here remembered that this remarkable experiment was performed before the introduction of the collodion process. The plate employed on this occasion was an albumen one, iodised by iodide of iron, sensitised by nitrate of silver, and developed by protosulphate of iron.

It only now remains that we say a few words on Talbot's photographic engraving process. Dissatisfied with silver prints, because of the possibility of their fading, he sought to have them produced in carbonaceous printer's ink. This he eventually did by coating a plate of polished steel or copper with a very thin solution of bichromate of potash and gelatine, to which, after exposure under a *cliché*, he imparted a grain, originally by the interposition of a textile fabric such as fine crape, and subsequently by subjecting the plate to a deposit of the dust of a powdered resin which, after subsidence, was fused by heat. The plate was then subjected to the action of an acidulated solution—bichloride of platinum or perchloride of iron—which penetrated the thin film in a discriminative manner according to the action of the light. In this way were produced many charming photogravures, so fine in grain and good in detail as to bear examination under a powerful glass.

Here, for the present, we take leave of Fox Talbot. We knew him well, and have experimented much with him, and in conclusion say

* Continued from page 485.

that it is our belief that, had his life and energy been spared for two decades, such was the originality of his mind, many more original researches might have been expected from the fertility of his resources.

COLLODION SCREENS FOR ORTHOCHROMATIC PURPOSES.

At a time when the question of coloured screens is once more exercising the public mind, and when there seems to be some doubt as to the best colour to use for general purposes, it may not be amiss to describe a simple means by which photographers may, with very little trouble and scarcely any expense, supply themselves with a variety of screens of different colour for comparison.

The medium I shall recommend is collodion, which I find to answer every purpose, although Mr. Birt Acres some time back took the trouble to write condemning it; but I think his opinions—at least as expressed in print—on collodion and other orthochromatic questions are open to some revision. The charge against collodion was that its structure interferes with the quality of the definition obtainable, which suggests that the manipulator must have been extremely unfortunate in his choice of collodion or else used it in a very blundering way.

We hear so much about optically worked glass screens and their expense, that it would not be surprising if photographers really did, as has been suggested, make them the great stumbling-block in orthochromatic practice; but at least there can be no complaint against the expense of a small piece of well-polished ordinary plate glass, of a size sufficient for the requirements of the screen, and that, beyond a small bottle of suitable collodion and the colouring matter, is all that is wanted.

As regards the collodion, almost everything depends upon the pyroxyline from which it is made. It is not difficult to obtain samples of "surgical" collodion, which will fulfil every purpose if only they are sufficiently thinned down to dry without crapiness; much of the outcry that has been raised is, no doubt, due to neglect of this precaution. The quality of pyroxyline most suitable for making a good tough collodion for surgical purposes generally possesses the additional property of great transparency and freedom from "structure," if it be not made too thick. Where a suitable sample of surgical collodion is not to be obtained, it will, of course, have to be specially prepared, and a suitable pyroxyline is obtainable at Hopkin & Williams's at a shilling an ounce that answers admirably.

The only other point to be observed is that the ether and alcohol employed are as free from water as possible, as the presence of the latter in collodion tends greatly to increase the "structure" as well as to cause the solution to flow unevenly on the plate, and produces "crapiness." The methylated ether, of sp. gr. ·720, or even ·717, is cheap enough, and easily obtainable from the same source as the pyroxyline, and one of these grades should be selected. The alcohol had better be pure "absolute," as it is well-nigh impossible nowadays to get a sample of methylated spirit of lower specific gravity than ·830.

It is of great importance in coating the glass that the setting of the collodion take place as slowly as possible, in order not only that the film may be free from "crapiness," but that it may be as uniform in thickness as possible. To attain this end it is desirable that as large a proportion of alcohol be used as possible, as this conduces greatly to the easy flowing and even setting of the collodion, though, if the proportion be unduly increased, it may lead to the opposite effect. Some samples of pyroxyline will bear four parts of alcohol to two of ether if both be of the quality stated above, but others work better with four of alcohol to three of ether. With the particular pyroxyline I mention, using four grains to the ounce, these proportions answer very well. Five grains of pyroxyline may be used if a very strong film is desired, but I find four quite sufficient.

Of colouring matter I do not intend to say much here, leaving that to the choice of individual readers. I have used aurine, the preparation known as "aurantia," turmeric, and a sample of yellow aniline dye obtained in solution, the nature of which I am unaware. There are, perhaps, very many more substances equally or better suited to the purpose to be found in the mineral and vegetable kingdoms, but it must be borne in mind that *complete* solubility in a mixture of ether and alcohol is a *sine quâ non*.

Before coating the glass, it must be first of all thoroughly cleaned, and for this purpose it is better to employ dilute nitric acid, followed by distilled or perfectly clean water, than any of the polishing pastes or powders, which are liable to leave traces adhering to the glass. The finishing polish must be given with a silk handkerchief and a little solution of *pure* beeswax in ether, and must be continued until no trace of the wax remains visible to the eye. Powdered talc is to be avoided for the same reason as the cleaning powders.

The film of coloured collodion may be allowed to remain on the glass plate if that course be preferred, but then the same necessity exists for optically worked glass as if the latter itself is coloured; but my plan is to strip the film from the glass. Then, given a well-polished surface, the parallelism of the two sides of the glass is quite immaterial, and the extreme thinness of the collodion film renders it very unlikely that any distortion will arise from varying thickness in *its* substance if the film itself be kept perfectly rigid. The thinness of the collodion film combined with its freedom from colour (until stained) form its strongest recommendations as a medium to be interposed between the subject and the photographic plate, whether it be before, behind, or in the centre of the lens.

After the film has become thoroughly dry on the glass it can be stripped in the following manner: Take a piece of thin, fine card, as thick as—or a little thicker than—a visiting card, and with a very sharp penknife cut a *clean* aperture in it the size of the screen required. It is of the utmost importance that the edges of the aperture be cut perfectly even and smooth, as any inequalities of the surface will cause corresponding flexions in the collodion film when stripped. Brush over one side of this cardboard mask in a thin and even layer a little warm gelatine solution, and allow it to "set;" when this has taken place lay it down upon the collodionised glass, and squeegee or rub it down until, when examined from the reverse side, it is seen to be in perfect contact, taking care, of course, that it does not slip and damage the collodion. If there should be any difficulty in securing perfect contact, the glass may be slightly warmed to melt the gelatine, and at once put under gentle pressure.

If the mask be so applied, and kept under pressure until quite dry, it will afterwards remain perfectly flat; but, if stripped while still retaining any moisture, it will be liable to warp and get out of shape when freed from its support. To assist in perfect desiccation, several thicknesses of blotting-paper may be thoroughly dried at the fire or in the oven, and, while still warm, not *hot*, laid over the mask before applying the pressure; these will subsequently extract the whole of the moisture from the card.

When thoroughly dry a sharp penknife must be passed round the edges of the card, cutting clean through it and the collodion film to the glass, when the whole may be lifted off, and, if carefully looked after, will remain quite flat. I have kept a good-sized screen rigid and uninjured for months by riveting it between two sheets of thin metal; but small ones, to be used in the diaphragm slot, do not require any such protection.

W. B. Bolton.

"NOTES ON PERSPECTIVE DRAWING AND VISION."

Replies to Various Criticisms.

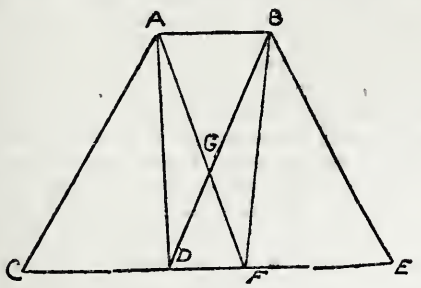
We shall reply to our critics in the order of appearance of their papers.

Mr. Slight, an "old perspective draughtsman," is the first to take the field. We omit any comment upon the bad taste shown in his first paragraph, and proceed directly to his intellectual parts. We regret Mr. Slight cannot get the impressions we have obtained, and we can only answer that necessarily such impressions are easiest seen by trained observers or by persons with delicate nervous organizations such as all good artists possess. We assure Mr. Slight several artists have, since we pointed these facts out, seen things in the same way as ourselves.

Mr. Slight takes an example which we give to show the effect of *binocular* vision, and immediately proceeds to show that the effect seen by *monocular* vision is different—we refer to the tapering slip of paper experiment. Such criticism is ridiculous, and shows how incompetent Mr. Slight is to discuss such matters.

We give a diagram which will roughly explain our meaning. Let A B C D and A B E F represent the monocular perspective impres-

sions of the slip of paper both *vanishing towards* A B. Now, what you get with binocular vision is the figure A B D F vanishing towards *D F*, an *inversion* of perspective. What Mr. Slight has seen is the figure C B G, therefore our figure A B D F is not caused by



overlapping. If Mr. Slight fixes the paper at the normal *distance of vision* (say, five to six inches), he will get the true impression easier.

Mr. Slight next objects to measuring with two eyes. Undoubtedly this experiment is difficult to the inexperienced, but it is merely another way of stating Proof 2, page 6—the square sheet of paper experiment. There are persons, however, who can measure with two eyes, and the figure given in answer to the last criticism fully explains the truth of the observation. This experiment is very easily verified by measuring large objects.

And these are all Mr. Slight's objections. Mr. Slight then goes on to say that, if people shut *one* eye and look at a photograph from one particular point of view, they will see it rightly—in the case of a Cyclops we do not dispute this—but we see nature *with two eyes*, and that is the point. Mr. Slight, too, is naturally biassed by his previous training. All photographs and monocular perspective drawings are, we maintain, altogether false to the visual impression.

The next is Mr. Boord, who is unfortunately *hors concours*, since he is short-sighted and wears glasses. Mr. Boord has pleasantly advised us to go to our oculist. We have no occasion; our sight is normal. Mr. Boord avoids the main proposition ostensibly from fear of the British policeman. We have found others unable to study some of the propositions from an accumulation of adipose tissue, but the policeman is new to us. Mr. Boord asks whether physiology bears this out. We ask Mr. Boord whether physiology does *not* bear this out. Seriously, we are awaiting some researches on this point. Mr. Boord seems to think that he has overthrown Proposition B because evolution must have eliminated all such defects. Why, then, have we the remains of a caudal appendage? Perhaps Mr. Boord will tell us.

Mr. Boord then gets muddled over foreground and distance. Our researches are for objects seen in one position which we shall call the real position. One position must be selected as the real position. We therefore take the generally accepted, *i.e.*, a plane at right angles with the ground plane. When you look at the plane at a distance, you see foreground as well as distance. When you look at the immediate foreground, you alter the plane, and it is just the same as if the body were suspended at an inclination, and all the same phenomena will follow but with different objects. Mr. Boord refers to Dr. Emerson's naturalistic law of focussing. This is the best *compromise*, both artistically and scientifically, for photographers, but the results are in no way true to the visual impression, but the truest that can be got by the camera.

Next we do hear of "eye-troubles." We do not hear of sailors going about in spectacles, and we do hear of most kindergarten-bred Germans doing this. Results of this kind are formed by ages of experience, and outlive their causes. We again refer Mr. Boord to the remains of a tail which he possesses. Mr. Boord has little idea of the difference of delicacy of vision in different persons. It is greater than the difference between a good musical ear and a bad one, though not so easily demonstrated. We have several photographs of the Parthenon, and they do *not* appear parallel to us, neither are they, nor will they appear so to any person of normal vision. Mr. Boord then says, if he turns the photograph upside down, the columns will appear parallel. Obviously they cannot appear parallel *both ways*, for, as he says, by measurement they are not parallel. It appears to us that Mr. Boord has wilfully deceived himself. As to the door, we find most people get the impression we do. Mr. Sutcliffe has published his observations, and we cite Mr. Sutcliffe as Mr. Boord cites him against us. Mr. Sutcliffe's experience will then pass as sufficient answer to Mr. Boord. We shall be glad to consider any geometrical diagram offered by Mr. Boord, but suggestions of such are not proofs. Mr. Boord then goes on to give the difference of visual impressions and chemical impressions due to atmospheric effects. This is a point we are working at. Mr. Boord is quite right. The photograph does not give the "loom" of objects, and this is an *additional* death-blow to the pretensions of photography as an art. Photography gives quite a different result to that seen by the eye as regards atmospheric effect *in addition* to the difference of perspective when atmosphere is not considered. Mr. Boord seems, however, to make it a virtue of photography that it *does not* give the loom, but gives exactly the objects before it; and that after trying to refute us because we show that photography does give exactly (mathematically), and not visually, what is before it. Exactitude *is* the virtue of photography which makes it unsurpassed for all purposes of scientific drawing, and which renders it absurd as an art medium.

Next comes 'C. J.' Mr. Chapman Jones refers to us in his leader in *Photography*. We wonder at his temerity in saying drawing and photography are the same thing after the explanation of that accomplished draughtsman, Mr. J. Pennell, that they are not the same. We would recommend Mr. Jones to study an elementary treatise on perspective, and to take some elementary lessons in drawing from the model, and then compare the result of both methods, and perhaps after that he will see reason to alter his last statement. Mr. Jones says, without hesitation, that photography does not dwarf the distance; he, of course, compares it here with a monocular perspective drawing, which we contend is just as false as photography. Mr. Jones then suggests that the photographer should get further back. This has been the custom with many artists, and the practice we hold to be a fundamental error, and consequent on the teachings of monocular perspective. This is merely a convention, and does not give you a visual impression—it is merely monocular perspective drawing with the errors made to look less glaring; it is a monocular impression and not a binocular. Such a treatment would preclude the artist from drawing interiors altogether. In short, it still remains a monocular impression and false to the visual impression. We are combating the whole convention of monocular perspective, which the best artists in France have already discarded in practice. The lengthening of the image by tipping swing-back is merely distorting the monocular perspective drawing, and in no way affects the case; the results are not so true as the throwing distance out of focus. Where there is no difference between the photograph and the draughtsman, so much the worse for the draughtsman. Possibly some misled amateur photographers would rather gouge out an eye from every one in the world than give up their Cyclopean box. How a drawing is to be done we do not enter into, but leave that to each *individual* draughtsman, who, if he possess any ability, will do it in his own method, as did Velazquez, Rembrandt, and others.

Next we come to Mr. Sutcliffe, who seems to be our only critic with sufficient art-knowledge and capacity of observation qualifying him to understand our pamphlet. Mr. Sutcliffe only finds difficulty with Proof 1, Prop. B. We would suggest to Mr. Sutcliffe that he must have tilted his head and eyes back in looking at the tower, and consequently changed his plane of vision. We think it possible it was a tall lighthouse, and he was too close to take in all the tower without changing his head. As far as to the bulging and tapering to the base, it coincides with our views.

Mr. Sutcliffe asks whether, because we see a doorway wider at top, we will not also see the doorway corrected in a photograph. We answer possibly; but the whole photograph will not be correct on account of the extreme disproportion introduced by monocular perspective when objects are reduced and seen on one plane. If people look at a photograph with one eye and be satisfied, we would suggest at the next Photographic Society of Great Britain exhibition that everybody have one eye bandaged as he goes in, and every picture should have a measure before it of focal length of lens employed. Photographs are all wrong artistically—they are altogether false to our every-day visual impression. The photograph of a man with boots five times as big as himself is correct in Mr. Sutcliffe's sense—*i.e.*, mathematically correct—but that is only an extreme expression of the fallacy which runs through the whole thing. Photography has nothing to do with art, We thank Mr. Sutcliffe for making such careful experiments before committing himself to print, as is the habit of the "amateur."

Lastly we come to Mr. Debenham. As regards his second paragraph, it might have been left to *finish* his paper with, for then we should have had a clear idea of Mr. Debenham's intellectual powers, and of his vague notions of the meaning of the words "exact," "loose," "indefinite," &c. To disprove our first proposition Mr. Debenham tells us that *perhaps* a rush of blood to the head, or *perhaps* a lower point of sight, or *perhaps* confusion may do it, and this is "exact" proof, and this is not "loose" nor "indefinite"—it is puerile at any rate. Has Mr. Debenham any reasons to give why "con-

fusion" or "rush of blood" to the head, &c., does not make the distance look bigger instead of smaller? Mr. Debenham then "plots" Proof 3 mathematically, which was not intended by us, but which we do not object to, for Mr. Debenham's arithmetic now states exactly in figures what we saw exactly with our eyes; but with Mr. Debenham's deductions we entirely disagree, for, although the difference is inappreciable arithmetically with such a small object as the slip of paper, it is of fundamental importance when dealing with buildings; or why did the architects of the Parthenon take such trouble over these matters if the differences were imperceptible? So much for Mr. Debenham's "disproof." Mr. Debenham cannot see the door look wider at the top than bottom when looked at as he suggests. Our experiments were made under similar conditions, and we do see the door wider at the top, so does Mr. Sutcliffe, and every artist. Mr. Debenham should remember that the Parthenon was to be viewed from the *ground*. This is another of Mr. Debenham's "exact" disproofs.

Mr. Debenham next objects to the material "paper" used for Proof 3, and says, "It is asserted, if both are held at a distance," &c. Did it not occur to Mr. Debenham to use stiff paper or cardboard? We assumed that the experimentalist had sufficient intelligence to place the slip of paper in the required position for experiments, nor have we have been disappointed. We would point out that we did not assert that "both are to be used," but only *one at a time*. To answer Mr. Debenham's objection that people get what they "expected," we answer that the experiments were made by people who had no idea what was "expected" of them. But such criticism is absurd. Any one can try these experiments with whatever precautions he likes. So far no one has *disproved them*. Many "loose," "inexact," and captious remarks have been made upon them.

Next we come to the coin experiments. Mr. Debenham, as usual, anticipates his own "disproofs" by his choice words "loose" and "inexact." As to what distance the eye is to be placed, or at what level above the table it is, does not much matter; a pedant might think otherwise, for is not science measurement according to the petty and "unlettered scientist?" Mr. Debenham has invented a gallows-like machine, which he has erected for the execution of our coin-proof. Now, Mr. Debenham is going to be "exact," and "scientific," and all that is stolid. Mr. Debenham blames us for not erecting a monument to our own damnation. We made the experiment, but not in Mr. Debenham's way. We inserted the penny and halfpenny in a notched stick, so that we could look at it from below and above the line of sight; and we found that our experiment, so far from upsetting our proof, tended to confirm it. When the penny was above the line of vision, it looked larger in proportion to the halfpenny that when it was below. Mr. Debenham said it should, and for once he is right; and *it did*, and does, as any one can prove to his own satisfaction. Mr. Debenham's great gallows machine is quite vitiated by the very simple fact that the structure compels one to look at the coins *through an eye-hole*, the effect of which is to cut off that portion of the field of vision which causes the phenomenon observed. And this is "exact," and not "loose" nor "indefinite;" and this is *Science* according to the gospel of the photographer.

Mr. Debenham will find the answer to the rest of his paper in the replies to other critics.

Finally, we beg earnestly (since life is short) that untrained and rash persons will not make it necessary for us to waste time in educating them.

P.S.—We are glad to find such an authority on the eye as Dr. Griffith accepting our experiments and observations; but Dr. Griffith goes wrong in his deductions, for, as he says, he is not an artist, or he would have known that the artist gives a compromise, and that the camera does not give correctly the proportion between near and distant objects, nor a compromise in any form.

Dr. P. H. Emerson and T. F. Goodall.

PHOTOGRAPHIC OPTICS AND "PHOTOGRAPHIC PERSPECTIVE."

At the last meeting of the Photographic Society of Great Britain, Mr. Dallmeyer is reported to have said "that, from where he sat, the heads of two of the members, one very near and the other at some distance, came of very different sizes, and if photographed from there with a short-focus lens would appear very disproportionate in size;" and, further, Mr. Dallmeyer said "that he should like to insist upon the effect of short-focus lenses in giving *violent* perspective"* (italics mine).

* [Not having been present at the meeting, we do not know otherwise than from our report what Mr. Dallmeyer said, but we have no doubt that what he meant was—and it is a truism on which we have often insisted—that, as a short-focus lens defines very near objects as well as distant ones with almost equal distinctness, an inexperienced photographer can seldom resist the temptation of including such near object, whether figure or otherwise, in his picture, by which the perspective, because of the near object, becomes violent or strained. It is this that makes mountains of molehills, and reduces real mountains to a level mediocrity. It is well to have the giant's power of including the near object, but it is inexpedient and unwise always to use it.—Ed.]

After this and other misleading statements from those who ought to know better, it is no wonder that artists and photographers get mistaken notions of photographic optics and "photographic perspective," and for the benefit of those who have not studied the subject I propose to give a few plain common-sense explanations and facts.

Perspective means the art of representing, on a plain surface, objects as they appear *relatively* to the mind in nature. Now, it will be seen that photography is limited in its power to represent objects as they appear in nature (absence of colour, &c.),. and the perspective in a photograph is only *partial*—and, when we speak of the perspective in a photograph, mathematical perspective is generally implied.

Supplementing a lecture which I gave at the Stereoscopic Club, it has recently been ocularly demonstrated (at the Stereoscopic Club and reported in these columns) that a four-inch picture made by a twelve-inch focus lens, and an eight-inch picture made by a twenty-four-inch focus lens, each from the same point of sight, will contain exactly the same amount of subject; and when two such pictures are viewed at distances corresponding to the focus of the lens employed to produce them the same impression is conveyed to the mind of the observer, both as regards size (external dimensions), amount of subject, proportion, perspective, and everything else; in fact, it is impossible to distinguish one picture from the other. The two pictures, it will be observed, were taken at the same angle of view. It may be questioned here, as it was at the Stereoscopic Club; but if we make a third picture from the same point of sight on an eight-inch plate, using this time the shorter-focus lens (twelve-inch), will not the perspective in this differ from the eight-inch picture made by the twenty-four-inch lens, or, in other words, will not the perspective be exaggerated, or produce what Mr. Dallmeyer calls "violent" perspective?

The reply is, Certainly not, as a very little consideration will show that in such a picture we have an image of something, occupying two inches of the entire margin, which is not shown at all in either of the two first pictures. Thus, the pictures are not alike, they are not the same thing at all; and how is it possible to compare the perspective of one thing with something else that does not exist?

If, however, we cut away two inches of the margin all round this last picture, we shall have left the centre four inches square, which will exactly correspond with the first four in picture taken, and, if this be enlarged, or viewed, as already stated, it will correspond in every detail, size, and proportion, with the eight-inch picture made by the twenty-four-inch focus lens.

Let us suppose that a photograph be taken of a building with a six-inch focus lens (never mind about the size of plate, which has nothing to do with it), and next we make other photographs of the same building from the same point of view, using, say, a three, twelve, and twenty-four-inch lens respectively (on any convenient size plate), the perspective of the building in all these photographs will be alike; and, if we enlarge or reduce them to equal size, one could not be distinguished from the other, their proportions being identical.

Now let us go back to the position occupied by Mr. Dallmeyer at the Photographic Society, with the heads of two members in front. We fix up the camera, with, say, a six-inch focus lens and a twelve-inch plate, and find that the image of the head of the near member occupies a space of two inches near the margin of the plate, and the head of the distant member is represented by only a quarter of an inch space in the centre of the plate. This may be what Mr. Dallmeyer would call "violent perspective," for the proportions of the two heads are as eight is to one.

Now we apply a twelve-inch focus lens, and find the head of the distant member still occupying the centre of the plate, but it is enlarged to half an inch; but where is the head of the near member? Why, it is not on the plate at all, and the only way to get it from where we stand is to use a twenty-four-inch plate, when we shall find the head of the near member occupying a space of four inches *near the margin*, and it will be seen that the only alteration is an enlargement of the whole, with the two heads in the same relative positions and proportions, viz., eight to one, as in the previous case.

Of course we could get the near head on the twelve-inch plate, still using the twelve-inch lens, by going further back, and this altering the position, or point of sight, to one more remote also alters the perspective and reduces the "violent" proportions, and it would be possible to take up a position with the twelve-inch lens where the

proportions of the heads would be represented by only four to one; but we cannot discuss the subject from different standpoints, or we might take the six-inch lens to a still more remote distance, where the proportions of the two heads would be only as two is to one. They would naturally be smaller; but it is not size we are discussing, it is proportion. If the small pictures were enlarged, they would still maintain the same proportions.

I hope this explanation will make clear that the focus of a lens, long or short, does not alter or influence the perspective or proportions of definite objects, and, no matter under what angle a photograph may be taken, there is a certain position from which we can obtain the impression of true mathematical perspective.

Recapitulation.—If we photograph Nature from one point of view on one size plate, with say a six and a fifteen-inch focus lens respectively, and view each picture at the same normal distance of fifteen inches, that made by the six-inch lens will as *a whole picture* convey impressions of exaggerated perspective; but I must emphasise the facts that we are not viewing the picture from the right position, and that the two pictures are not alike, and cannot be compared one with the other. If we remove the fifteen-inch lens to a more remote point of sight to include the same subject produced by the six-inch lens, so we must alter the points of sight when viewing the two pictures.

W. I. CHADWICK.

BROMIDE ENLARGING.

[A Communication to the Buffalo Convention of the Photographic Association of America.]

My purpose this evening is to make a practical demonstration before you of enlarging a 5×7 cabinet negative up to a 25×30 bromide print on Eastman's permanent bromide C paper, using the arc electric light as means of illumination.

This, to some of you, may look as a needless exertion, inasmuch as by chance you do not use bromide paper in your studios, and therefore, perhaps, you think you would not care for it, because, you may argue, "so many of the so-called cheap photographers use it." Be this as it may, many of our very best photographers in this country, as well as Europe, use bromide paper, producing exceedingly artistic effects, and to great advantage to their ledgers; therefore, needless to say, of great advantage to themselves.

Enlarging on bromide paper ought to be of interest to all of you, because a good enlarging process is a great desideratum in every first-class photographic studio, though, not having had the advantage of using a process of this kind, some of you may not feel its necessity.

It is a well-known fact that in the averages of cases small-size negatives give better satisfaction to patrons of photographic studios than larger ones. There are many reasons for this, in which the lenses used play no small part, causing more or less distortion to a much greater degree in large work than in small; the operator is more accustomed to small work; it takes less time of exposure, and costs less if a small plate is spoiled; therefore, perhaps, more willing to try it over if the first sitting is not up to your usual standard. Many other reasons could be enumerated in support of my assertion that prints from large negatives, as a general rule, do not give as good satisfaction as prints from small negatives.

Having produced a good small negative, which pleases the sitter, it is a very easy matter, by using a little honourable business tact, to sell your customer a good, artistically enlarged picture from the same negative. Or will you argue, "A photographer has not the same right to call attention to his goods that other respectable business men have?" or perhaps you will say, "It is not necessary to call especial attention to our large work, for our customers are aware of our facilities for producing that class of work before entering our studios." The latter is, no doubt, true in many cases, but experience has taught every first-class business man in the land that their goods must be prominently brought to the attention of customers and the public time and again if success shall be theirs. In other words, I contend that, while you practise photography as an art, it behoves you also to practise it as a practical business man, and with that end in view I wish to call your attention to the bromide process as a very valuable auxiliary.

A very successful method of introducing large work, as practised by many, is to have an enlarged print ready for the purpose of showing to the previously selected customer when the small contact prints are called for; then, by slipping the said enlargement into a convenient, suitable *passe-partout* or frame, explaining in the meanwhile the different styles in which the enlarged picture can be finished, such as crayon, oil, or pastel, a sale will invariably follow, and, if occasionally no sale, the loss in cost of material in making up the print is very trifling indeed.

While on the subject of frames, I wish to show you what enormous difference it makes to a large bromide print to be appropriately framed, thus:—(Demonstration).

Also the difference one hour's crayon work makes on a good bromide print.

When first the bromide process was introduced in this country there was much speculation rife as to the permanency of bromide prints; but this has ceased now, for it has been conclusively proved, when bromide prints are properly made from good permanent bromide paper, they are as permanent as any other photographic prints whatsoever.

To prove this I call your attention to Professor H. S. Starnes's (of London) experiments (see THE BRITISH JOURNAL OF PHOTOGRAPHY, November 11, 1887), and we have many others' substantial evidence in corroboration of this statement; besides, we have our own tests and experiments.

When the bromide process was first introduced in this country many photographers went into using it, some only to soon give it up, claiming that it was much more difficult than they had anticipated. This was chiefly due to the great degree of latitude of possibilities in results, as well as the different methods which can be adopted to secure good results; from a strong negative it is possible to produce either strong or soft prints, and the same from a soft negative. (This I will endeavour to explain more fully in my demonstration.)

This yielding flexibility of the process proved a stumbling-block to some of the busy photographers on their first attempts. However, the demand for Eastman's bromide paper has been on the steady increase from year to year, the last year's sales being much larger than any of its predecessors.

Some photographers are successfully using hydroquinone and also eikonogen as developing agents. After extensive experiments we have concluded that the iron oxalate is the very best developer for bromide prints. However, I concede that there is more latitude in the actual development with the two former developers, inasmuch as the operation can be commenced with weak developer, increasing in strength as it is found necessary. On the other hand, with the oxalate developer we get a purity of white and blacks unattainable with the others.

To proceed with the demonstration.

If, upon examination of the negative to be enlarged, it is found difficult to determine the correct amount of exposure to be employed, do not venture to expose a large sheet of bromide paper, but, as a guide, place in position on the easel a small piece of bromide paper—that is, after the image has been thrown up to the proper size and focussed sharp, then expose and develop.

If daylight is used for exposure, care must be taken to permit as little time as possible to elapse between the exposure of guide and print, as the light is apt to vary, making your guide useless. On dense parts of the negative extra time can be given on the same plan as vignetting, and very deep shadows can easily be held back by means of a shaped card on the end of a strip of glass.

The amount of bromide solution used in developer has great influence on the quality of bromide prints. For weak negatives the amount of bromide solution can be doubled or trebled to advantage, and for strong negatives it can be reduced to half or a quarter the normal amount. However, with fresh, normal developer some bromide solution ought always be used, or a measly, mottled deposit may occur in the print.

To ensure permanency, care must be taken to remove all the iron solution after development by washing thoroughly with acid solution, and all white light excluded until the print is thoroughly fixed in the hypo, and the final washing must be very complete.

The apparatus necessary for bromide enlarging, as you see, is very simple, a camera, lens, and easel being the most essential parts.

Daylight is very good for enlarging, giving a smooth, even illumination. However, when a large quantity of work is to be provided for, the arc electric light is most convenient, as it is powerful and practically uniform.

After the bromide demonstration, I propose to make a flash negative of the audience with a Kodak camera, develop the same, and make a lantern slide from the negative while still wet, employing the same apparatus to make the slide as used for enlarging, this being a very practical method.

G. D. MILBURN.

PHOTOGRAPHS, AUTOMATIC OR OTHERWISE.

WHEN a particularly ridiculous company promotion comes under notice, people are very apt to describe it as the most absurd and outrageous they have known. Which of the many schemes to which this description has in turn been applied is really entitled to claim it for its own it would be difficult to say, and we must not just now attempt to determine. We may,

however, without risk of serious contradiction, venture to express the opinion that one of the most ridiculous and outrageous promotions of last year was the Automatic Photograph Company, Limited. It was probably not surpassed by any competitor on the roll of folly, unless it were by its twin brother, the Automatic Photograph (Foreign and Colonial) Company, Limited. Unquestionably the first was a fool of a thing, and, if possible, the second was worse. The scheme, as some of our readers may remember, was to acquire from one Isaac Joel—who, by the way, has since found his way to the Bankruptcy Court—letters patent of an automatic machine which was to develop the "put a penny in the slot" idea in the direction of supplying the public with counterfeit presentments of themselves at the rate of a penny per head, and in the short space of time of forty-five seconds each. For the patent the vendor was to receive the modest sum of 60,000*l.*, some two-thirds of which were to be paid in cash, and the balance in shares, including a large allotment of founders' shares.

According to the prospectus, the profits to be made out of the venture were simply enormous. The arithmetical calculation by which this result was arrived at was a model of ingenuity. Nevertheless, it was scarcely calculated to be convincing to any ordinary mortal who had an average share of wits about him. With an appearance of modesty which, curiously enough, does seem always to characterise promoters of ventures of this kind, the calculation in question proceeded on the assumption that the machines would take only thirty photographs a day, although it was believed that they would readily supply 300. As Messrs. Salter, of West Bromwich, were under contract to supply at once 1000 machines, the process of calculation was that 1000 machines at 30*d.* a day would yield 125*l.* per day. Allowing seven days a week, and deducting one halfpenny per photograph for the cost of materials, the neat little profit of 22,812*l.* per annum was arrived at. Then it was calculated that two-thirds of those who were rash enough to invest a penny in a photograph would invest another halfpenny in a frame for it, and these, it was estimated, would yield a further net profit of 12,251*l.* per annum. Nor did the ingenuity of the compilers of this prospectus stop here. 1*l.* per thousand was to be obtained—in fact, there was said to be a distinct offer to that effect—for advertisements on the back of the photographs, and that was to yield 10,950*l.* a year more, making the receipts the neat little sum of 46,013*l.* From this a deduction for collection, rental of machines, depreciation, management, &c., to the amount of 15,000*l.* was made, leaving a yearly net profit of 31,013*l.*

This was to be the result of merely touching the fringe of the business that was waiting to be done. The directors were of opinion that this amount of profit was capable of being increased fivefold, and in addition to that amount still further revenue was to be derived from advertisements on the top, front, and sides of the machine, so that apparently the immediate annual profit was to be over 30,000*l.*, and the ultimate revenue somewhere between 150,000*l.* and 200,000*l.* a year. All this on a capital of 100,000*l.*! Was there ever anything like it? Yes—often, as the result has proved. The whole thing was and is fallacious, and it is sufficient to point out one weak spot only in the calculation; for that weak place alone means a hole big enough to let all the prospectus profits slip through. As we have indicated, the calculation went on the assumption that each machine would take half-a-crown a day for photographs, and tenpence per day for frames, giving a total of 3*s.* 4*d.* The cost of the materials for the photographs was to be 1*s.* 3*d.*, and for the frames about 2*d.*, leaving a net receipt per machine of rather less than 2*s.* But, in order to take this money, it is necessary to have an attendant. The machines are not automatic in any correct sense of the word—they require a person to keep them in working order. Apart altogether from that, they require an attendant to put the frames on the photographs. Yet in the calculation in the prospectus no allowance was made for this attendant, and how could one be paid for out of profits of less than 2*s.* per day per machine?

The natural result is, as should have been obvious to every one except the most obtuse, that every machine that is working is likely to be a dead loss. At present the Company has 150 machines in operation, and is losing 150*l.* per week. The contrast between that horrible result and the tempting picture painted in the prospectus is too obvious to require elaboration. It is not surprising, therefore, that within very little more than twelve months since the Company was floated we have petitions for winding up and reconstruction. Of course the directors never got the money they invited the public to subscribe. Unfortunately, however, some few people were simple enough to apply for shares, and of course they got them. 30,000*l.* in cash was paid for the patents, and the balance in shares, and at present the Company has in hand and on deposit about 1454*l.*, with a certain number of machines, which, if they work at a loss, are practically valueless.

The Foreign and Colonial Company, which was floated a few days later, was even a more outrageous affair. For the patents, other than those in the United Kingdom, 200,500*l.* was to be paid, of which 130,000*l.* was to be in cash. It was too much of a good thing, and, for the credit of our race, be it said, that fewer simpletons responded to that bait than to the previous one. Altogether the capital of the Company was 251,000*l.* in 5*l.* shares, but only 3035 ordinary shares were issued to the public, upon which 14,037*l.* has been paid. Of course, with that meagre response the promoter had to abandon all idea of getting 130,000*l.* in cash for his scheme, and ultimately he consented to take the whole of his payment in shares. At present the position of this Company seems to be somewhat this: It has 3803*l.* in hand, and, for the balance of more than 10,000*l.*, all that it appears to be able to show are twenty machines, which have probably cost 600*l.* for the lot, and a debt of 5000*l.* stated to be due by the British Empire Debenture Corporation. The whole business is a scandal, yet the directors have the audacity to invite the shareholders to consider a reconstruction scheme under which the two concerns would be amalgamated. If the shareholders are wise, they will insist upon both ventures being wound up at once, in order that they may secure the remnant of their money that has not yet been frittered away. To throw good money after bad would be folly. The whole thing is a delusion. It has not paid, and it never will. The machines do not produce a photograph that any self-respecting being would care to own. The productions are almost invariably most miserable daubs, and require a vivid imagination to enable those who look at them to recognise that they represent a human being at all. It would be a charity to the shareholders and to humanity at large if the whole of the machines could be buried in oblivion, and the memory of this ludicrous fiasco with them.

—*The Daily Oracle.*

ON THE UTILITY OF MODERN PHOTOGRAPHIC APPARATUS.—III.

During the last few years one of the most noticeable features in matters photographic has been the steady progress made with regard to the introduction and use of hand cameras, and now unquestionably they are all the rage, and are as plentiful as blackberries, as the saying goes, and so much so that they have become a veritable nuisance and byword to the tourist proper. I was forcibly struck with a remark which I heard Tom Fullerton, the well-known ferryman at Corrie, that lovely retreat in the island of Arran, make on a recent occasion. "Mon, I wunner what the world's comin' tae. I hae had my pictur drawn by eight folk the day, and I hae seen far mair on board the *Ivanhoe*."

I don't know to what extent this sort of thing is carried on in other quarters, but here on the Clyde one cannot put a foot on any of our magnificent fleet of steamers for a day's sail but they are met with numbers of these plate-spoilers, until the practice of photography has virtually become a byword, and is scoffed at. There are times and seasons for everything, but I fancy, had I been one of the eight on the *Ivanhoe* on the day in question, I should have put my plate-spoiler out of sight. In the hands of clever workers, I am aware that some good little things now and again have been got, but I firmly believe the introduction of hand cameras, to the exclusion of a good, sensible outfit, has done much to lower the general tone of work, and to bring ridicule on the pleasurable practice of photography. In the main, were anything like satisfactory results got by those who go strutting about the decks of our steamers and corners of the streets, I should be the last to raise my voice against the use of a hand camera, but, when I see such absolute failures attending ninety-five out of every hundred plates exposed by the hand, I think it high time to raise my voice against a practice which, in itself, has no utility, but, on the other hand, frequently savours strongly of impertinence in the hands of some unblushing youths, who have no hesitation in levelling their box at any pretty passenger they see.

I am aware some of my readers may differ from me in their opinions of hand cameras, and assert that good all-round work can be done with them, but in nearly every case where satisfactory results have to be recorded I think it will be found that some method of holding the camera steady has been resorted to, such as by using it on a light stand, &c. We seldom hear of failures, however, and I am satisfied they tot up to ninety per cent. at least.

In making these remarks I am far from wishing it to be understood that I condemn all kinds of modern cameras; such is very far from my desire. It has been my pleasure very frequently to see magnificent results derived from some of our superior portable boxes, chiefly of the magazine form; but these results, as I have said, are not got by taking up the box at random, and pointing it square at this or that item of interest in a big hurry. Those results are got by using a good, sensible stand, and when such is adopted a really good magazine camera will yield results in small sizes quite equal to any other method of working; but it is against the silly toys with which the market is flooded from time to time that a beginner should guard, and bear distinctly in mind that the taking of what is now commonly termed a *snap* shot is more likely to result in failure than success. What I fear is, that this sort of thing will tend to lower the status of photography as a pleasurable occupation, for I am certain already it has lowered the quality of work turned out. I think, however, quite recently I can read through the lines, and see a reaction setting in by those who have sufficient brains to learn by experience that *hand-camera work* is, after all, not altogether such a cheap amusement

as many imagine; and, on looking round, I can see some workers of note, who were at one time carried away with the novelty of the thing, returning to their first love, viz., a good, sensible half or whole-plate camera.

Doubtless the idea that these hand cameras, or, as some choose to call them, detective cameras, can be used without the knowledge of any bystander, has had something to do with the extraordinary amount of popularity they have achieved; but this idea is entirely wrong, and it must be a very smart man, and a very smart bit of apparatus, that would now, in such an advanced age of photography, permit of such being entitled to the name of detective. The truth is, the public are getting tired and too well used to the game; and to my thinking, when a party wants to make a few pictures, it is far better that the work be gone about in an open, straightforward way, for, depend upon it, the general public now know quite well what an oblong or other shaped box means when carried under the arm or slung over the shoulder in tourist fashion by Harry when out for a holiday.

Into the numerous forms of hand cameras it is not my intention to enter. When such are capable of carrying a good stock or magazine of half-plates (say, a supply of twenty-four), and is capable of being utilised for stereoscopic work when desired, such is, without doubt, a distinct advance on the old form of camera, with its limited number of double dark slides, &c., for toning purposes; but when a few plates only are required, or one special job is being taken in hand, then recommend me to a good old square form of camera and double back, so as to get out your plate handy, and only fill the slide when required, for a plate does not generally improve by being kept in a slide.

Another item of importance in hand cameras is the cost. It has often been a matter of surprise to me that people can be found to readily part with their 8*l.* or 10*l.* for a really good thing *theoretically only*. Doubtless the bulk of this cost is contained in the special form of lens which it is necessary to employ to permit of the plates being very rapidly exposed. But, then, after all, what does one get for the money? A paltry quarter-plate outfit at best, with hardly one item capable of being used for any other branch of photography; and very likely, after all, the lens will not honestly do its work at *f*-6, an aperture which is now looked upon as a necessity for street scenes and many other similar subjects. In olden times, when lenses were just as good as in later years, somewhere about *f*-11 was the largest working aperture which the leading opticians gave to the class of lenses known as rapid symmetrical; and at this one, as a rule, could always rely on getting a lens to work honestly all over a given size of plate for which the instrument was said to be adaped; but, as time wore on, there were those who advertised that their lenses were more rapid, and would work at *f*-8, then down to *f*-6; but here, again, utility is entirely sacrificed, and when any one sets down, and compares the entire working of one of the good old lenses with the modern type, it is most likely he will find, after all, that *f*-6 means only partially covering a plate sharply, and those makers who honestly advertise the covering power of their lenses with open aperture so much, and stopped down so much more, to my mind they are dealing honestly with the public, and as such deserve their support. I have met with numerous cases where lenses have been sold to cover a certain size of plate with an aperture equal to *f*-6 of its focal length, but which, on trial, failed miserably in doing more than merely giving a disc in the centre of the plate tolerably sharp.

Some may consider this an advance on the good old form of working aperture, but I don't; and when such is desired it will most likely be found that to cover, say, a whole plate with *f*-6, a lens of larger calibre will be required than is generally sold for the size of plate in question.

In the matter of a universal adapter for all sizes of lenses to the one front, I some time ago saw a very useful bit of apparatus. This was in the shape of a flange, which worked after the principle of the iris diaphragm, and was made sufficiently strong to carry all sizes of lenses from a certain size down to the smallest. The aperture was contracted just like an iris diaphragm, and gripped the screw of the lens quite tightly without permitting any light to pass. This is a distinct advance, and does away with the bother of unscrewing the old form of brass ring adapters. I fancy this handy flange is not so well known as it deserves to be.

T. N. Armstrong.

WHO WANTS A MEDAL?

The following extraordinary letter has been handed to us; it is lithographed, and has probably been sent around to the manufacturers and dealers. It will be seen that the writer holds out as an inducement for those who intrust him with their exhibits that *he* will *secure* for them the "highest awards." Have medal awards come to this?

"Tasmanian Exhibition, Launceston, 1891–2."

"Dear Sir,—The Tasmanian Exhibition, which will be opened on the 16th of October this year, promises to be of great importance to manufacturers forming the trade with Australasia.

"I am now completing arrangements with several leading firms to take out with me articles of their manufacture with a view to exhibit same, and now suggest to you to send out a small suitable exhibit.

"In addition to displaying your goods and doing all necessaries, *securing highest award*, &c., I would thoroughly push the sale of your goods throughout Australasia. Your exhibit would at the same time be of the utmost value to merchants out there, who could examine your samples, and no doubt large orders will follow.

"No duties are levied on exhibits. Awards will be made, and freights will be greatly reduced.

"I shall be happy to hear if I can secure the necessary space for you.—Yours faithfully,

"Herbert Saunders."

Foreign Notes and News.

Herr Max Lantner, whose paper on *Who was Rembrandt?* formed one of the principal features of the last meeting of the Silesian Society, claims to have discovered and perfected a new process of intensification, which, he states, is of special value for photographing old-faded manuscripts, particularly papyrus-rolls, palimpsests, and similar articles. This will probably be good news for the specialists of the British Museum and other archæologists, though we are not aware that they make as much use of photography in their researches as they possibly with advantage might. The main principle of Herr Lantner's method consists in exposing chloride paper from *both* sides under the same or exactly corresponding negatives.

M. Marez has recently laid before the "Académie des Sciences" a paper of considerable scientific value on the flight of insects as elucidated by means of photography. The instrument employed by M. Marez was one of his own invention, and entitled by him the "Photo-chronograph." That it is an arrangement of considerable delicacy may be concluded from the fact that by its means he was enabled to obtain exposures of the insects of only $\frac{1}{2500}$ of a second in duration. The principal method employed with the insect itself was to insert him into a glass box, placed sufficiently far from the instrument. He was then encouraged to fly about the box—the rays of the sun from a heliostat concentrated upon him by a large condenser doubtless serving as an additional inducement—and exposed. As a matter of course, an objective with great depth of focus had to be employed so as to allow for variations in the creature's position.

M. Guntz also makes a communication of some length to the same learned Society. He has been attacking the time-honoured problem of the action of light on silver chloride. His theory is that the action of light on the chloride is *not*, in the strict sense of the word, to decompose it, forming a subchloride, as has often been supposed, but merely to convert it into an isomeric compound, in which the chlorine is, as it were, less firmly attached to the silver—so much less firmly, in fact, that under the action of the developer it leaves hold of the silver altogether. M. Guntz has succeeded in producing this isomeric chloride, which is reducible by ferrous oxalate without the action of light at all. This he effects by boiling the chloride—we presume the chloride emulsion—in the dark for several hours, and cooling gradually. It is only, he holds, when the chloride is exposed to light sufficiently long to discolour without the aid of a developer that chlorine is given off, and that this is so he was able to demonstrate by effecting the exposure *in vacuo*, when chlorine was found to be set free.

The last *Nachrichten* has a very good instantaneous illustration. The chimney of a manufactory, some one hundred feet high, near Brunswick, was to be thrown down, to which end it was scooped out on one side and shoved over from the other. Herr J. Schombart was fortunate enough to secure an excellent shot just as the chimney was assuming the graceful, but inconstant, condition of equilibrium generally associated with the Tower of Pisa, and a couple of seconds before it fell in a crash and a million fragments to the ground—we mean the chimney, not the Tower of Pisa. The exposure was one-fiftieth of a second.

Dr. E. Vogel publishes a short but highly valuable paper in the *Nachrichten* giving the results of some obviously very extensive researches into the sensitiveness to light of the eosine dyes. He finds that the slightest trace of chlorine, bromine, or iodine, in the resorcin or phthalic acid residues of fluorescein greatly increases their sensitiveness to light. Other experiments showed conclusively that the bleaching of the eosine colouring matters by light was not due to oxidation, as tests were made with hydrogen peroxide in the dark for several hours, and no alteration of colour was observed.

A BRITISH MUSEUM OF PORTRAITS.

THE idea of "a British Museum of Portraits," to be executed by photography, was conceived as long ago as 1864 by Mr. James Glaisher, F.R.S., and brought before a meeting of the Council of the Amateur Photographic Association, of which the Prince of Wales is the President. The suggestion was cordially approved by the meeting, and photographs were taken in *carte-de-visite* size and deposited at the South Kensington Museum. At first, however, only fading silver prints were made, and these were so unsatisfactory that for some years the undertaking was held in abeyance. By the discovery and perfection of the process of permanent carbon printing an opportunity has at length been afforded of resuming the prosecution of the work under infinitely more favourable conditions, and as a result a collection of excellent portraits is now being made by the Amateur Photographic Association. Already there are nearly two hundred large permanent carbon portraits deposited in the Art Department at the South Kensington Museum, and about as many more are ready to be sent. These latter were on exhibition at a private view on Saturday last at 58, Pall-mall, S.W., the studio of Mr. Arthur J. Melhuish (photographer royal). They embrace photographs of men of distinction in politics, art, science, letters, and the learned professions, and are excellent both as likenesses and as specimens of photographic art.

A dinner in connexion with the private view was given by the Council on Saturday evening at the offices of the Association, 58, Pall Mall, S.W., to the representatives of the press and others. The Duke of Teck, one of the vice-presidents, occupied the chair, and there were also present Mr. James Glaisher, F.R.S., Mr. W. Wood, Mr. Teasdale Buckell, Mr. A. J. Melhuish, Mr. A. N. Melhuish, and Mr. J. Traill Taylor. Letters regretting their inability to be present were announced from the Duke of Cambridge (Vice-President of the Association), Sir P. Cunliffe Owen, and Sir J. Whittaker Ellis, M.P.

The Chairman having proposed the usual loyal toasts, which were cordially drunk,

Mr. GLAISHER proposed the toast of the evening, "Success to the British Museum of Portraits." In doing so he traced the history of the idea of that collection, and said that he had always felt in reading the works of an author that he would have understood them much better if he had had a photograph of the author before him. It was now more than a quarter of a century since they had attempted to do for those who should come after them what had not been done for themselves. The non-success of the attempt at first was due to the fact that at that time there was no process of photography sufficiently perfect to admit of the carrying out of the idea in a satisfactory manner. Now, however, with permanent carbon printing, they were in a position to do what in the first instance they could not even attempt. Great credit was due to the Hon. Secretary of the Association (Mr. A. J. Melhuish) for the earnestness and cheerfulness with which he had taken up the suggestion and carried it out. He concluded by proposing the toast, and coupled with it the name of Mr. A. J. Melhuish, who, in responding, gave some further details of the Association and its work.

Mr. J. Traill Taylor suggested that with a view to rendering the collection as complete as possible, application should be made to photographers throughout the kingdom, many of whom doubtless possessed negatives of deceased men of mark who might not otherwise be easily obtainable by the Council. From his knowledge of the profession he felt assured that they would readily aid in the furtherance of such an excellent object.

Several other toasts followed, including the health of the Chairman.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,374.—"Improvements in Portable Photographic Apparatus adapted to take Views." W. F. STANLEY.—*Dated July* 21, 1891.

No. 12,408.—"An Improved Apparatus for Registering Photographs, applicable to Film Photograph Roll-holders." W. ACKLAND.—*Dated July* 22, 1891.

No. 12,527.—"Improvements in, and connected with, Magazine Photographic Cameras." W. O'REILLY.—*Dated July* 23, 1891.

No. 12,961.—"Improvements relating to Photographic Cameras and to Appliances for Changing Plates or Films therein." B. J. EDWARDS.—*Dated July* 31, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 13,836.—"Photographic Films." ACWORTH.—Price 4*d.*

No. 13,867.—"Photographic Cameras." CLARKE.—Price 8*d.*

No. 18,403.—"Photographic Cameras." MILLER.—Price 8*d.*

1891.

No. 8557.—"Photography." BOULT.—Price 6*d.*

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHY.

(A Communication from John North, of New York, in the County and State of New York, United States of America, Inventor.)

No. 8557. ALFRED JULIUS BOULT, 323 High Holborn, Middlesex.—*July* 4, 1891.

THE invention has reference to a new process of producing photographs, images, and pictures on hard surfaces, as glass, metal, porcelain, &c., and the invention consists in applying to such a surface a coating of a solution of guaiaretic acid, or of the guaiaretate of a metal or organic base, and submitting the so-coated surface under a photographic negative or a transparent positive of the image to the action of light, whereby the parts of the coating exposed to the light through the unaffected parts of the negative or transparent positive become hard and insoluble, then developing the coated surface, and finally applying to the film a suitable acid, whereby the picture is etched into the surface. The hard portions of the film which are not affected by the acid are then removed, and the etched plates, if desired, blackened by means of a suitable pigment. If coloured glass pictures are to be produced, the so-prepared surface of the glass plate is painted with the desired colours, which are burned into the glass plate.

It has been found that the guaiaretic acid (C_{20} H_{26} O_4) or its metallic salts, or those made of guaiaretic acid with organic bases, by exposure to light, change their properties as to solubility, and as to resistance to oxidising agents.

The guaiaretic acid, as well known, is freshly prepared, soluble in alcohol, ether, bisulphide of carbon, chloroform, acetic acid, benzole, and other substances, but, by exposure to light, it becomes less or entirely insoluble in these substances, like asphaltum or resinates, that is to say, the salts of abietic acid (C_{44} H_{64} O_5). As far as the researches go, guaiaconic acid (C_{19} H_{22} O_3) is formed by this action, which latter is still more oxidised by certain likewise acting substances. A similar effect takes place by exposing the salts of guaiaretic acid with metals or organic bases, also the chlorine, bronine, and iodine substitution products or the corresponding salts, to the action of light.

Certain colours, for instance aniline violet, magenta red, safranine, when combined in minute quantities with guaiaretic acid or its salts, accelerate the action of the light, *i.e.*, they act as sensitisers. A thin coating of this acid or its salts, laid upon a hard surface and exposed to the light for a certain time, becomes impermeable to dilute mineral or organic acids. These properties of guaiaretic acid or its salts, as aforesaid, render them useful for the production or reproduction of pictures, photographs, ornaments, *i.e.*, by means of the actinic rays.

In carrying out this invention to produce a photographic picture, image, or ornaments on a hard surface, as metal, porcelain, glass, lithographic stone, &c., I first dissolve 100 parts of crystallised guaiaretic acid, or, to obtain a more sensitive film, of 120 parts of dry amorphous guaiaretate of silver or of a corresponding quantity of the zinc, lead, or magnesium salt (which latter are less sensitive than the silver salt) in 500 parts of pure benzole. I may use the salts coloured with three to four per cent. of aniline violet, or another aniline colour or colours. I then prepare a rubber solution by dissolving 7½ parts of dry caoutchouc in 500 parts of benzole. Instead of rubber or guttapercha, a collodion solution, containing one to two per cent. of nitro-cellulose, may be used, but I prefer the above-described composition of rubber.

Both solutions are then thoroughly mixed together and the well-cleaned surface on which the picture is to be produced is carefully coated with the mixture, thus obtained, in the dark. Then the so-coated surface is exposed under a negative or transparent positive to the action of light, a ten to twelve minutes' exposure to direct sunlight being sufficient to harden the exposed parts and to render them insoluble in the developing bath. As the best bath for this purpose I use a mixture of one part of benzole and five parts of spirits of turpentine. Of course other developers can be used. The parts of the film which are not affected by the action of the light are thereby removed, and the picture appears on the surface. The plate is then dried and etched by appropriate acids, according to the nature of the surface to which the sensitive film is applied. Another method of applying the light sensitive properties of the guaiaretic acid, or of the guaiaretates to the art of production of pictures, images, or ornaments, is the following :—

I mix a neutral aqueous solution of ten parts of guaiaretic acid in any alkali with 100 parts of a dilute solution of gelatine ; then I coat the well-cleaned surface with this solution, and dry it in the dark in a horizontal position by a heat not exceeding 120° F. The object is then put into a tray containing a weak solution of sulphuric, hydrochloric, or any other suitable acid to precipitate the guaiaretic acid in the gelatine film or in a weak solution of a salt of a metal, for instance, of nitrate of silver, sulphate of magnesium, &c., to form a guaiaretate. The film can be more sensitised if it is brought after thoroughly washing in a very dilute bath of an aniline colour, as above mentioned. After a second drying the film is exposed under the negative or transparent positive, and developed by means of a benzole developer. The gelatine film is then, after drying, hardened by chromic or common alum, tannic acid, or any other suitable substance. The surface is then etched in the manner described. If the picture is produced on a lithographic stone or on a metal plate, the stone or metal plate can be used as a printing plate.

If it is desired to produce a coloured glass picture, the etching produced on the glass plate according to the described process is rubbed in with a black pigment and the plate burned, whereby the fundamental picture is fixed on the glass plate in lines or half-tone. The colour powders or colour mixtures as used in the art of glass-painting are then applied to the fundamental picture, and the glass plate then burned in a muffle-furnace.

The glass pictures produced by this method have a highly attractive appearance, as the etched and blackened background imparts to the same an effective and natural expression.

The guaiaretic acid which I used is prepared in the following way :—two parts of guaiacum are dissolved in ten parts of alcohol filtered and concentrated to a thin syrupy solution, then it is mixed with a warm concentrated solution of one part of potassium hydrate. After twenty-four hours' standing the mixture forms a mass of the consistency of a pulp, and is pressed through a filter-

ing cloth. The remainder is thoroughly washed, first with alcohol and then with water, and crystallised by means of dilute alcohol.

Having now particularly described and ascertained the nature of the said invention, as communicated to me by my foreign correspondent, and in what manner the same is to be performed, I declare that what I claim is:—1. The process of producing photographs, images, and pictures on hard surfaces, which consists in coating the surfaces with a solution of guaiaretic acid, or of the guaiaretate of a metal or organic base, subjecting the so-coated surface under a negative or transparent positive to the action of the light, and after developing the same subjecting the surface to a suitable acid, by which the photograph or image is etched into the surface substantially as set forth. 2. The method of producing coloured glass pictures by subjecting the glass plate coated with a solution of guaiaretic acid, or of the guaiaretate of a metal, or organic base, under a negative or transparent positive to the action of light, and, after developing the same, subjecting the surface to a suitable acid, then blackening the etched parts of the glass plate with a suitable pigment and burning the plate, then applying to the picture in lines or half-tones thus produced the desired colours, and finally burning the colours into the glass plate substantially as set forth. 3. In the art of photography the employment of guaiaretic acid, or its metal, or organic salts, as the essentially sensitising medium substantially as set forth. 4. As a new article of manufacture a photograph made by means of guaiaretates or guaiaretic acid substantially as set forth.

Improvements in the Manufacture of Photographic Films.

No. 13,836. Joseph John Ackworth, Brondesbury, London, N.W.—*July* 4, 1891.

The object of this invention is to facilitate the economic manufacture of gelatinous photographic films, so as to render them sufficiently impervious to the action of water for photographic purposes.

My invention consists, first in preparing a film of gelatine or other analogous substance, such as isinglass, either toughened or not, by coating a suitable support with a strong solution of gelatine, preferably containing glycerine or other similar material, in order to render it pliable. Such support may consist of a band of American leather cloth of suitable quality and dimensions, or of any other suitable material. When the gelatine coating has set and dried, it is stripped off the support in the form of a film, and rolled on to a roller, after which it is passed through a solution of pyroxyline or nitro-cellulose, so as to coat both sides of the film with a thin coating of the solution, thus rendering the film waterproof, or nearly so, and facilitating the subsequent manipulation of such film. The solution employed consists of pyroxyline dissolved in any suitable solvents, such as mixture of amyl, alcohol, and amylic acetate, made of any suitable strength, say, containing from about three to about five or six per cent. of pyroxyline. The film is then dried, either by passing dry air over the coated surfaces, or by placing it in a room kept at a suitable temperature, or by passing it through a suitably constructed hot-air chamber containing circulating hot air at, say, 200° Fahr. This latter method will be found very convenient, particularly when long lengths of film have to be coated, as they can be rolled as they are withdrawn from the hot-air chamber, thus economising space.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—Coating gelatinous photographic films on both sides with a solution of pyroxyline or nitro-cellulose so as to render them waterproof, or nearly so, all substantially as hereinbefore described.

Improvements in Photographic Cameras.

No. 13,867. John Henry Grayson Clarke, Abbey House, Kenilworth, Warwickshire.—*July* 4, 1891.

This invention consists, firstly, in improvements in arrangements in connexion with the change box of hand cameras, and is effected as follows: The plates are placed in an upright position in the upper portion of the box, in sheaths, held at their bottom angles in a groove or slot, and kept in position one behind the other by a spring pressing against the rear one.

At the bottom of the box is a tray, arranged so that pressure on a spring button will actuate a bar, and cause the front plate to fall down two slots into this tray. Upon the sides of the tray are flanges, to prevent the plates falling excepting when opposite the before-named grooves. The tray is pivoted, so that it may be tilted up back into the box by means of a handle outside after it has received the plates, a piece forming the back of the tray then becoming the bottom to hold the plates in a groove, from which they may be slid to be removed. The box has "light-tight" back and front sliding plates, and it can be detached from camera without interfering with the plates inside.

The second part of the invention consists in improvements in film holders in connexion with cameras generally, and is constructed as follows: The film is placed upon a roller at the top of the box, and passed over a guide roller through a slot at the top of the front of the box, and from thence downwards to expose it. It is then passed back through another slot round a bottom roller, and attached to a fourth roller.

This last-named roller is constructed as a spring roller, so as to wind the film automatically on to it, but it is checked in so doing by arrangement similar to a clock escapement, placed upon the shaft of the bottom roller, working so as to allow only a given quantity of film to be wound at a time. The required lengths of film are perforated by means of a bar carrying pins, which take into holes in this bottom roller. The bar is attached to the catch of the escapement, and it is actuated by means of a press button and rod. The action is as follows: pressure upon the button moves the bar towards the roller, and at the same time releases the catch and allows the roller to revolve until stopped by the other catch of the escapement when the pins fall into the holes in the roller and perforate the film. The two rollers upon which the film is wound are removable for refilling. Another part of my invention consists in constructing the camera so as to enable me to attach at the back thereof an enlarging lantern, thereby dispensing with the necessity of using a separate camera for enlarging purposes.

The description of hand camera (that is to say, the portion containing the focussing arrangement) which I prefer to use in combination with the above-named improvements, is a front case, or box, to the back of which may be attached the box containing the plates, the film box, or the lantern, as desired. This front box contains the lenses fitted with the ordinary bellows action.

My improvements also refer to instantaneous and time shutters for cameras, and consists, firstly, of constructing instantaneous shutters in what is known as the fan shape.

The fan works between two plates, with a circular groove in the front plate, through which a hook projects, to which is attached an elastic band, which, being attached to a peg on the front plate, will draw the fan forward when released from the catch, which consists of a peg passing through the front plate into the fan, and held down by a spring. This peg is raised by a pneumatic tube and ball placed under the spring. My improvement consists, secondly, in the construction of time shutters as follows:—I form a cylinder and piston rod, connected by a rod to a rigid arm or crank, attached to the bottom of the fan-shaped shutter. To the bottom of the cylinder is attached a pneumatic tube, so that pressing the ball of the tube raises the piston rod and works the shutters.

A Shutter for Photographic Cameras.

No. 18,403. Edward Scott Miller, 11, Bath-road, Bedford-park, Chiswick.—*July* 4, 1891.

My invention relates to a shutter for photographic cameras, by which a rapid or regulated exposure may be effected, and the principal feature in my invention consists in the use of a means for entirely concealing the lens aperture except for the short space of time during which the exposure is being made, the object being to render the camera less conspicuous.

To carry my invention into effect, I provide in the camera front a sliding panel arranged so as to move in an upward and downward direction, and in so moving to uncover or cover the lens aperture.

On the inside of the camera front I provide a quadrant or other similar shutter with an opening working across the lens aperture, and to this shutter I couple the sliding panel by a connecting link in such a way that the movement of the shutter in making the exposure raises and lowers the panel, the action being so arranged that the panel reaches its highest point at the exact moment that the opening in the shutter has fully uncovered the lens aperture.

I provide for the panel remaining closed whilst the shutter is being set in the following way: Instead of making a fixed attachment between the connecting link and the panel, I provide in the link a longitudinal slot with a lateral recess at its upper end, in which slot a pin on the sliding panel works freely. A suitable spring attached to the link insures that the latter shall allow free movement of the shutter independently of the panel when the shutter is being moved in the direction for setting it, but on the reversal of the movement in making the exposure the same spring causes the recess in the slot to engage with the pin on the panel, thereby raising the latter in the manner already described.

Another feature of my invention is the special means for setting the shutter, consisting in the employment of an annular plate which is fixed upon the face of the quadrant concentrically with its axis. Part of this annular plate is made to project through the bottom of the camera front, and it carries a pin by which the movement necessary for setting the shutter is made.

The internal edge of this annular plate has suitably placed notches with which a spring catch engages to hold the shutter when set.

I may also provide for setting the shutter without uncovering the aperture by reversing the spring or motive power, and causing the quadrant or other disc to move in opposite directions. The link aforesaid need not then be slotted.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 10	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 11	Derby	Society's Rooms, Derwent-bldings.
,, 11	Manchester Amateur	Manchester Athenæum.
,, 11	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 12	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 13	Birkenhead	Association Rooms, Price-street.
,, 13	Manchester Photo. Society	36, George-street, Manchester.
,, 13	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 30,—Mr. F. A. Bridge in the chair.

Mr. G. E. Clarke showed a photograph of yellow flowers, the catlya, taken on an Ilford rapid plate without a screen. The yellows came out better than it was supposed could be the case on plates not orthochromatised with dye.

Mr. P. Everitt asked if any member had a sample of cotton that did not give density when used to make collodio-bromide. If so, he would like to experiment with it. He had found that by a particular method he could get density with a cotton that in the usual way gave a thin image.

Mr. A. Haddon said that at a former meeting Mr. Everitt had stated that the angle of vision, in a bright light, did not exceed sixty degrees, and had produced a diagram, taken from Helmholtz, which was supposed to support this proposition. He (Mr. Haddon) had undertaken to look up Helmholtz's statements, which he had done, and now read a translation, as follows: "Though the pupil, it is true, is a little behind the extreme edge of the cornea, in consequence of the refraction which takes place at the latter, it is still possible to transmit rays, which fall on the edge of the cornea perpendicular to the axis of the eye, so that the field of view with one eye answers nearly to a hemisphere, an extent which is not found in any artificial optical instrument. Variations of this field must naturally occur dependent on, in individuals, the size and position of the pupil; since, when viewing near

objects, the pupil approaches the cornea, the field of vision then increases a little. This is, at least, what I can easily confirm from my own sight by placing a brilliant light on the extreme margin of the field of view. A portion of the field of view is occupied inside, above, and below by portions of the face, the nose, the edges of the eyelids, and the cheeks; the field is only free when outside these. But the two eyes, when their axes are parallel and focussed for a distant object, embrace a horizontal angle of at least one hundred and eighty degrees." It was a pity that Mr. Everitt, in giving his diagram, had not turned over the page, and come to the explicit statement now read.

Mr. W. E. DEBENHAM said that, as to the diagram which Mr. Everitt had put forward to support his proposition, the argument had entirely depended upon the assumption that no light entered the eye except that which passed through the spot marked on the diagram as the nodal point, an entirely erroneous assumption. That nodal point was such for the axial ray only. Marginal rays did not pass through it. This statement he supported by diagrams on the blackboard, showing the eye in one case and a single photographic lens in the other, in which it was shown that marginal rays, when a stop was used, did not pass through the same portion of the lens at all that central rays did.

Mr. EVERITT admitted that if this was so he was mistaken on that point. What he contended, however, was that he was right in limiting the angle of view to sixty degrees, as beyond that, although there might be a sensation of light, there was none of form.

Mr. DEBENHAM replied that wherever light was perceived, and the direction from which it came, that was form, although it might be very vague. There was a gradual falling off of definition from the centre to the margin of the field of view, and to fix upon sixty degrees, or any other limit, as that of definition was altogether artificial and conventional.

Mr. A. MACKIE pointed out that the field of precise definition would not exceed about one degree. If there were to be a limit for accurate recognition of form, it would have to be about that.

Mr. DEBENHAM said that some had complained of the tackiness of caramel when used as plate backing. He had not found that difficulty with caramel made from crystallised sugar, nor with commercial caramel, if sufficient gum or gelatine were used with it. He now showed a plate thickly backed with a mixture of caramel and burnt sienna, without any other vehicle, and which had dried without any artificial heat in an hour.

Mr. HADDON said that they had heard and found the use of caramel in backing; but, as many members would doubtless like to prepare it for themselves, he had brought a small metal saucepan and sugar. If Mr. Debenham would now demonstrate the simplicity of the manufacture, it would be of service.

Mr. DEBENHAM then made the sugar into caramel by melting it over a gas stove, and continuing the heat until the caramel was formed. He explained that the saucepan must be iron or copper, and not be of soldered tin, or it might give way with the heat. It must not be filled more than about a quarter with the sugar, or when heated it might froth over and catch fire, and so prove dangerous. Perhaps the most convenient way was to make it over a kitchen fire when the fire had sunk low but there was still a good draught up the chimney to carry off the fumes, which, if a quantity was made, were rather suffocating. The melted substance was kept constantly stirred, and, when it began to froth strongly, was removed from the fire for a while, as the ebullition continued for some time. When the process was complete, the melted substance was poured on to a sheet of tin, and when cold broken up and distributed, it being explained by Mr. Haddon that it was only necessary to leave the lumps all night in a small quantity of water in order to have a useful solution.

A vote of thanks to Messrs. Debenham and Haddon closed the proceedings.

The Saturday outing for August was announced. It was for the 29th, and to be at West Drayton.

HACKNEY PHOTOGRAPHIC SOCIETY.

THE Council of the Hackney Photographic Society has decided to hold an exhibition on September 23 and 24 in the Morley Large Hall, Hackney, when, in addition to an apparatus section and members' work, there will be an open class. No subdivision of classes will be made, such as architecture, landscape, &c., the medals going to the best pictures irrespective of subject. Full particulars will be sent on application to the Hon. Secretary, Mr. W. Fenton Jones, 6, Victoria-street, King Edward-road, N.E.

RICHMOND CAMERA CLUB.

AT the ordinary meeting on the 31st ult., Mr. Davis in the chair, the subject for discussion was *Photographing Interiors.*

Mr. Faulkner showed negatives taken in some of the apartments at Haddon Hall with only one minute's exposure, developed with eikonogen, and showing plenty of detail and superabundance of density.

Other members contributed to the discussion hints on levelling the camera, backing plates, exposure, &c.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE sixth ordinary meeting of the twenty-eighth session was held at the Association Club Rooms, 3, Lord-street, on Thursday evening, July 30. Mr. Paul Lange (President) occupied the chair.

The following gentlemen were elected members:—Messrs. G. H. Addinsell and Richard Owen.

Mr. F. ANYON reported on the excursion to Miller's Dale, which had been attended by eighteen members and two friends, and was a decided success. Proceeding seven miles on foot from Miller's Dale to Buxton, about ninety plates were exposed, and a very successful photograph was taken of the party by Mr. Pennington. As the result of the excursion, a little sweepstake competition was arranged. Nine sets of pictures, of three each, were sent in. Mr. Thomas S. Mayne and P. H. Phillips were the adjudicators, the following being the successful competitors, viz., Mr. F. Anyon (silver pyro), first prize; J. Pennington (silver pyro), second prize; J. H. Swift (lignum vitæ), highly commended.

Samples of silver paper, by John Charles & Co., of London, and Adams, of Kent, were handed round and discussed.

One of the members, at present in Norway on a holiday tour (Mr. B. Boothroyd), had sent some quarter-plate negatives that he had developed "on tour," and which showed spots and curious finger-marks, as if some acid had eaten into the film. Various conjectures were assigned for the phenomenon.

Mr. Henry Crouch, of London, attended and exhibited his "Presto" hand camera. He also showed an ingenious shutter that he had designed for Mr. Dresser, and the same attracted much attention.

Dr. KENYON then read a paper and gave a practical demonstration on *Obernetter's Ferro-cupric Process.*

HALIFAX CAMERA CLUB.

THE new premises, 12, Crossley-street, Halifax, were formally opened on Tuesday evening, the 4th inst., the President (Mr. Edward J. Smith) in the chair. There was a very large attendance of members and friends.

The PRESIDENT said: I have purposely delayed taking the chair this evening until a few minutes past the appointed time, in order to give our members the opportunity of looking round what I may justly call our splendid premises. The studio is one of the largest, if not *the* largest, in the town, and the lighting seems capable of arrangement with the blinds and shutters for all classes of portraits, groups, &c. The entire end of the studio is a good plaster wall, distempered a very light French grey; this makes an infinitely better lantern screen than calico—no light passes through, as with calico; all, or nearly so, is reflected back to our eyes, and the dash of blue counteracts the trace of yellow in the light, thus giving a more perfect white. The furniture is, perhaps, at present somewhat scanty, but your Council have deemed it wiser to purchase accessories by degrees as required, rather than hastily to get together a large number of articles, some of which might turn out to be little more than useless lumber, and we have also had in view the taunt so often hurled at the head of unlucky amateurs, "They like to spend a lot of money on apparatus, and then have not any results to show for it." I should like our expenditure to be kept well within limits, and our results to show great proficiency, not only in the technicalities of the art, but in the artistic niceties of our craft—lighting, posing, &c. Our dark room will, I fancy, be the envy of those who are accustomed to work in the stuffy little dens that are so often dignified with the name of dark room—dark, unventilated cupboards, they should be called—and I look to this accommodation as one of the greatest "draws" to obtain new members. How much better to bring one's plates and develop them in a large, airy, well-lighted room, where the light is perfectly safe, and yet sufficient to enable development to be easily watched, and the labels on every bottle to be read with comfort, rather than broil in a dark, unventilated hole, where in *feeling* for what is wanted, something is sure to be upset, and all sorts of catastrophes happen, resulting in spoiled work and bad language. Let me call your attention to the mode of lighting. Firstly, as from the position of the room the sun cannot ever shine upon the window, daylight has not been absolutely excluded; there is just sufficient to enable us to find our way to the gas-tap and matchbox upon first entering, but not enough to do any work by. The source of illumination for working is gas, and gas only; this light, which is of itself deficient in violet rays, is filtered of nearly all but the yellow rays by passing through two thicknesses of canary paper—not cloth, or "medium," as it is called. These two papers are not placed close together, as is usually the case, but one inch apart. You will readily see that if two papers are placed close together, and they have, as all papers may have, small pinholes in them, it is quite possible for the position of two pinholes to exactly coincide, and thus let white light direct through. If, however, the papers are placed some distance apart, if two holes do coincide, the light passing through the hole in the first sheet is diffused in the space between the sheets, and only an infinitesimal portion passes through the second sheet. The gaslight has no communication with the room; it receives its supply of fresh air from below direct from outside, and the vitiated air passes direct out above. A separate ventilator is provided for the room itself. You will have noticed the inartistic colour of the walls—walls, ceiling, cupboards, everything a canary yellow; not pretty, certainly, but safe. Those walls, in their bald ugliness, will absorb all but yellow rays; these they reflect, hence the general airy lightness of the room, which looks most unsafe, but is really perfectly harmless. A long experience of dark-room work has convinced me that, *with gas as the illuminant*, a yellow screen is perfectly safe for the most rapid plates, and is far less injurious to the eyes than a red screen. Further, you will notice the light is entirely hid from view; it shines on to the sink, but the actual window cannot be seen, and this you will find most restful to the eyes; but if more light is desired in the room generally, the swing shutter can be raised, and the whole room is fully illuminated. In addition to this, there is a gas bracket for white light, fitted with a "matchless" self-lighting burner. Your Council have endeavoured to provide all that is needful of the best, and through me express the hope that the members will find convenience, utility, and economy have been well studied. The third room needs no comment, beyond that it has been fitted up as a reading and smoke-room, and will be supplied with the photographic weeklies. All I have to say is that, as it is the intention of the Council to have these journals bound, and thus in time form a valuable library of reference, we have to request that the individual numbers be treated with care. I cannot close without a word or two of congratulation and caution. We have every reason to be proud and satisfied with the start we are making: we open the Club premises to-night with a roll of sixty members, and I have every hope that if each member will make a point of bringing a friend, either lady or gentleman, to all the meetings, as our rules preclude the same friend being introduced more than twice in any one year, we may by this time next year have doubled our numbers, as I am sure, if the friends introduced have any, even the smallest, interest in photography, they cannot fail to see what advantages they may obtain by themselves becoming members of our Club. We have specially requested each member to bring a friend to-night because we are not having any technical paper, but an evening more for enjoyment than instruction, but I hope each friend introduced to-night will enrol his name on the Club before leaving. But, let me add, we are trying a unique experiment. I doubt if the like has ever been tried before, either among photographers or others—and I for one shall be deeply disappointed if it fail—we are opening premises

to-night for the use of a Club numbering, to begin with, not less than sixty persons. The rooms will be open to members, upon applying for the key, at all times between nine a.m. and ten p.m., and we *do not intend to have a resident caretaker:* that is a state of things hardly attempted even in churches. If you enter a church, you may be pretty sure there is a verger hanging around somewhere. *We* intend to depend upon the honour and good feeling of our members. But let me say emphatically, this experiment is doomed to failure unless *each individual member* will strive earnestly to practise fully the golden rule, "Do unto others as you would they should do unto you." If we all treat the property of the Club as a trust committed to our charge, are careful, cleanly, and tidy in our work, remembering that others have to follow when we have gone away, I have no fear of the result. We can then be comfortable in our work, and proud to invite members of other societies to visit our Club, and see what good feeling and unanimity of purpose can accomplish. Before I sit down I must remind you that all the preparation you see in these rooms has not been carried out without a considerable expenditure of money. The best motto to insure success in life is "Pay your bills promptly," therefore let me ask all those who have the needful now in their pockets to pay their subscriptions at the close of our meeting, and those who have not, to send the amount to the Hon. Secretary as early as possible, that our Hon. Treasurer may be able to liquidate our debts. Each member will be provided, when his subscription has been paid, with a ticket of membership for the current year, and this ticket must be produced each time a member applies for the key of the studio. As it is desirable that at all our meetings we should have something in the way of instruction, either a practical demonstration or a paper on matters of photographic interest, followed, I hope, by a discussion, your Council wish to get up a syllabus for the coming session, and I invite any member who is willing to read a paper or give a demonstration to communicate with our Hon. Secretary. If those who know will write papers for those who do not, and those who do not know will freely ask questions of those who do, we shall have no lack of interesting papers and instructive discussions. If those who have never written a paper will just sit down and write one, they will find that trying to convey knowledge to others is the best way of instructing themselves. I hope the question box will be freely used. Don't be afraid to ask a question because it seems so simple. Remember, others may want information on the same subject, and that a simple question placed in the box may elicit a useful discussion and help others.

The evening was spent in an agreeable manner, among the main objects of interest being a selection of slides lent for the occasion by Messrs. R. W. Thomas & Co., B. J. Edwards & Co., and the Britannia Company, and passed through a lantern provided and worked by one of the members, Mr. M. Manley.

Correspondence.

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

THE NEW PHOTOGRAPHY.

To the EDITOR.

SIR,—Mr. Chesterman writes photographic history as he takes pictures (on his own confession) badly, or he would have mentioned that the Camera Club was the prime mover in the abolition of trade prizes which he so much abhors, and that the Ilford Company were the first to accept the suggestion and publicly say so. Mr. Chesterman has so much to say against these two bodies, that in common fairness he should have given them so much credit on this score.

I do not agree with much that is held sacred by the naturalistic school, but I can hold their opinions as honest, and treat them with courtesy and temperate language, such as is due to an opponent. Mr. Chesterman's language is too dogmatic, not to say "Emersonian," to pass for argument, and he would have been well advised to have let his article lie with those things he has done, that he says are "not worth publishing."

He goes on to charge a well-known firm, whose methods of business are above criticism, with a most dishonourable action. The Ilford Company have made their plates since 1879, and every one but Mr. Chesterman is probably aware that the change of name from "Britannia" to "Ilford" was not one of choice but compulsion. The plate is the same, and has been sold for twelve years as claimed.

If I am not taking up too much of your space, I would add that Mr. Chesterman has chosen to abuse two evils which he says are rampant, viz., "fuzzicism" and "shopography," and with most unwarrantable presumption has coupled with each of those evils a personality. I will leave him and the public to consider how valueless his opinions are when weighed in the balance of public estimation. Let him remember that Mr. George Davison has been elected future President of the Photographic Convention, a body that does not contain many adherents to "naturalistic" views, but that recognises in Mr. Davison a man who is a more than considerable factor in photographic evolution, and honour him accordingly.

As regards "shopography," that the Ilford Company are free from this the example I have mentioned above will show; whilst the public estimate may again be taken as a measure of the value of their goods and their methods of business. I have, for curiosity, verified their most recent claim, and five different dealers have told me they sell more "Ilford" plates than all other makes put together.

I must apologise to Mr. Davison for thus classing his name and trade together, though only indirectly; but the question scarcely admitted of any other procedure.—I am, yours, &c., TENACITER.

TWELVE YEARS (1879–1891).

To the EDITOR.

SIR,—The writer of an article in your last issue questions the accuracy of a claim we make in our advertisements. Allow us to inform him that we commenced the business of making plates in 1879, and have therefore every right to claim a twelve years' record. The fact that our plates were subjected to an enforced change of name in 1885 is not material to the subject.

To those who know us and our methods of business, Mr. Chesterman's want of taste, as well as want of accuracy, will be equally apparent.—We are, yours, &c., THE BRITANNIA WORKS COMPANY.

Ilford, London, E., July 31, 1891.

THE TRANSPARENCY OF GLASS A DRAWBACK AS A MEDIUM FOR THE NEGATIVE PHOTOGRAPH.

To the EDITOR.

SIR,—My experience with the collodion and bromo-gelatine processes has made me conscious of some advantage in the older process. A comparison of a gelatine and a collodion film shows that the gelatine film is much more transparent than collodion, that the colour of the two films is different, and that much more light from the lens passes through the gelatine film.

As a result, what we know as halation is much more frequent with gelatine than with the more non-actinic film of collodion, and this is, of course, shown in subjects having great contrasts of light and shade. The remedies *have been* thickly coated plates, ground glass, and backed plates.

The plan which I wish to make public is that which I have practised the last three months with much satisfaction, and which has yielded me results much more like what were produced on collodion. I have my glass non-actinic—yellow or ruby. Upon this the gelatine film is spread. It will be evident that with such plates no light can pass through them—the image is localised.

In developing the plates the use of a strong light close to the plate enables one to judge of the density of the negative, and when the plate is dry I remove the film from the plate, converting it into a film, which is the form I aim at.—I am, yours, &c., ALFRED PUMPHREY.

[If we remember aright, Mr. A. L. Henderson also advocated this method of avoiding halation.—ED.]

Exchange Column.

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

Talmer hand camera, new, in exchange for good posing chair, with two or more backs.—Address, W. HAKE, Windsor Studio, Sutton, Surrey.

Wanted, in exchange for Optimus 7×5 rapid rectilinear lens, a half-plate, wide-angle; difference, if any, adjusted.—Address, DORAN, 43, George-street, West Brighton, Sussex.

Wanted, quarter or half-plate camera, or offers, for hand sewing machine, value 25s., in good condition.—Address, BENJAMIN ARTHINGTON, Salisbury-street, Bradford, Yorkshire.

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

J. A. Draycott, Northampton.—*Two photographs of the Millers' Convention*, 1891.

GEORGE T. HARRIS.—Kindly send present address to the editor.

J. LEWIS.—When quite convenient we shall be glad to receive the vignette negative.

W. BECKWELL.—Both the Autotype Company and Messrs. Mawson & Swan supply plates for stripping the films from.

A. MUNDT.—There are two Russian photographic journals. The following will serve your purpose: *Photographitscheski Westnik*, published by B. Saenger & Co., St. Petersburg.

S. A. CHILDS.—We think you stand very little chance of succeeding in photographing a scene at a theatre during the performance with a detective camera and a lens working at *f*-16. Scenes at theatres have been photographed, but then things have been arranged beforehand, and the pictures have usually been taken after the regular performance was over, the scene reset, and a long exposure given.

R. W. Howes.—1. If the engravings are valuable, better take them to a print restorer. Without knowing the constitution of the varnish we could not indicate a solvent. 2. Ink stains may be removed from prints by either salts of lemon or oxalic acid.

M. F. W. wishes to know how and where it is possible to get one's own negatives printed, decoratively and permanently, on china plates or dishes, that would be useful and stand washing, the same as other dishes.—Mr. Rudonski, 3, Guildhall-chambers, E.C.

Warden.—The design for the studio is good. We should certainly advise you to put ground glass *entirely* on the south side, both side and top. On the north side clear glass; or, if the studio is not shaded at all by surrounding buildings, the top of the north side might with advantage be glazed with ground glass.

S.W.—It is quite impossible for us, or any one else, to judge of the suitability of cardboard for mounting photographs upon without testing it. The appearance goes for nothing. If the manufacturers refuse to give a guarantee with it, you must either rely upon your own judgment or submit it to an expert for chemical examination.

A Constant Subscriber (Harrow-road) inquires: "Could you give me the recipe for sensitising paper (for silver printing)? If you can tell me how to make my paper keep its colour for a fortnight, I should be greatly obliged."—Float the paper on a forty to sixty-grain silver bath, according to the amount of chloride in the albumen. Dry, and then store between sheets of blotting-paper that has been saturated with a weak solution of carbonate of soda and dried.

Camera writes: "1. I am about to buy a 12×10 landscape lens, and shall be obliged if you will let me know which will be the most serviceable. 2. Also what is the reason of toning bath going dark, and does it take any of the toning action away?"—In reply: 1. For pure landscape work there is nothing better than a single landscape lens. 2. The darkening is caused by a reduction of the gold. Of course, if any portion of the gold is reduced, there is so much less left for toning the print.

F. Bryant puts the following queries: "1. Is hard soap the best lubricant for burnishing, and how to use it? 2. In what manner should medium be applied to negative previous to retouching with pencil?"—1. Yes, use good Castile soap dissolved in methylated spirit, in the proportion of one grain to the ounce. Apply with a pledget of cotton wool or a piece of soft rag. 2. Directions for use are generally put upon the bottles, but it must be sparingly applied, usually by the finger or a small piece of soft rag.

W. R. Wilwekra writes, asking if any licence is required for the sale of photographic chemicals on a small scale. No licence is required for the sale of chemicals in small or large quantities; but several materials used in connexion with photography can only be sold by duly qualified chemists, such, for example, as come within either Schedules A or B of the Poisons Acts—cyanide of potassium, bichloride of mercury, &c., for example. No licence will enable these to be sold in small quantities; they can only be vended by properly qualified pharmaceutical chemists.

John T. Taunton.—1. Either form of sheath will answer. Let them be made of ferrotype plate or other thin metal. 2. Any finder will answer if shielded from light whilst being used. 3. It will be advantageous for you to buy a shilling bottle of retouching varnish, which will be sufficient for several hundred quarter-plates. 4. Although home-sensitised paper yields, as a rule, better tones, yet there are some brands of the ready-sensitised which give good tones. 5. The presence of an image, when viewed from the back of the negative, depends both on the plate and the developer. 6. Suede leather can be obtained from any glove manufacturer or be ordered through dealers in gloves.

Robert McConchie.—The paper you are using is, as you suggest, scarcely suitable without sizing; the prints sent show, in addition to the streakiness you complain of, a number of minute specks or blisters where the emulsiou has absolutely refused to "take" the surface, while in other parts it has sunk in too deeply. The emulsion itself appears all right, though possibly a little more free silver and citric acid would improve it for thin negatives, and a slightly thicker coating would perhaps do no harm. As regards toning, the ordinary borax bath, as used for albumen paper, is of no use; it must be much stronger—say, one grain of gold iu not more than three or four ounces of solution.

H. G. M. Conybeare writes as follows: "A day or two since I was toning and fixing a batch of prints. When I took the prints out of the hypo, and placed them in water, they became covered with a mass of blisters. For about twenty minutes I kept changing the water and turning them over by hand. I then left them to soak, and returned in about an hour. I then found that every blister had disappeared, and not a trace of them could be seen or felt by the fingers. This, to me, is such a novel experience that I venture to ask if you have known of blisters disappearing in this way before? All the water used was from the same tank, and rain water."—The circumstance is by no means uncommon. We have frequently met with the same thing ourselves. Very often, however, though not always, slight markings are left where the incipient blisters formed.

Collodion writes: "On two occasions recently I have changed plates in two professional photographers' dark rooms, and in each case was assured that the light was quite safe for the fastest plates; but, nevertheless, my plates were fogged. Similar plates, placed in the slides in my own dark room, used in a hand camera, produced excellent negatives, and I have used the camera and slides which I had on the above occasions since, and with similar plates, and, on developing the latter, no trace of fog. Now, would you be good enough to tell me the best way of proving that a light is perfectly safe? If the blue is absent from a light when viewed by means of a direct vision spectroscope, is the light safe for plates 24-25 sens.?"—It does not necessarily follow that, if the blue rays be cut off, the light is safe because some plates are sensitive to other than the blue rays—orthochromatised, for example. If a professional's dark room is safe for his own use it ought to be also safe for that of an amateur. We should seek for some other cause for the fogging.

Inquisitive writes: "In answering us in your issue of July 24, you ask: 'What does it matter if a professional man gains medals for professional work, or not?' We reply, it does not matter one whit what the medals are gained for. We consider that a medal gained for one thing is just as worthy to be prized as another gained for a different thing. But we should like you to touch upon the following point, and in considering the matter we ask you to do so as if you were one of the public, totally unacquainted with photographers or photographs, except seeing them in show windows, and getting them from the photographer. Suppose, then, you saw medals exhibited in a professional photographer's window, would it not be natural on your part to conclude that they had been gained for professional work? For instance, if medals were exhibited in a saddler's window, no one would imagine they had been gained for making a pair of boots. Now, if it did happen that a photographer exhibited medals not gained for professional work, what would be your opinion about his action? Would he not, by his action, be misleading the public? We trust you may see your way clear to go into the shoes of the public, and give us your verdict per correspondence column."—This subject is treated upon in another column. Our correspondent appears to treat professional work as entirely confined to portraiture. This is not the case. A professional portraitist is quite justified in competing for medals in any branch of photography, and, if awarded them, turning them to business account.

Change of Address.—Mr. A. H. C. Corder, Hon. Secretary of the Brighton Photographic Society, has removed from 42, Montpelier-road to 77, Buckingham-road, Brighton.

Glasgow Exhibition.—From an announcement elsewhere it will be seen that the last date for entries has been postponed till August 20. The last day for receiving exhibits is August 22.

Mr. A. Brooker, Hastings, sends us a sample of matt varnish prepared by him. We must congratulate Mr. Brooker upon the excellence of this varnish, which we have tried with much satisfaction.

The Photographic Club.—Subject for discussion, Wednesday, August 12, report of delegates to the Convention, illustrated by the lantern. August 19, *The Primuline Process.* Saturday outing, August 8, Cheam; train from London-bridge, eighteen minutes past two.

"Illustrations," still under the editorship of Mr. Francis George Heath, will commence an entirely new series as a sixpenny monthly on August 15, and continue thereafter as a mid-monthly, comprehending recreation, art, biography, literature, invention, science, economy, and fiction, profusely illustrated.

Halifax Camera Club.—What promises to be a highly successful Club has been inaugurated in Halifax. The premises formerly occupied by Mr. Gregson have been taken and fitted up as club-rooms. The following officers and committee have been elected:—*President:* Mr. E. J. Smith; *Vice-President:* Mr. Thomas Illingworth; *Committee:* Messrs. W. Wainhouse, Dr. Leech, E. Finlinson, E. J. Walker, and W. H. Ostler; *Hon. Treasurer:* Mr. J. I. Learoyd; *Hon. Secretary:* Mr. Thomas Kershaw, 15, Queen's-road, Halifax. The total number of members has already reached the satisfactory total of fifty-eight.

Annual Dinner of Mr. Dallmeyer's Employés.—On Friday evening last the annual dinner of the *employés* of this firm took place at Anderton's Hotel. We counted over sixty present. Mr. Thomas R. Dallmeyer was in the chair. The Chairman's health was proposed by the oldest hand in the firm, who had beeu in the employ for more than thirty years, from whose remarks we learnt that there were many other old hands then present. In replying, Mr. Dallmeyer said he was gratified by the feeling of mutual co-operation that occurred in every department of the works. He referred to the efficacy of the services of the heads of departments, and the necessity for the continuance of the excellence of the work produced by each individual. Mr. J. Traill Taylor, being called upon to respond to the toast of "The Visitors," said it afforded him great pleasure to be present with the active workers in a firm whose name was familiar wherever the English language was known, and even in countries where it was not known. He spoke of the services rendered to optical science by Mr. J. H. Dallmeyer, the founder of the firm; services ably continued by his son, their Chairman, the present head of the establishment. During the toasts excellent music was contributed by the Imperial Glee Singers, and after the stated programme many of the party also displayed their talent in this direction.

Our Convention Group.—Such was the demand for last week's issue containing the Convention Group that soon after noon on the day of publication the Journal was "out of print," to the disappointment of many. A new edition was speedily got out, and our publishers inform us that copies can now be obtained. In addition to the Convention Group and the key to the members, that number also contains another fine pictorial illustration.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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THE KEEPING QUALITIES OF NEGATIVES.

The question of the keeping qualities of dry plates before exposure is one that has troubled the photographic mind since long before gelatine films were in the market; but, when the negative has been secured, it is supposed to be "a thing of beauty" to be enjoyed "for ever." It is, however, questionable if this is really the case, because so many different circumstances surround the gelatine, as compared with the collodion negative, that we may well pause before giving a decision in favour of the undoubted permanency of the former, even if the latter can be put altogether beyond dispute.

Collodion negatives are known to be in existence that were made over thirty, and nearer forty, years ago, thus proving, so far as that length of time permits, that they possess some claim to permanency. But is it probable that gelatine negatives will come up to that ordeal? It may be so, for every care is now taken to insure stability, simply because experience has shown that more care is required, but in the earlier days of gelatine they were treated too much in the same manner as collodion, with the result, if not immediate, that in the long run they had to succumb to circumstances.

We are led to these remarks from a recent overhaul of a large number of negatives taken, some of them, over twelve years ago, that have been carefully packed and well protected from damp and other injurious influences for some five or six years. Most of these negatives have been printed from, indeed they are the pick of the work of their time, and it may therefore be taken that they received what was considered proper treatment to insure their stability.

Before going into the question of permanency, it may be worth noting that the negatives of ten, and more especially twelve years, ago possess very different characteristics from those of to-day. Leaving colour, for a moment, out of consideration, the image is altogether different in its physical nature—clear and almost transparent, without any symptom of granularity—an image, in fact, that answers to the old description of "a stain," rather than a deposit. Later on, the transparency of image disappears altogether, and, though we may not lay a charge of absolute granularity against modern negatives, certainly, judged alongside those of a dozen years ago, they can scarcely "deny the soft impeachment."

This peculiarity is not confined to the plates of any one maker, but simply pervades the whole list of commercial plates of the day, as well as amateur and home-made films; for in most of the old negatives we are able, from recollection, aided by association of ideas, to determine the source of the plates, and generally its subsequent treatment.

The alteration in the character of the deposit forming the image is not difficult to account for, if we look back to the earlier period we have mentioned. In 1878 and 1879 there were but few professional plate-makers, and they and the then large body of amateurs were working purely on Bennett's lines of "prolonged emulsification." In 1879 the "boiling" process was introduced, and a little later came the "ammonia" process, neither of which give the same fineness of division of the silver bromide in the emulsion as the older plan. It took some time for the newer methods to disestablish the old, hence it is not until 1881 or early in 1882 that we begin to miss the transparency of image already alluded to.

Reverting to the keeping question, we have been surprised at the result of so short a time on some of the negatives, and still more surprised at the apparently erratic manner in which time and other circumstances have acted. Many negatives, developed and finished by methods which are theoretically beyond suspicion, have gone unmistakably into the "sere and yellow" stage, while others, intensified by some of the most discredited of formulæ, remain at the present day as good as they were at first. Possibly there may be instances amongst the number in which carelessness in manipulation or insufficient washing may have had something to do with the result, when the result is bad; but that argument can scarcely hold when the result is unexpectedly good.

For instance, the worst cases of "fading" or "yellowing" are to be found amongst the negatives that were simply "pyro-developed"—that is to say, without intensification by mercury or any other means. It must be borne in mind that the use of sulphite of soda in the developer was not known at the period we speak of, or, if known, was not generally practised, and that, therefore, the majority of negatives showed more or less yellowness in the shadows, while the colour of the image was very different from what we expect now. But most of the early pyro-developed negatives have acquired an additional yellowness that was certainly not theirs when last they saw the light, and that is surely not traceable to the developer. Here it may be noticed that very many of these early plates, however treated, show a discolouration at one end or one corner, while the remainder of the film is either clear or nearly so. This points, in the first place, to unevenness of coating, and in the second partly explains much of the cause of the falling-off of the negatives—namely, insufficient washing. Modern plates coated by machinery, or even hand-coated, rarely show this fault, as in the old days, for greater care is now taken on all hands.

Various methods of mercurial intensification are represented amongst the negatives we have under review, and with very few exceptions, strange as it may appear to many, they have proved quite permanent, so far as the time has gone. True, some few show signs of discolouration, but in each case it is clearly traceable to imperfect washing, since the change of colour is partial, and does not cover the plate evenly. One particular method of intensification with mercury, which was

very seriously decried at the time of its introduction on the very ground of instability, proves itself by the test of time to be about the most stable. That is the solution of iodide of mercury in hypo, introduced in various forms, and known at one time as "Edwards's" intensifier. The colour of the image at the time of intensification varied from golden yellow to almost anything; but, whatever it was originally, so it has remained after ten or more years.

Perhaps, however, the greatest surprise of all to many—even old hands at gelatine—will be the fact that *silver*-intensified negatives are perhaps the very best "keepers." Not a single one out of a very large number that we can pick out of the lot that has been intensified with silver shows the slightest sign of deterioration, or of discolouration, in the shadows or anywhere else. Now, curiously enough, it is a matter of religion almost with some of our earlier gelatine plate-workers that silver intensification is fatal to a negative, that, in fact, no sooner does silver touch gelatine than gelatine is ruined. Where should we get our gelatine plates if that were the case? At any rate, gelatine negatives, intensified with silver over ten years ago, are still existent, with shadows as colourless as on the day they were developed.

A SUBSTITUTE FOR BURNT-IN PHOTOGRAPHS.

A MATTER of surprise to most is that so little is done, commercially, with ceramic photography. Every one is agreed that good photographs, burnt into porcelain or enamel, are very beautiful, while their permanence, when fired *into* the ware itself, is unquestionable. Why, then, is it so little practised? It may be, as often is asserted to be the case, that the public do not care for these pictures, or that they are too expensive. These reasons, we fancy, can scarcely be sustained, seeing that the general public have but little opportunity of seeing them and judging of their merits, at least in this country

One may visit a score of photographers' reception-rooms in the metropolis without seeing a single specimen of vitrified photography. Yet they would find in nearly all of them a good display of so-called "enamelled" photographs with the picture pressed up in a convex form. This class of picture is always in demand, which proves that a large proportion of the public do appreciate imitation enamels if they do not the genuine ones. If at any of these places burnt-in photographs were inquired for, no specimens would be forthcoming, and the inquirer would be told that they could not be supplied. As a matter of fact, the photographer could not do them himself, and, very possibly, would not know, or care, where he could get them done.

Many have been deterred from experimenting with any of the ceramic processes owing to imaginary difficulties and costly apparatus, which, by the way, do not actually exist—certainly with such small work as enamels. But in the case of large porcelain plaques, which require hard firing to get the image into the ware, the circumstances are somewhat different. However, we are digressing from our subject, which is not that of producing ceramic photographs, but imitations thereof, which, both in appearance and permanence are almost, if not quite, equal to the vitrified picture, and from which they cannot easily be distinguished, while the method of production has this advantage that no costly appliances are necessary, and almost any size picture can be as easily made as small ones; furthermore, there is little to learn in producing them.

We all know the hardness of surface and durability of japanware. A good japanned tea-tray, for example, is one of the most durable things to be found amongst the household goods simply by reason of the impenetrability of the "japan." Now, if we get a photograph on china, or earthenware, protected with a surface as hard and brilliant as that on the best japanned ware, we certainly shall have a most permanent picture. By this time our readers have no doubt arrived at the conclusion that we suggest producing photographs on porcelain, and then japanning them. That is precisely the case. The idea is not altogether a novel one, inasmuch as the process was patented—or, rather, provisionally protected—some eight or ten years ago by M. Irelánde, of Paris, and about that time we saw some excellent results that could scarcely be detected even by experts from veritable burnt-in pictures, while the surface was so hard that it was exceedingly difficult of abrasion even with a penknife used with force.

Japanning, it may be explained, consists in applying several successive coatings of a hard, transparent varnish, such as amber or copal, to the article, and then "stoving" it, that is, subjecting it to heat 130° to 200° Fahr. for some hours. In the operation care must be taken that one coating of the varnish is perfectly dry before the next is applied. If any brush marks show, they must be rubbed down with fine glass paper. After stoving, the surface is polished, first, with fine pumice powder, and afterwards with tripoli and oil, followed, we believe, for the finest work, by putty powder. If amber varnish be employed, we obtain on the picture a film as hard as the amber itself which is nearly, if not quite, as hard as some of the soft glazes used on enamels. As, however, amber has a slightly yellow tint, it is not quite so well adapted to our present purpose as copal, because that varnish may be obtained very free from colour, while, after stoving, it is scarcely less resistent than amber.

Mr. Irelánde's method of working was this: A carbon picture was developed on porcelain, glass, earthenware, wood, or other material. It was then japanned in a similar manner to that just described. Now, it will be seen that a carbon print on a porcelain plaque, protected with a substantial film of amber—the melting point of which is between 500° and 600° Fahr.—or copal, will be to all intents and purposes perfectly permanent, while it can scarcely be distinguished from an actual vitrified picture. Of course, these pictures do not require protecting with glass any more than does ordinary ceramic ware.

Both the varnishes named are articles of commerce, and may be obtained from any of the best varnish-manufacturers. In ordering, however, it will be necessary to mention that they are required for "stoving," so as to secure the proper kind for the purpose.

Photographers need not be deterred from experimenting in the production of these pictures on account of expense, as the oven of the kitchen range will do quite well for the stoving of plaques up to ten or twelve inches. Some japanners, we believe, stove for the trade. Enlarged portraits in carbon, finished either in monochrome or colours, on fifteen or eighteen-inch oval convex plaques, by this method, would be very handsome pictures. We commend the idea to enterprising photographers who are in search of novelties.

AT the meeting of the Paris Academy of Sciences, held on July 13, M. Guntz read a paper on *The Action of Light on Silver Chloride*. The experiments indicate that, when a thin layer upon a plate of glass is exposed to light, it is, in the first few moments, only coloured very slightly; but, if it is then placed in ferrous oxalate, the chloride is reduced with formation of metallic silver. Even in the absence of

ight the author has succeeded in producing a modification of silver chloride, which is directly reduced by the oxalate solution. To obtain this modification it is merely necessary to boil silver chloride for some hours in the absence of light. If, on the contrary, silver chloride is left for some time exposed to the light, it takes a violet-red tint and loses chlorine. The silver subchloride formed in prolonged exposure to light yields, on further reduction, metallic silver. A layer of silver chloride after exposure to the light consists of three superimposed layers—metallic silver, silver subchloride, and unaltered AgCl.

We read that "A patent has been obtained for frosting or 'obscuring' the glass used for incandescent lamps by means of a solution of nitro-cellulose, which may be coloured, *e.g.*, with one of the aniline dyes." But we do not read, what is simply the case, that this solution is another name for collodion. When nitro-cellulose, in other words, pyroxyline, is dissolved in alcohol and ether, the kind that gives the milkiest-looking film is one in the manufacture of which a maximum quantity of water has been employed. It has a short texture, and dissolves freely. Of course, a solution in amyl acetate may be intended to be used.

The work of photographing the moon at the Lick Observatory goes on apace, and promises to be of great value when further extended. The plan is adopted of making a large number of exposures of various lengths, by which means details are seen which would not appear in some of the negatives properly exposed under an ordinary standard. The photometric contrasts are naturally greatly exaggerated, but the outlines remain unaltered in any other way. Already very important results have followed the examination of the prints, some of them showing features not to be found in any of the lunar maps.

Speaking of astronomical photographs, it is stated by a recent scientific correspondent of the *English Mechanic* that, judging photographs taken by Dr. Max Wolf, it would appear that quite as good results can be obtained with small instruments as with great, and with a smaller exposure, this plan having been recommended by Mr. Wesley at the last British Association meeting.

BATH CONVENTION NOTES.—IV. *

It is already upon record that during the first three days of the Convention week the rains descended. It is unfortunate that this is by no means a new experience for those who have regularly attended these annual gatherings, especially those in Glasgow and Birmingham. On the forenoon of the day on which the group was taken the weather was singularly fine, and numerous views of the city and suburbs had been obtained, and, when the members wended their way to the lovely Sydney gardens where they were to be grouped, it was felt that at last the god of day was to smile favourably, and the Chester experience be wiped out. Middleton Ashman stood behind his big camera, and, after a rapid survey of his *clientèle*, flung off his coat, and, in shirt sleeves, got them rapidly posed; but, while doing so, down came the rain, and up went umbrellas. History was repeating itself. But mind triumphs over matter, and, at the proper moment, at Mr. Ashman's signal down went umbrellas and off went hats, and the exposure was made. The rain failed to quench the happy look on the faces of those who were conscious that they were thus to be handed down to posterity; and, what is of equal consequence, it failed to prevent the skilful photographer from developing a singularly fine and clear negative.

The numerous friends made during Mr. Ashman's long residence in London—in several of the Societies of which he took a prominent part as a valuable, hard-headed, practical member—will be interested in learning that he is not merely a photographer, but a dealer in photographers' requirements. Visiting him one morning at the centrally situated site, 12A, Old Bond-street, we made notes.

* Continued from page 502.

We passed in at the shop entrance, where the display of specimen photographs, and the more commercial departments of apparatus, dry plates and photographic sundries appear to be about equally shared, and noticed that a very good plan has been adopted here for the storage of dry plates and other delicate, sensitive surface, namely, a special room for their reception, wherein artificial light is not employed, but diffused daylight, filtered through a non-actinic medium, served to illuminate the apartment. Nearly every English brand was here to be found. Other goods, of a bulky nature, were assigned another room. Between these, and starting from the shop floor, we passed, by means of an easy staircase, to the reception-room, where examples of the work issued are displayed. On this floor is the studio—a substantial building supported on iron girders. It is of the ordinary ridg e roof type, about 24×12 feet, and 14 at the ridge, facing the Mineral Water Hospital, and consequently having a south aspect. This studio is glazed with twenty-six-ounce ground glass, cut in sheets 3×2 feet, and further diffusion is obtained, when necessary, by means of a series of ordinary striped window blinds.

In order to cool the atmosphere of the studio on exceptionally sultry days, arrangements are provided for flooding the roof with water. This is effected by a perforated pipe, fixed to the top of the ridge, the supply of water being controlled in the dark room immediately adjoining. This apartment—as also the printing, negative storing, and packing-rooms—is fitted conveniently for the work intended. Outside one of the studio doors we are shown the veritable 'White Hart' referred to by Dickens, and we are told it does excellent service now as a resting-place for snapping off hand-camera exposures of the passers-by. This famous old sign is certainly not in obscurity; moreover, the surroundings are enlivened with our friend's neatly decorated building and a goodly show of the horticulturist's art. When we mention that there are still other rooms, used for dressing, stock, &c., and there are two staircases in use for this floor, which runs continuously through three houses, it will be gathered that in designing this establishment Mr. Ashman determined to provide accommodation for a business of importance.

After inspecting Mr. Ashman's premises we could only express to him our acknowledgment of the kindness he had displayed to the members of the Convention in placing both his dark room and himself so much at their convenience, and to the temporary detriment of his business.

In thus giving prominence to Mr. Ashman as an old Londoner, we are not unmindful of the many courtesies shown to the Convention by other photographers and dealers, courtesies which went far indeed to render the Bath meeting of the Convention one which will be looked back to as one of the most enjoyable yet held.

Bath is a lovely city, situated in a valley surrounded by heights. The suburbs are singularly beautiful. If any one wanted to do a week's photographing, he might fittingly select Bath as a central point from which to make daily excursions. On the one hand the quaintest of quaint old English villages (Lacock, for instance) lie within easy ride, or even walk, affording opportunities of securing pictorial bits of cottage architecture which it is to be feared will soon cease to exist during the march of modern improvements. While, again, the proximity of Clifton, with its pushing companion, Bristol, insures, on the other hand, scope for the photographer who desires to perpetuate the numerous pretty places around and on the coast. Bath, as regards commerce, is quite up to date. Its shops are not inferior to those of Regent and Oxford-streets, London, although proportionately less numerous. Its houses, especially those in the residential portion of the city, are elegant, clean, and apparently very comfortable. Its residents seem largely composed of a fairly well-to-do class, such as retired army and navy officers, many of whom are amateur photographers.

Concerning the Convention as a whole, it is universally conceded that, the weather notwithstanding, it was a most enjoyable meeting throughout. It seems now to be "part and parcel" of the Convention that the members adjourn, after the evening's work is done, to a smoking-room in one or other of the principal hotels, usually that in which most members are located. Here they indulge in those social greetings, reminiscences, and friendly chats so dear to those who meet only once a year, amid the fumes of tobacco-smoke and the sippings of—ginger-beer.

PERSPECTIVE DRAWING AND VISION.

In a characteristic effusion—characteristic at least of one of the signatories—wherein Mr. Chapman Jones is advised "to study an elementary treatise on perspective and take some elementary lessons in drawing," my own "intellectual powers" are, by the help of misquotation, held up to ridicule, and "untrained and rash persons" are entreated not to make it necessary for the writers to waste time in educating them—Dr. P. H. Emerson and Mr. T. F. Goodall profess to reply to the criticisms which have been called forth by their theories concerning perspective and vision. If the intellectual powers of either party in the discussion were the matter in dispute, the judicious reader would probably take into consideration which side had, in default of argument, supplied its place by impertinence, bluster, and misquotation. Mr. Chapman Jones may, for all that has been shown to the contrary, be at least as well acquainted with the rules of perspective as the writers who so contemptuously assume him to be ignorant of them. Mr. Sutcliffe alone receives the doubtful compliment of being the only one capable of understanding Messrs. Emerson and Goodall.

If any further illustration were required of the loose and inexact character of Messrs. Emerson and Goodall's so-called "proofs," it may be found in the fact that the only two persons, so far as I am aware, who have supported their pretensions in public discussion, Mr. P. Everitt and Mr. T. R. Dallmeyer, have each found one of their proofs to operate in the reverse direction from that indicated by the authors. Mr. Dallmeyer says that pillars, to look vertical, should not be inclined inwards at the top, as stated by them, but the other way; Mr. Everitt finds that the door looks narrower instead of wider towards the top. Such a difference may be expected when the looseness of the direction is remembered. The observer is to look at the middle of a doorway. Now, according as the doorway is high or low, or the observer is sitting or standing, the line of vision, when looking at the middle, may be upward or downward. It has before been pointed out that, to obtain results at all comparable, that part of the door level with the eye, and not the middle, should have been directed. Mr. Everitt, however, though observing this more precise direction, still found the "proof" to work contrary to Messrs. Emerson and Goodall's assumption.

Messrs. Emerson and Goodall say that my demonstrations with the coin experiments were vitiated by the use of an eyehole, the effect of which is to cut off the portion of the field of vision, causing the phenomenon to be observed. This is not the fact. The eyehole was made of such a size as to allow all the coins concerned to be seen at one view, and the verdict of the members of the Society present, with the exception of Mr. Everitt, was that the upper and lower coins appeared equal to each other. With the notched-stick repetition of the experiment, as the upper and lower pennies are not in view simultaneously for comparison, and as no means are indicated for insuring equality of angle above and below, for which the eyehole provides, varying effects may easily be produced or imagined.

The introduction of the question of binocular vision is only calculated to mystify the matter. The difference of outlines to the two eyes, of objects at such distances as are generally included in views, is so small, that if both were included in a painting the effect would only be to double the lines to a slight extent without, on the whole, materially enlarging or diminishing each particular object. It should be remembered, too, that the vertical dimension of any object is not in any case affected by binocular vision. If Messrs. Emerson and Goodall say that the lateral dimension is affected, and ought to be represented in a picture as so affected, will they state whether it should be by increase or diminution? Should a circular form, for instance, in any given part of a picture (since its height is not affected) be represented as broader or narrower than the circle? If they can settle this, how would they arrange, not for a single object, but for a series, filling up the picture? It is useless to fay, "How a drawing is to be done we do not enter into," and to quote the names of Rembrandt and Velasquez. If the works of these painters really support the contention of Messrs. Emerson and Goodall, it should be possible for them to point out that they paint such an object as less, or such another as greater in width (vertical height, as before stated, does not enter into the question of binocular perspective), than would be in accordance with mathematical perspective. Perhaps they will not object to a quotation from Reynolds: "An artist ought to see clearly enough to enable him to point out to others the principle on which he works." This is particularly true with respect to those who profess to upset accepted principles and substitute a doctrine of their own.

The writers say that they have answered my criticisms either directly or in reply to other critics. They seem, however, to have quite overlooked the observation, that "if their proposition is true, that the lower half of the eye sees things on a smaller scale than the upper, and for this reason a perspective drawing surprises us by making the foreground objects look large, then such foreground objects as are above the distance should surprise us by appearing too small in the perspective drawing or photograph. Perhaps one of the most familiar instances of a near object above the central distance is that of a chandelier depeding from the ceiling when the interior of a room is photographed." Do they maintain that such an object as a near chandelier does surprise us by appearing too small in the photograph as it should do if their statement and explanation are to be accepted?

It may further be noticed that Messrs. Emerson and Goodall have not given any satisfactory reason why, assuming their proposition with regard to the eye to be true, the upper and lower halves of the eye should not see the photograph or perspective drawing enlarged or diminished in the same proportion that they see natural objects, and so why the photograph should not, after all, give a true rendering and impression to the observer.

If possible to find rational answers supporting their contentions in reply to the questions referred to in the last three paragraphs—*i.e.*, 1, Whether a raised foreground object, such as a chandelier, really does surprise us by appearing too small in a photograph? 2, Why the alleged difference of the upper and lower halves of the eye in representing dimensions should not act upon the drawing or photograph as stated to do upon natural objects? and, 3, What is the alteration of form which a regard for binocular vision dictates as required in a drawing, since width alone, and not height, can by any possibility be affected by it?—Messrs. Emerson and Goodall would do well to adduce them. If such answers cannot be found, readers will be apt to look elsewhere than in the direction indicated by these writers for the "rash and untrained persons" who make it necessary to waste time in educating them.

W. E. Debenham.

THE RAYS WHICH REVERSE.

Having completed a series of experiments which, simple though they be, seem to me to throw a strong light upon a difficult subject, and, as far as they go, to be conclusive, I cannot, despite the fact that I have been in bad health for many months, resist the temptation of attempting to describe them, chiefly in the hope that those who have recently interested themselves in reversals and electric currents may be spared useless trouble, and be enabled with the greater ease to devote their energies to the turning over of fresh soil. The field of photography is wide—far too wide to be all turned over by one spade. Let each, then, stick to his own "claim," and dig, some for nuggets of gold, silver, and platinum, others for a grain or two of that still more precious element, truth.

As the title I have chosen suggests, the ground in which I have been "prospecting" and "panning-out" is bestrewn with flints—flints which break up white into coloured light, and play the very deuce with the waves of luminiferous ether which lap their siliceous sides.

A small "rain-band" spectroscope was fitted to the left-hand side of a quarter-plate camera. The jaws of the slit were opened to their widest, and a reference map having been made, showing the position occupied by each colour when the ground glass was a certain distance from the prism, a number of exposures were made on the continuous spectrum of a gas flame, a pill-box forming the cap. The exposures at first were very short. It was found that, where the merest fraction of the coloured horizontal band was brought out, this fraction always turned up in the same place, which, on consulting the chart, was found to correspond to the blue portion of the spectrum. Longer exposures gave larger fractions, which increased in length more quickly into the violet than into the red end. Giving longer exposures still produced a blurring of the comparatively sharp edges of the band at the top and bottom. This blurring began at, or very nearly at, the same part of the spectrum as the first fraction developed. Any further prolongation of the exposures simply increased the extent and density of the band proper, and, at the same time, of the blurring, and, while the darkest part of this halo was conservative of its position, the density tailed away as far as the plate would let it on the violet end, but at the red end the band retained its original depth, and formed a sort of shapeless neck to a most inelegant bottle, a stumpy handle to a brush or besom.

I now considerably modified and improved my apparatus, so as to insure the production of a reasonably pure spectrum, and at once proceeded to take a number of negatives of the solar spectrum on plates of various makes, using any developer—ferrous-oxalate, pyrogallol, hydroquinone, and eikonogen—of any strength, for any length of time, equally, or locally, so as to coax out A, B, C, D, E before F, G, H, K were engulphed in superfluous density. When bromides, or sulphite, or both together, were prescribed in the formula for deve-

lopment, I invariably found that, *cæt. par.*, it took much longer to reach a given stage or line than when these restrainers, or retarders, were omitted. Similarly I found—and the point is of the utmost importance—that when an exposure had been given which greatly exceeded that necessary to give a "neutral," or "reversal," with another developer, it was held back to the phase by the employment of a bromide or a sulphite. Had I, indeed, been working with anything else than the almost closed jaws of a slit, I feel satisfied that an exposure certain to give what I have called "second neutral," with a developer exclusively composed of pyrogallol, ammonia, and water, would have been so reined up by these restrainers that the preceding phase of reversal would have been obtained instead. Indeed, what might otherwise have yielded a poor "second normal" could, I think, be kept a passable reversal. Once again, indeed, I was coerced to the conclusion that accelerators hastened the rapidity of succession of the phases, whilst restrainers in general lengthened the intervals between. Although experiments on the lines of those of Professor Crookes (1854), showing to what radiations the iodide and bromide of silver were most sensitive, when repeated by myself, confirmed the accuracy of his observations, yet, when working with ordinary commercial plates, with and without a screen, as also when using Edward's isochromatic plates, I was struck with one or two appearances which I have not seen mentioned before, and which, occurring, as they did, so constantly, may be worth passing notice.

While at once thoroughly familiar with the graphic curves by which graduations in density are so frequently illustrated, and with the comical discrepancies of range or extent, and of the positions of the maxima and minima of opacity, put forward as scientific registrations of the same phenomena under identical circumstances, I, nevertheless, confess that it was only when the exposures were exceptionally long, the developers disproportionately strong, the lines conspicuous by their absence, or the salts complex or doubtful in composition, that I saw anything like delicate undulations in light and shade in any of the photographs of the solar spectrum obtained by myself. For instance, with a short exposure of a clean Ilford ordinary plate, developed quickly and softly with a rather weak, or slightly restrained, developer, I invariably obtained a flat, but not necessarily thin, deposit, beginning at, or immediately below, F, and extending to, or very slightly beyond, G. Between these two comparatively pronounced lines the "wash," so to speak, of reduced silver was broken, or subdivided by some ten to fifteen minor lines, or imperfectly resolved groups of lines. With a somewhat longer exposure, similarly treated, this wash would come out darker, with the lines less contrasted and therefore more indistinct, while, simultaneously, a deposit would be produced between G and *h*, very like what that from F to G was in the first instance. A longer exposure still would develop into three grades of density, the strongest from F to G, the second from G to *h*, and the weakest from *h* to H or K. In each case, below the less and above the more refrangible limiting line, a swiftly fading degradation was frequently observed, but was always a minimum where the contrast between the grades themselves, and the grades and the lines contained within their limits, was a maximum. With greatly protracted exposures, an entirely different series of results was manifested, for the moment the "normal" exposure was passed—and by "normal" here I would wish an exposure and development resulting in the bringing out at their best of all the lines between F and K to be inferred (not between *b* and K)—the phenomenon of halation steps in to muddle matters unmercifully. Much as I should like, at this point, to show the connexion which, I am satisfied, exists between halation and reversal, I am afraid that anything like an adequate treatment of the subject requires that a complete article be devoted to it. I shall therefore confine myself at present to stating that, as far as my experiments in this direction have gone, the centre of halation seems to lie somewhere in the region embraced between F and *d*, near the calcium lines λ 4530–4535, and that while the blurring extends very much more rapidly into the violet than it does into the red—in this behaving exactly like the normal image—yet for a long time the density remains greatest in the region specified.

Plates treated with weak solutions of eosine, as also Edward's isochromatic plates, gave a double disjointed deposit, the densest extending from a little below D to E, with a maximum density at D. From E to F was very thin and clear. From F to G the density throughout was almost equal to that at D. From G to *h* it was about half as strong, and from *h* to H or K about half as strong as from G to *h*.

Of all the images of the solar spectrum which I obtained from first to last, one, and one only, gave anything like an iso or orthochromatic representation of the relative colour values, and this was an Ilford ordinary plate which had received a very long exposure through a yellow glass screen, and was developed more or less locally to force out the lines A, B, C, and D. But even in this case the violet (and ultra violet) came out too dense.

Having by this time ascertained that a brief exposure of a commercial dry plate showed that the bromide of silver in it was most rapidly reduced in that region of the spectrum lying between F and G, a series of attempts was made by means of auxiliary exposures to find out what radiations were most active in promoting reversals.

A strip of a "Fry" plate was found not to reverse under a negative of a strong black and white scale with millimetre divisions at a given distance from a gas flame in less than fifty-five minutes when subjected to a constant developer for a certain length of time. Consequently a slip was exposed for about forty-five minutes under this negative in the dark slide belonging to my photo-spectroscopic apparatus, and a subsequent exposure to the light of the sun was given, which, I calculated, would be just sufficient "to turn the scale." In this I was successful twice, but only enough to convince myself that some of the scale lines had reversed between F and G. Disliking the idea of auxiliary exposures altogether as a clumsy makeshift, I withdrew my "negative" of the mm. scale, scraped a strip of the film 4 mm. wide clean away from one end of the glass to the other, and then proceeded experimentally to find a reversing exposure for the developer which, by this time, I was constantly using. After many trials I finally succeeded in obtaining clean unmistakable reversals, of which the following description may afford an idea of the type. In the "infra red" region the image of the scale was "normal;" from A to F, "neutral." The "ultra-violet" region was normal, but very flat indeed, till at some distance beyond K, at which point the markings of the scale were barely distinguishable for some distance into the visible spectrum, the transition from neutral to reversal at the more refrangible end being extremely gradual and subtle, the *h*, G, and *g* lines, however, being distinctly reversed. The region of the spectrum which first produces transparency instead of opacity in a film of silver bromide or in a commercial "gelatino-bromide" plate is thus found to be the same as that which, when the exposure is very brief, induces that change whereby through the intervention of a developer the salt is reduced to metallic silver, and deposited at those points to which the light has had easiest access. In short, those rays which, acting for a little while, promote the formation of a deposit, are precisely those which, acting somewhat longer, entirely prevent any such result from taking place, and the most active of them all are those situated a little to the red side of *d*, or about 56,010–56070 W.N., or 4535–4530 λ.

In conclusion, let me once again emphasise the one great difference between a "printed-out" and a "developed" image. With the first the essential action is continuous from beginning to end. With the second the essential action is discontinuous and fluctuating, alternating between two extremes.

HUGH BREBNER.

PHOTOGRAPHY AND FICTION.

"THE LAODICEAN."

IN Thomas Hardy's *Laodicean*, published in 1881, photography holds a prominent position in the working out of the plot of the story, and most of the scenes so illustrated have the advantage of being possible; although, in one case, unlikely, unless retouching had been resorted to to a considerable extent, which is never mentioned at all as the means used to produce the effect.

The heroine of the story is Paula Power, a young lady, who, on the death of her father (a very wealthy railway contractor) was left in possession of an immense fortune, a part of which was the De Stancy Castle. At the opening of the story Miss Power resides there, and in the vicinity of the castle the movements of the plot principally centre.

Charlotte De Stancy, one of the descendants of the original proprietors of the castle, stays with Miss Power as her friend and companion.

Young Somerset, an architect out on a holiday, blending business with pleasure, asks to be allowed to make some sketches of the older parts of the castle. The permission is granted, and from this small beginning an intimacy springs up between Miss Power, Miss De Stancy, and Mr. Somerset, which ends in the young architect being engaged to superintend the rebuilding of certain parts of the castle.

Just at this juncture, a Mr. Dare introduces himself to Miss De Stancy (Miss Power being from home) at the castle as an amateur photographer, stating that he had Miss Power's permission to photograph some views around the castle. Miss De Stancy asked Mr. Somerset to see the young man and arrange the matter. When Mr. Somerset went down for this purpose and saw Mr. Dare, he was puzzled to decide whether he was a man or a boy. It was impossible to tell his age. There was no hair upon his face which could serve to hang a guess upon, but his actions were so completely those of a man, that your estimate of sixteen as his age suddenly turned to thirty. After a little conversation on the matter he got liberty to take pictures in and around the castle. Somerset at

this time was advertising for some draughtsmen to help him with his plans for the projected improvements at the castle. When he went home to his hotel that night he found Mr. Dare waiting for him.

"This is yours, I believe," Dare said, showing cutting of advertisement from *Architectural World*.

"Yes," said Mr. Somerset, "I inserted it."

"I think I should suit your purpose as assistant very well.

"Are you an architect's draughtsman?"

"Not specially. I have some knowledge of the same, and want to increase it."

"I thought you were a photographer?"

"Also of photography," said Dare with a bow. "Though but an amateur in that art, I can challenge comparison with Regent-street and Broadway."

Mr. Somerset engages him.

Now, this Mr. Dare turns out to be the illegitimate son of young De Stancy, an officer in the army, and Dare, for his own ends and advancement, has arranged with himself that his father must come down and woo and win Miss Power, and by this means get back the castle and lands that had passed from them. It was easy for De Stancy to gain an introduction and entrance to the castle through his sister, who was Miss Power's most intimate friend. De Stancy drops into the trap prepared for him by his not over-scrupulous son; and, after gaining a footing in the castle and friendly intimacy with Miss Power, he arranges to copy some of the pictures of his ancestors in the castle gallery.

Dare, being in the castle at the time, showing his portfolio of photographs, overhears this arrangement to copy the paintings; so, whilst the ladies are looking over his photographs, he says to De Stancy, whom he treats as a perfect stranger, of course, "Excuse my interruption, sir, but if you should think of copying any of the portraits, as you were stating just now, my patent photographic process is at your service, and is the only one, I believe, that would be effective in the dim window light."

It was arranged that Dare was to bring his instruments to the castle, and, under the guise of picture-copying, the father and son go on plotting the game of marriage with the proprietress.

As De Stancy's intimacy advances, he asks to be allowed to take a photograph of the lady's own portrait at the same time, conveying that the favour granted would be prized more than any other in life. But such direct compliments and soft passages go by unheeded, for the lady fair has placed her affections elsewhere, and Mr. Somerset is the favoured rival.

The uncle of Miss Power returns quite unexpectedly from foreign parts, and resolves to settle down with his niece. After he has been some time at the castle, he sees how things are working, and inclines to favour De Stancy's suit. Acting on this idea, he gets his niece and this De Stancy to arrange to go a tour with him on the Continent, thus taking the lady out of Mr. Somerset's way, and then inviting De Stancy to join them abroad.

In the mean time the amateur photographer sends a false telegram in Somerset's name, asking for the loan of money, and by this means gets the lady to begin to doubt whether Somerset is all that he had assumed to her.

In further prosecution of his plot, Mr. Dare went to the hotel at Carlsruhe, where the party was staying, to see what further he could do for the overthrow of Somerset.

The matter of the telegram is gone over with Miss Power, who does not feel easy in her mind about it. Needless to say, Dare lies and misrepresents, until Somerset is placed in the most unfavourable of positions. Having finished, he felt at liberty to say a few polite nothings to Charlotte De Stancy, in the course of which he drew from his pocket his new silk handkerchief. By some chance a card came out with the handkerchief, and fluttered downward. His momentary instinct was to make a grasp at the card and conceal it, but it had already tumbled to the floor, where it lay face upwards beside Charlotte De Stancy's chair.

It was neither a visiting nor a playing card, but one having a photographic portrait of a peculiar nature. It was what Dare characterised as his best joke of all, in speaking to Captain De Stancy in the morning; he had in the morning put it ready in his pocket to give to the Captain, and had, in fact, held it in waiting between his finger and thumb, but feared the Captain would not see the joke. So he resolved to keep it till a more convenient season. So fully had he made up his mind to this course, that when the photograph slipped out he did not perceive the appositeness of the circumstance in putting into his hands the *rôle* he had intended for De Stancy till after a moment's reflection. However, once having seen the accident, he seemed resolved to take the current as it served, and, smiling imperceptibly, waited events with cheerful inanition.

The card had fallen beside her. Miss De Stancy glanced over it, which, indeed, she could not help doing. The smile that had been previously on her lips was arrested as if by frost, and she involuntarily uttered a little distressed cry, "Oh!" like one in bodily pain.

Miss Power asked what was wrong.

Miss De Stancy, still confused, whereon Paula noticed that her eyes were continually drawn, as if by fascination, towards the photograph on the floor, which, contrary to his first impulse, Dare, as has been seen, now seemed in no hurry to regain. Surmising at last that the card, or whatever it was, had something to do with the exclamation, Paula picked it up.

It was a portrait of Somerset, but by a device known in photography the operator, though contriving to produce what seemed to be a perfect likeness, had given it the distorted features and wild attitude of a man advanced in intoxication. No woman, unless specially cognisant of such possibilities, could have looked upon it and doubted that the photograph was a genuine illustration of a customary phase in the young man's private life.

Paula observed it, thoroughly took it in; but the effect upon her was by no means clear. Her face paled a little. This was followed by a hot blush, perceptibly a blush of shame—that was all. She flung the picture down on the table and moved away.

Paula's experience had never lain in the fields of heliographic science and she would as soon have thought that the sun could stand still upon Gibeon as that it could be made to falsify men's characters in delineating their features.

"It is a pity a professional man should make himself so ludicrous," she said, and this incident seemed to put an end to all young Somerset's hopes. Dare had played the card well for some time after. On De Stancy pressing his suit, he was accepted, and all Dare's daring hopes looked as if about to be realised.

However, Miss De Stancy, on her return to England, by chance met Mr. Somerset in the train, and, from a conversation she had with him there, she became convinced that the said photograph had been manipulated for a purpose. So, on her return to Markton, she got the coachman to drive her to the shop of Mr. Ray, an obscure photographic artist in that town. The studio and shop is described as follows:—

"Ray's establishment consisted of two divisions, the respectable and the shabby. If, on entering, the visitor turned to the left, he found himself in a magazine of old clothes, old furniture, china, umbrellas, guns, fishing-rods, dirty fiddles, and split flutes. Entering the right-hand room, he was in an ordinary photographer's and print-collector's depository, to which a certain solidity was imparted by a few oil paintings in the background. Charlotte entered the photographic part, and put her question about the manipulating of pictures, not really from life, simply enough."

He told her that such misrepresentations were quite possible, and that they embraced a form of humour which was getting more and more in vogue amongst certain facetious classes of society.

"Have you any specimens of such work to show me?" asked Charlotte.

"None of my own preparation. I consider them libellous myself. Still, I have one or two samples by me, which I keep merely as curiosities. There is one, he said, throwing out a portrait-card from a drawer. That represents the German Emperor in a violent passion. This one shows the Prime Minister out of his mind, and this the Pope of Rome the worse for liquor."

She inquired if he had any local specimens.

"Yes," the photographer said, "but I prefer not to exhibit them. If you wish to buy, ask me for a particular one."

But the lady declined to be more explicit, nor did she want to buy.

"Well," continued the artist, "I shouldn't myself have known that any such things were produced if there had not been a young man here at one time who was very ingenious in these matters. Mr. Dare was his name."

Charlotte, as she was leaving the shop, felt that a great wrong had been done to Mr. Somerset by this lying photography. On her return home she resolved to let Paula know how wickedly the architect had been treated; and next morning, although it was the wedding morning, Charlotte made up her mind that Paula must know at once. When the miserable plot was explained to Miss Power she stopped the marriage, and refused the hand of De Stancy entirely. She also demanded that Dare, who was then in the castle, should be immediately arrested; but De Stancy, thus driven into a corner, confesses that Dare is his son, and gets proceedings against the schemer stayed on condition that he and Dare quit the scene of their knavery together.

By-and-by Mr. Somerset returns, to find his character cleared from those blemishes which he had never known had been placed to his credit.

In course of time he received as reward that which he wished more than anything else in all the world—the lady's heart and hand.

MARK OUTE.

ORTHOCHROMATIC PHOTOGRAPHY.

[Presented at the Buffalo Convention of the P.A. of A.]

IN my lecture delivered at the late Washington Convention, I have given the outlines of the history and description of ortho or isochromatic photography, both terms meaning the same, viz.: The art of *correctly* or *equally* rendering in monochrome the various colours which in the ordinary process have such a different effect on the sensitive plate, that blue and violet are reproduced much lighter, yellow and orange much darker, than they appear to the eye. The orthochromatic process is receiving the highest attention abroad, while on this side of the Atlantic we have been considerably behind the times so far; but, with the well-known determination of our people to march in the front ranks of progress, we shall soon make up for lost time, fully acknowledging the importance of orthochromatic

photography. Inasmuch as the great problem to make photographs in natural colours is being far from solved, we must aim to accomplish the next possible, to reproduce the colours in monochrome in the true gradations as they appear to the eye.

American manufacturers have commenced to give orthochromatic plates their attention, and I for one have spared neither trouble nor expense to produce coloured sensitive plates that meet the requirements of photography in its present advanced state. In the commencement I was assisted by the talented Boisonnas, of Geneva, Switzerland, known in Europe for his success in this direction, but whose experiments were unhappily cut short by his untimely death.

Later on, I availed myself of the offers made by the well-known B. J. Edwards, of London, and Attout Tailfer, of Paris, whose isochromatic plates have a great reputation in Europe, and I have followed their example in adopting the name "isochromatic." I am now in the position to furnish plates that combine great speed and fine quality with good orthochromatic effect without the use of a yellow screen. The yellow screen, which serves to filter the light, and is either a yellow glass placed behind the lens, or a yellow pellicle inserted with the diaphragm, necessarily slows the action of the light, and demands a much longer exposure in direct proportion to the depth of colour of the yellow glass or pellicle employed. It also causes trouble and annoyance in focussing.

It has been my aim to dispense with it, and I have succeeded in preparing rapid plates which are sufficiently orthochromatic for landscape and portrait photography without the use of a yellow screen.

For copying oil paintings where long exposures are not objectionable, and where it is imperative to secure the fullest orthochromatic effects, I prepare a *slow* plate especially for this purpose.

It has been stated that the orthochromatic effect can be obtained with ordinary plates, simply by the use of a yellow screen; but this idea is erroneous. The plate must have the elements of colour sensitiveness in itself, and, in comparing orthochromatic plates, they should be tried without a yellow screen to determine their merits.

Now, let us see what are the advantages of an orthochromatic plate over an ordinary plate, for instance, in landscape photography.

Let us imagine a landscape before us—above, the blue sky with white clouds, in the horizon the distant hills, in the foreground foliage in the beautiful shades of autumn. The ordinary plate would take the sky white, being just as sensitive to the light blue as to white rays, and therefore will show no clouds unless they are of a darker shade. The distant hills would be only faintly visible, and the foliage be lacking in detail. The orthochromatic plate would give us a soft grey sky, not white, but with beautiful white clouds, the distant hills just as distinct as you see them in reality, and the foliage with all the various gradations, from the finest high light to the deepest shadow, every leaf being clearly detailed, and every blade of grass standing out from the rest. In all, it gives us just what we see with our own eyes, except the colours. For portraits, we will consider to photograph a pretty rosy-cheeked girl from the country—rosy-cheeked, but a little freckled, with a blue dress and yellow trimmings, and with auburn hair. The ordinary plate will give her a fair face; but what a job to retouch all her freckles! The blue dress will appear like a white one; the yellow trimmings will be too dark. Her hair will show a great lack of detail, and appear the same as black hair. While the other plate will give, if anything, a bolder, rounder image, freckles will not be visible to a greater extent than you see them with your eyes, and the portrait is generally smaller than the original, as they are almost entirely invisible. The hair will be of a medium shade, and as full of detail as that of a brunette; the dress will be of a proper tone, the yellow trimmings in harmony with the rest.

Now, for another portrait. A gentleman from the country, with blue eyes and straw-coloured hair, fairly sunburnt, and with a clear white forehead. You know these kinds of subjects (I believe there is no photographer who does not get some of them). In his photograph the eyes are a colourless spot, the hair too dark, face without the roundness and life it should have, with a solid white forehead. The isochromatic plate, on the other hand, does justice to the eyes and hair, and gives tone to the forehead, and roundness and gradations to the face. For copying paintings or coloured drawings, they are the only plates that can be used with success. The reason for which I do not believe it necessary to further illustrate, as you will observe by looking over the various pictures on exhibition at this meeting. I wish further to state that, in developing the isochromatic plates, you must bear in mind that they are very sensitive to the yellow and orange light, and nothing but a dull ruby light can be used with safety, with the precaution to keep the plate away from any light as much as possible.

G. CRAMER.

THE REQUIREMENTS OF THE MODERN PHOTOGRAPHIC SOCIETY.

[American Photographic Conference.]

THIS is an age of centralisation. Such have been the rapid strides of photography within the past few years, that those who practise it—whether for pleasure or profit—realising that "in union there is strength," feel the necessity of organizing for mutual improvement and benefit. Where the management is careful and enterprising, and a proper interest shown by the members, the net results cannot but be most helpful.

It is indeed a very insignificant place which does not now boast of its camera club or photographic society. It therefore seems *àpropos* in this "gathering of the clans," the American Photographic Conference—a society of societies—that a few suggestions on the best way to attain success in the management of the average club will not be without interest. Having been connected with one of the oldest—if not the oldest—photographic societies in this country for upward of fourteen years, and in an official capacity part of the time, I feel that I can speak from experience.

To go back to the days of wet collodion—and no amateur ever had a greater discourager than the silver bath—when one was burdened with an amount of apparatus and *impedimenta*, judged from a modern standpoint, truly appalling. In those days the meetings of the society were full of interest, since the membership was largely composed of the persevering and enthusiastic workers, who, by recounting the results of their experiments, and exhibiting samples of their work, made the meetings instructive as well as interesting, since each spoke from his own practical experience.

There was at that time none of the "press the button" type of photographer, now mastodonic in proportions—a type, I trust, which will emulate this extinct mammal, and like it pass into oblivion.

With the commercial dry plate, and the comparative ease of producing a photographic negative, there developed a new order of things, and it is to this that our attention must now be given.

Too many take up photography, not from a love of the art, *per se*, but simply because it is a fashionable fad, a matter to be treated lightly, a mere amusement to while away an idle hour, and not, as it should be, a study of one of the most beautiful arts known to mankind.

There are those who, upon the purchase of an outfit and an instruction book, imagine that their success in the photographic field is assured, little dreaming that before them lies a vast amount of work in an unknown field before they can produce a *picture*. Perhaps, had it been known, the purchase would not have been made. Some go half way, and appear satisfied with merely producing medium work. From such, one constantly hears the questions, "Whose plates do you use?" "whose developer?" "whose lens?" Just as if the sum total of photographic success was to be found in some particular plate, developer, or lens. It is this half-way class which makes the most trouble in our societies; those, I am safe in saying, who do the poorest work. If such were to work out for themselves the various problems that arise, there would, I am sure, be a great diminution of quantity with a corresponding increase of quality.

One object of a society is to promote social intercourse between men of a kindred taste, and I am sure there is no stronger, more entertaining, and refining bond of friendship than a camera. It not only brings us in contact with things beautiful, but helps to perpetuate beauties which may have long since passed away. An attractive meeting-room is therefore imperative. It should be convenient, well arranged, well supplied with books and periodicals, and, in short, everything which would tend to the comfort of the members. A well-arranged dark room is also necessary. Some of the larger clubs have elaborate quarters, operating room with skylight, and, in fact, all that modern ingenuity can suggest. Such are, of course, desirable, but are usually beyond the treasury of the average club.

With all these appliances, it should be the aim of the members to encourage original thought and research, and it is just here where so many make a mistake in supposing, when called upon to read a paper, or take part in a debate, that something *new* must be given. No two men think alike, and, if a member comes forward with an imperfectly developed plate and asks assistance, ten to one a discussion will be brought out that will be of great interest. I have known some most interesting meetings to have been those when some one, by asking an apparently trivial question, by discussion brought out new and interesting ideas. It is not the weighty matters, but those of every-day occurrence, that are interesting to the average photographic society.

It is essential that in every club there be a leading spirit to take the initiative—one of large experience and fertile in ideas—who is always ready with some scheme when interest is failing. There is one thing which, however, militates against open discussion—the fact, I regret to say, that so few of our modern amateurs do all their own work, and thus

lacking practical experience, are partially debarred from discussing a point. How can a man take part in a discussion on the best method of toning a silver print when he never made one? This, I may say, is a key-note as to why so many of our clubs are not more flourishing—the want of real earnest experimenters.

My experience has been that in most clubs those who take the most active interest in its affairs are the really hard workers—men who make good pictures, who know how to develop a plate or tone a print, men who use their brains. To remedy this paucity of what I may call practical activity is to encourage individual work by making it imperative that in all exhibitions or displays, whether of prints or lantern slides, all pictures shown must be entirely the work of the exhibitor—in fact, offer a premium on self-made pictures.

There is no better teacher than an exhibition, neither is there anything which will take the conceit out of a man quicker than to see his work alongside of that of much better quality. Just as soon as a man learns practically how to accomplish a certain thing, then, and only then, can he talk from experience, and give ideas having some weight.

Encourage beginners to show their failures quite as much as their successes, for it is by the former that most information is gathered. No one can know it all, and the greater the range of experience the better the understanding of the subject. It may often happen that a very trivial circumstance to one may be a serious stumbling-block to another's success.

It is advisable to encourage the exhibition of new apparatus and appliances; but here it must be understood that where this is done it is simply for *display only*, and not a means of advertising any particular firm or company. In this way petty jealousies are avoided, and more encouragement given to the showing of new things, because no one can claim any undue advantages.

Lessen, if possible, the distinction between the professional and the amateur. I must confess an objection to the use of the word "amateur," as applied to one who makes photography a study and not a means of profit. The platform should be broad enough to include all photographers, and it seems to me altogether wrong—a mistaken idea—for so-called "amateurs" to surround themselves by a high wall of exclusion, thereby preventing their associating with their professional brethren. Professionals owe much to the amateurs, and the amateurs can square accounts by learning much from the professionals. It is a well-known fact that, in the most successful clubs both here and abroad, but more especially abroad, the members, both professional and non-professional, meet on an equal footing, and the interchange of ideas is doubly beneficial.

In the matter of product, the competition between the two classes is limited to but a few lines, and in those the stimulus of a healthy rivalry cannot but be replete with benefit. In competition, let it not be in a pecuniary way, but rather in quality of work. If it is necessary—and I doubt very much if it ever is—for a non-professional to occasionally sell pictures, let it be distinctly understood that the prices asked are as much as a well-recognised professional would ask under the same circumstances. Rather let the amateur feel that he is doing the purchaser a great honour to sell a picture and ask a price quite commensurate with that honour. On the whole, however, I consider it best not to sell at all.

To conclude: there is no better way to keep up the interest in a club than a constant round of lantern exhibitions, displays of apparatus, pictures other than photographs, and club competitions. In the summer time occasional field days are always enjoyable.

Now, there is so much to be learned in artistic composition from the works of first-class painters, etchers, and engravers, that exhibitions of these, with explanations from some artist of note, cannot but be largely beneficial and afford a means of study and comparison. A camera may be likened to the paints and brushes of an artist—a means to attain an end. Lectures by artists and men of science will add very largely to the interest of the meetings.

Now, to provide all this will entail a large amount of work on those taking the most active part in the management of affairs, and some one or two must be philanthropic enough to do this for the general good of all, and, in consequence, take all blame for what s apparently wrong, and usually, I regret to say, trust to silence to know when their efforts are appreciated. Virtue must be its own reward. It was ever thus, and I must say I see no other alternative. C. R. Pancoast.

PRELIMINARY, SECONDARY, AND SUPPLEMENTAL LIGHTING.

[A Communication to the Philadelphia Photographic Society.]

The following interesting paper is a translation from Dr. J. M. Eder's new exhaustive *Hand-book of Photography* (Part 2, Vol. I., pages 313–320). The subject will, without doubt, be a revelation to the professional and amateur who know nothing beyond the commercial dry plate of the present day. In days gone by the proceeding was technically known as "flashing." Our object in reproducing the article in its entirety is a twofold one: first, to call the attention of our readers to the exhaustive nature of Dr. Eder's labours; and secondly, to recall the possibilities of this almost forgotten method of bringing out a negative which would otherwise be lost or valueless. In our own experience we have frequently resorted to this practice, and have rarely lost a plate. Whenever we find a plate under-timed or coming up too slowly, we simply pour off the developer and expose in the tray from two to ten seconds before the ruby glass, then again pour on the developer. In extreme cases we have repeated the operation as often as four times, and almost always with satisfactory results. Again, when we had reason to believe beforehand that we were under-timed, an exposure of two-thirds second in front of the ruby light before development proved of service. The former plan, however, is by far the safest.

It is a proceeding, however, which requires care and judgment, and should not be resorted to unless all other manipulations of the developing agents fail to be effective. Still, in our own practice, the method as stated has proved successful with at least three makes of dry plates of varying degrees of rapidity.—J. F. Sachse.

In the Negative Process. — If a Daguerreotype plate, wet collodion, or gelatine dry plate, after a short exposition in the camera, is subjected to an exposure of several seconds over the whole surface in a weak, diffused light, a favourable result will be attained.

If the exposure in the camera were gauged so short that the development resulted in an imperfect image, this supplemental general lighting continues the first action of the light so far that it results in a substantially better or perfect picture. This action was first noticed over forty years ago with Daguerreotype plates. *Becquerel* credited this continued action especially to the red and yellow rays, and denominated them as "continuing rays" (*rayons continuateurs*); while to the green, blue, and violet rays he attributed the primary cause of the action, and called them "creative rays" (*rayons excitateurs*). This view was, however, soon found to be erroneous, and *Moser* was one of the first who recognised the fact that all the rays can commence and complete the action; later it was even proved that in actual practice it was just the subdued rays of the violet end of the spectrum which were the most active.

In the photographic practice, it has been repeatedly proposed to expose the plate in the camera for a shorter period than called for by ordinary conditions, and then subject the plate for a short time to a diffused light. This proceeding is called secondary lighting. A similar effect is attained if the plate is subjected to an exposure of a weak, diffused light before being placed in the camera (preliminary lighting), or if weak, diffused light is introduced into the camera during exposure (supplemental lighting).

In all three cases a reduction of period of exposure-in-chief is gained, frequently, however, at the expense of the quality of the picture. The means, therefore, are manifold, and are described below. As early as 1871 *Schultz-Sellack* declared that the "continuating" action of the light upon a weak image was not a peculiar phenomenon, but the result of the necessary primary action, which explanation contains the greatest probability.

I. The Wet Collodion Process.—The action of preliminary and secondary lighting upon the photographic wet collodion plates was discovered by *Bazin* in 1870. His plan was to introduce a red light on the plate either during, before, or after the exposition. This was done by aid of four openings in the front board of the camera, around the lens; these were protected with glass plates, coated with a solution of carmine in ammonia, which were placed in front of a piece of brown glass. The opening or closing of the lens achieved the same effect upon the four supplemental apparatus. The same effect was obtained when the plate was exposed to a red light, a second either before or after exposure.

Carey Lea, in landscape photography, caused the red light to strike the plate only where the sky did not reach. His plan was to secure a red medium (carmine-stained paper) on the upper part of the camera, so as to cause the darker portions, foliage, &c. (but not the sky), to be strengthened by the red light, and come out stronger in detail. When the foliage was brightly illuminated the red medium was unnecessary.

Newton applied an opening in the first board of the camera, 2×5 inches; this was covered with a green glass, so that the plate was flooded with a weak green light during the exposure. This is said to have reduced the time of exposure from twenty to five seconds.

Newton, however, concluded that the best and safest plan was to leave the plate in the camera, and then give a secondary exposure by

taking a green, red, black, or grey medium in front of the lens, and thus reflect light upon the plate.

Others, again, exposed the wet plates one-third to one-fourth of the usual time; these introduced a piece of yellow glass in place of the dark slide, and subjected the plate to an exposure of ninety seconds in diffused daylight (*Gaenslin*).

Coloured papers (blue, green, brown) were also used for the same purpose, in front of the open lens immediately after the exposure (*Krüger*).

In the year 1887 the secondary lighting by means of violet light was recommended. *Scotellari* made an opening in the cap of the lens; this he covered with aniline violet. This opening was opened or closed at will by a rotary disc. The plan was to expose with open lens as usual, only much shorter, then put on the cap and turn on the violet light to complete the exposure. This process reduced the time from fifteen to seven seconds; this was exclusive of the supplemental lighting of two seconds.

Gillard recommended these coloured diaphragms not only for a reduction of the time of exposure, but on account of the peculiar mezzotint effects. He used diaphragms made of gelatine sheets, which were coloured violet or dark green.

Frequently the preliminary or secondary lighting was made by a white light. *Werge* used two thicknesses of tissue paper, giving four seconds.

Haugk suggested to expose a trifle less than half the usual time, then for a few seconds (say one-fifth of the usual time) to hold a piece of ground glass before the lens, and then cap.

Melchion in portraiture exposed his wet collodion plates to a diffused light for two seconds by holding a ground glass in front of the lens, and then made a normal exposure of eight seconds, the result being a plate equal to an exposure of fifteen seconds without any preliminary lighting.

Foxlee also was a strong advocate in favour of supplemental lighting with diffused white light.

It was further recommended to have an opening in the cap, covered with opal glass, this to be two-thirds the diameter of the lens, the preliminary lighting to be one-seventh of the normal, with the result of reducing the actual time of exposure from twenty-four to fourteen seconds.

Richard closed the opening in the cap with a thin piece of tissue paper. The supplemental lighting should not exceed three-fifths of the normal time.

Wyler preferred to make the preliminary or supplemental lighting by candle-light in the dark room, as he had more control over the exposure than in the camera. His plan was to expose the wet plates for ten seconds to the candle-light.

Chapman subjected his astronomical plates to the influence of lamp-light before he started development. This was also recommended by *Worthley*.

With under-exposed wet collodion plates *Prümm* found that the most practical supplemental exposure was to flood the plate with a yellow light in the dark room.

It is requisite with both fore and after exposure to take the greatest care that the light does not act too long, as this results in fog; while too short an action shows no improvement whatever. For instance, where an exposure under yellow glass of ten to fifteen seconds in diffused daylight already causes fog (wet collodion plates), a ruby glass with five to ten seconds under the same conditions gives perfect results, whereas a combination of the ruby and yellow glass, even with lighted exposure, gave no noticeable effect whatever. These additional exposures, notwithstanding the occasional results obtained, can only be depended on as a makeshift to save an under-exposed plate, as in almost every case fog results. Further, properly exposed plates are always preferable.

Quidde preferred the subsequent exposure.

A considerable reduction of the light is necessary with all the modalities of additional lighting, so that the proceeding can be controlled. Therefore, translucent mediums can only be used when violet or white light is used. When green or yellow discs are used, more transparent mediums are available—thanks to the fact that the colours admit but few of the active rays. It will be noted that in all these processes the blue and violet rays are the most active, red carmine paper admitting even a few of these rays. Plain red or yellow glass proves ineffectual.

In this connexion we will introduce the proposals made in 1850–51 to use white for photographic purposes. The idea originated with *Löscherer*, in Munich, who always operated with a camera the inside of which was white instead of black. He declared that thereby the action of the light was greatly increased.

Immediately after the publication of this statement *Blanquard-Everard* stated that he obtained pictures in shorter time when the interior of the camera was white instead of the usual black. This was substantiated by *Kilburn*, but denied by *Claudet*, or at least restricted to such cases where the outer light was not strong enough to form a strong image. Notwithstanding these experiments, they were again brought up by *Blair* twenty years later, but he soon returned to the dark camera and a preliminary exposure under red light.

Günther, in Hanover, 1855, suggested a modification in which he advised a blue-lilac colour in place of black.

As a matter of fact, some photographers (*Bellac* and others) actually reduced the time of exposure with similar apparatus. In the resulting discussion, in which *Horn* was especially active, it was soon shown that the reduction of time was at the expense of the picture, as the negatives were always flat. As a matter of fact, neither the quantity nor intensity of light within the camera is under any control; and even if in some exceptional cases the requisite measure of supplementary lighting is attained, in the great majority of cases it results in failure. Consequently, this expedient is practically useless; it is far more unreliable than the previous processes.

Carey Lea condemned the white and red interiors of the camera. Especially with a strong light (landscapes, &c.), the bright high lights would spoil the whole view, and result in fog and flatness.

De Constant, who again investigated the matter in 1870, found that an entire white camera resulted in a flat picture, little relief, and a confused appearance, as if the plate had been wiped over. If the top and bottom of the camera were black and the sides white, the resulting picture combined sharpness with softness and relief, especially on the part towards the black sides. If the bottom of the camera was black it added to the clearness of the face. If the top of the camera was dark, the clothing was clearer. Consequently, as the face in relation to the drapery usually has too much light, better results were obtained when the top and sides were white and the bottom black.

As will be seen from all the above suggestions, no precise method has been evolved which could be adopted in regular practice.

II. Primary and Secondary Lighting of Gelatine (Bromide of Silver) Dry Plates.—Gelatine dry plates may also be improved during development if the necessary caution is used. It is, perhaps, superfluous to remark that with the greater sensitiveness of the gelatine dry plate it is much more difficult to gauge the correct time for supplemental lighting than with the wet collodion plate, and the difficulty of preventing fog is greatly enhanced.

With extra-rapid dry plates the period of the primary action is so exceedingly short that even with a slight light-impression a developable image is obtainable, and even the shortest lighting causes a general reduction (fogging). On the contrary, on less sensitive, clear-working plates a marked effect is shown by additional lighting. Candle-light can only be used for this purpose at a very great distance, or when greatly weakened. According to *Eder*, candle-light worked better when thrown through a ruby glass. His experiments showed that a slow dry plate of 15 Warnerke, after being exposed from two to six minutes immediately in front of a ruby lamp (candle-flame), sensibility was raised to 19–20 Warnerke sensitometer, which was equal to a plate three times as sensitive.

E. Himly, in Berlin, patented a so-called (*Hilfshelichter*) auxiliary exposer, which introduced diffused light into the camera (D. R. patent 38,684, August 6, 1886); *vide* Eder's *Year-book*, 1889, p. 87.

Preliminary lighting with dry plates of high sensibility is partly unnecessary, partly dangerous, and therefore is not advisable in actual practice.

In all probability the same results obtained on gelatine dry plates, by auxiliary exposure, may be reached in a purely chemical manner without the action of light. A minimum reduction of silver bromide must be introduced. This takes place by extending the so-called ripening process. In fact, the continuation of the digestion of the emulsion leads to fogging, and otherwise it is exceedingly dangerous to the rapidity of the emulsion, when treated with reagents, which are apt to change the reduced bromide (sub-bromide) back to its normal condition.

J. M. Eder.

REPRODUCTION OF WRITING AND DESIGNS BY THE CHEMICAL METHODS.

Translated from the "Revue de Chimie Industrielle."

Polygraphy.*—Polygraphy—called velography, or chromography, or, again, hectography—is a process for reproducing writing and designs

* Polygraphy was invented by Ungerer, Kwaisser, and Hussak in 1878. The apparatus used to execute it have received different names, of which the following are the most common:—Polygraph, hectograph, chromograph, velograph, polycopy, printograph, compolythograph, belocygraph, polyaugraph, transphograph, graphotype typopress, &c.

to a small number of copies. It is founded on the enormous colouring power of the aniline colours.

They write with aniline ink on glazed paper. This writing is transferred on to a gelatinous paste, and by applying leaves on the paste a certain number of copies of the original can be worked off without inking. The composition of the polygraph pastes is very variable. The following are the best-known recipes :—

1. *Girardin Composition.*

Gelatine	100	grammes.
Glycerine	150	,,
Fine talc	20	,,

2. *Lebaigue Composition.*

Gelatine	100	grammes.
Water	375	,,
Glycerine	375	,,
Kaolin	50	,,

3. *Wharta Composition.*

Gelatine	100	grammes.
Glycerine	1200	,,
Water	400	,,
Sulphate of baryta	100	,,

4. *Wharta Composition.*

Gelatine	100	grammes.
Dextrine	100	,,
Glycerine	1000	,,
Sulphate of baryta	80	,,

5. *Kwaysser and Hussak Composition.*

Gelatine	100	grammes.
Glycerine at 30°	400	,,
Water	200	,,

6. *X Composition.*

Gelatine	200	grammes.
Water	750	,,
Glycerine	1200	,,
Sugar	200	,,

7. *Other Composition.*

Water	1000	grammes.
Dextrine	150	,,
Sugar	200	,,
Gelatine	400	,,
Glycerine	1500	,,
White of zinc	150	,,

The paste is prepared as follows :—Into an iron or copper vessel, plated with tin, water is poured, which is then raised to boiling point, and the gelatine dissolved in it, tablet after tablet, keeping it constantly stirred to prevent the formation of gluey balls, which might adhere to the bottom of the vessel.

The boiling is continued until all the gelatine is dissolved entirely. One-tenth of the water to employ is added to repace that which has evaporated, and the dextrine is dissolved in small portions, and finally the sugar. When the mass is very limpid the boiling is continued for ten minutes, and glycerine is added, constantly stirring. If a transparent paste is required it is left in this state; but, if it is wanted opaque and white, white of zinc is incorporated.

The composition is poured into a tin plate or zinc tablet, having dimensions in proportion with the size of the proofs to be obtained, but the height of which does not exceed ten to fifteen millimetres. The paste should be about one centimetre thick. The tablet containing the liquid composition should be placed horizontally on a table, covered with a sheet of paper to keep away the dust, and left a night for slow cooling. The next day the paste should be firm, smooth, homogeneous, and delicate. Pressed with the finger, it should yield slightly, but resume its primitive state when pressure ceases, exactly like indiarubber not vulcanised.

The inks also are of variable composition. These are the most employed :—

Violet Ink (Lebaigue).

Water	30	grammes.
Paris violet	10	,,

Violet Ink (Kwaysser).

Water	70	grammes.
Alcohol	10	,,
Paris violet	10	,,

Violet Ink (Other).

Water	100	grammes.
Alcohol	20	,,
Glycerine	5	,,
Crystallised violet	15	,,

Red Ink (Lebaigue).

Water	100	grammes.
Alcohol	10	,,
Acetate of rosaniline	20	,,

Red Ink (Villon).

Water	100	grammes.
Alcohol	10	,,
Bordeaux rouge	15	,,
Glycerine	5	,,

Red Ink (Villon).

Water	100	grammes.
Alcohol	20	,,
Rhodamine	15	,,
Glycerine	5	,,

The manner to work off polygraph proofs being generally known, we shall not enter into any description. The washing of the paste, to efface the transfer, should be done with a fine sponge soaked in tepid water, taking care not to lean too much, to avoid graining the surface. When the paste contains dextrine, cleaning is more easily done. When, after a certain time of service, the paste no longer presents the requisite qualities, it is remelted, and a little glycerine incorporated.

These are the weights of the pulp which enter into a velograph of different dimensions :—

Dimensions.	Weights of Pulp.
30 × 20	700 grammes.
40 × 20	950 ,,
50 × 25	1500 ,,
60 × 30	2100 ,,
75 × 40	3500 ,,

With a good velograph one can obtain fifty good proofs. It is much used in offices to reproduce letters, circulars, convocations, notices. The polygraph is also excellent for the reproduction of embroidery and tapestry work, which can be obtained with their respective colours and with great clearness.

The original is designed with as many colours as desired, and the pulling of the proofs is operated as though it were a question of a single colour.

Photochromotypy.—This is a process for the reproduction of plants, also based on the great colouring power of the aniline colours.

The plant, of which the details are to be reproduced, is dried between the folds of unsized paper, passing it over with a hot iron. The entire surface, or some portions only, are covered with the red or violet ink of which the composition was given above, or better with the following special inks :—

Red Ink.

Water	100	grammes.
Alcohol	100	,,
Glycerine	100	,,
Acetate of rosaniline	30	,,
or rhodamine	25	,,
or Bordeaux red	30	,,

Violet Ink.

Water	50	grammes.
Alcohol	75	,,
Glycerine	75	,,
Paris violet	20	,,

When the ink is dry the plant is placed on the folds of paper, the inked side on the top, and a sheet of paper is applied slightly damped with water, containing ten to fifteen per cent. of alcohol. An iron is carefully passed over the sheet of paper on the plant, so as to bring out well all the details. In this manner ten to twelve copies can be obtained quite irreproachable.

Velotypy.—Velotypy, called also *Schmithotypy*, is a process of graphic reproduction having much analogy with polygraphy. But in this system there is inking, which enables the pulling of as many proofs as desirable. The method was invented by Mr. Smith in 1879.

On a plate of zinc a perfectly equal coating of the following gelatinous composition is poured :—

Water	100	grammes.
Gelatine	10	,,
Glycerine	1	gramme.

And it is let dry out of reach of the dust, so that after drying it is not more than one millimetre thick, and presents a certain hardness. The zinc plate is placed in a basin of the same dimensions, and two centimetres high, containing a paste forming an elastic bed, and composed of—

Gelatine	100	grammes.
Glycerine	300	,,
Sugar	10	,,

The apparatus thus prepared bears the technical name of *Velocygraph* or *Schmithotygraph*.

The writing or design it is a question of reproducing is traced on glazed paper with one of the following inks :—

1. Water	100	grammes.
Alum	10	,,
Aniline colour	1	,,

2. Water	100	,,
Alum of chrome	10	,,
Aniline colour	1	,,
3. Water	100	,,
Perchloride of iron	7	,,
China ink	to colour.	
4. Water	100 grammes.	
Azotate of silver	10	,,
China ink	to colour.	
5. Water	100 grammes.	
Tannin	10	,,
Aniline colour	2	,,

Whilst the writing is drying, the paste coating of the velocygraph is humected during ten minutes with cold water and a fine sponge; the superfluous drops of water are next taken off with a cloth; the original is placed on the humid paste, and an indiarubber roller is passed over, and the image is transferred on to the gelatinous surface. Then it is inked with a roller and lithographic ink; this last adheres only to the written parts. A damp sponge is passed over to take away the ink not adhering, a sheet is placed, the roller passed over, and the whole is passed between two rollers, and thus are worked off as many copies as necessary, inking again.

In inking with transfer ink, one can pull proofs on autographic paper, and transfer them on to stone, zinc, or wood.

Papi-autography.—This is a process of multiplication of writing discovered by M. Chaillon, writer at the Marine Ministry. A sheet of Japanese paper is spread on a well-prepared sheet of zinc, after having damped the angles. A damp cloth is superposed, and on this cloth is applied a sheet of impermeable paper. The whole is placed under the plate of a copying-press, placing several folds of paper under the zinc plate, so as to form a pad. The Japanese paper is glued exactly on the zinc.

The design to be reproduced is traced on a sheet of glazed paper with the following ink:—

Water	100 grammes.
Crystallisable acetic acid	80 drops.
Aniline colour (Paris violet)	10 grammes.

When the writing is dry it is applied on the Japanese paper, a piece of cloth is placed above, and it is again pressed during a minute. The transfer of the paper is made on Japanese paper, which will serve as an autographic plate, from which twenty-five copies can be obtained. The paper to receive the proof should be damped with a sponge saturated with water.

M. Monteillet is the author of another process of papi-autography, in which the Japanese paper is replaced by a paper of special composition.

Polychrome Autography.—In this process, invented by Holzmann, two kinds of paper are used—*autographic paper*, prepared by saturating ordinary paper with a mixture of oil and resin, and the *negative paper*, which is nothing but paper well sized with animal size.

They write or draw on the autographic tracing paper with aniline inks, then it is turned and applied to the negative paper, previously damped during three minutes with cold water. The characters are transferred on to the negative, from which can be worked at a minimum twelve copies.

By writing with different kinds of inks, proofs of several colours can be obtained.

Polycopyon Paper.—This process is based on the same principle as polygraphy, and differs only because the paste is applied in a thin coating on strong paper, to which the aniline writing is transferred. A sheet can only be used once. The *Polycopy* of Giran and Estriband and the *Dagron Autograph* are nothing else.

Sheets of paper are arranged so as to be able to autograph, at once, a copy of several pages; such are the apparatus *Alisoff* in America and *Anderson* in England.

In the *quick polyautograph* of M. Frey, the sheet of paper is stretched on a roller, so that to obtain proofs it suffices to pass the roller on the paper intended to receive the copy, which should be slightly damped. The same sheet can be used several times, provided the surface is humected, and that it is let rest after each operation.

Papyrography.—This method of reproduction was invented in 1869 by Zuccato. On very permeable tissue paper, covered with a coating of impermeable composition, they write with an ink which renders the coating permeable and soluble in water. The writing being traced, the sheet is steeped in water, and a *cliché* is thus obtained on the best paper. This paper is pressed, on the side with the writing, on a cloth pad soaked with aniline ink, and on the other on a sheet of white paper; the ink leaks through, traverses the writing, and fixes itself on the paper.

Bauer Autocopier.—This apparatus of reproduction was invented in 1875 by Hyksa, and worked successfully by Bauer and Otto Lehm.

On a sheet-iron plate, covered with a mixture of aniline, tallow, and chalk, a sheet of tissue paper is placed, and on this a writing is made with a hard point, leaning heavily. The paper takes the negative imprint o the subject on the back. By applying, on this sheet turned back, sheets of white paper humected with alcohol, gum tragacanth, and water, a great many copies are obtained without the aid of the press.

Frey Autocopier.—Intercalary sheets may be used, charged on both sides with colouring substances with aniline base, and on condition of pressing sufficiently in writing to obtain from each of the two leaves a positive and negative copy. This last can be read by looking at the wrong side, by transparency, and gives a certain number of reproductions on humid paper. It suffices to smear the verso with a special composition to retain the aniline ink.

M. le Commandant Frey invented an apparatus based on this principle specially for the service of the transmission of orders from the Etat-Major in a campaign.

It is a register composed of several leaves of tissue paper, between which are placed sheets smeared with a composition with aniline base. It is accompanied with a stick of colouring composition which permits the rubbing up of the surface of the communicative leaves, and a stick of a soapy composition which serves to coat the verso of the leaves intended to give negatives, when one wishes to obtain reproductions of these last. From each of them can be obtained from eight to ten copies.

Pumphrey Apparatus.—This is a plate of glass covered with a very even coating of albumen, on which the transfer is fixed. The copies are worked as on the polygraph. This method was invented by Pumphrey, of Birmingham, in 1878.

Multiplicator Paper.—This paper was invented by Brackelsberg & Co., of Hagen. It is a kind of tracing-paper. When any species of writing is to be reproduced a white sheet is placed on the prepared side, and they write on it with a double No. 5 pencil, leaning heavily. The preparation of the multiplicator paper is detached under the pressure of the pencil, and is then transferred on to the verso of the sheet on which the writing has been made. This last forms a negative proof, from which a very clear copy can be obtained by applying it to another sheet of paper, slightly damped, and subjecting it to pressure. One can work off as many as ten copies from the same negative.

Gazegraphy.—This is a method of reproduction of designs by means of gases, invented by M. Renault. If a current of ordinary hydrogen gas is directed on to a sheet of paper, impregnated with a salt of oxide of silver, like the azotate, nitrate, acetate, &c., the silver is reduced and the paper becomes black. The halogen salts of silver, like chloride, cyanide, bromide, &c., are not reduced. In addition, the paper, immersed in a solution with one-tenth of a mixture of nitrate of silver and nitrate of mercury, or double arsenate of silver and mercury, is impermeable to hydrogen and unalterable in the light, whilst the strokes in chloride, bromide of silver, &c., let this gas pass. Therefore, if under a paper written with chloride of silver, paper sensitised with a double salt of silver and mercury is placed, and a current of hydrogen directed perpendicularly on the surface of the paper, the strokes or characters come out black on a white ground. One can with the same proof obtain a great many copies, which are fixed by the known methods.

Instead of hydrogen, nitrogen may be employed, or carbonic acid charged with phosphorous vapours. The phosphorus blackens the salts of copper and mercury. In this case paper is used sensitised either with nitrate of mercury or acetate of mercury or of copper. Carbonic acid gas is produced by the attack of the chalk by chlorhydric acid; the gas is washed in water, and run through a tube containing phosphorus, and it can then be employed for the purpose. One litre of carbonic acid is charged with eight-hundredths of a milligramme of phosphorus at a temperature of 4°, eleven at a temperature of 15°, and twelve of 17°.

There is a method still more simple for making use of this property; it is to write with thick ink containing phosphorus, which gives by simple contact with paper sensitised with copper or mercury pretty clear proofs. Phosphorus can be replaced with iodine, and paper sensitised with copper by paper with a double nitrate of silver and copper.

Metallotypy.—This method of reproduction is based on the displacement of the metals by each other. One writes with pitchy ink, with a sugar or gum base; the proof is sprinkled with powdered bronze, and on this proof is applied, with a slight pressure, a sheet of paper prepared with acetate of copper, nitrate of mercury, double nitrate of silver and mercury, according to the nature of the bronze employed.

Thus, with French bronze, paper is employed sensitised with the following solution:—

Nitrate of silver	1 gramme.
,, mercury	1 ,,
Water	12 grammes.
Glycerine	1 gramme.

A charcoal proof can be sprinkled with bronze powder, and used for the reproduction of the photograph. All the processes with powders are applicable in this case.

Perrault Process.—On paper sensitised with a double azotate of silver and mercury a design is applied, made with ink containing a soluble bromide—for example, bromhydrate of ammonia. Contact determines the formation of a haloid salt of silver, which becomes black in light, and reproduces exactly the design traced. This process is very good, and gives excellent results.

The ink with bromhydrate of ammonia is composed as follows:—

Water	100	grammes.
Bromhydrate of ammonia	10	,,
Glycerine	10	,,
Sugar	2	,,

Photochemical impressions are employed for the reproduction of industrial designs. They easily give accurate proofs of sketches made on tracing paper or cloth, laces, carved wood, &c., and in general of all objects with alternate and translucid parts. These photo-chemical reproductions are used by Engineer and Artillery officers, engineers, builders, mechanics, and architects, to obtain quickly and with little expense copies of drawings, plans, projects, documents, &c., without their being any necessity to confide them to strange hands, as when they are autographed or printed. During the last ten years photo-chemical processes have been largely multiplied. We shall give the chief.

Firstly, we shall remark that the designs to be reproduced should be traced with very black Chinese ink on faultless tracing cloth or paper, perfectly transparent, and rather bluish than yellowish. It is good to add a little Bismarck brown, or chrysoidine to the Chinese ink, producing an anti-photogenic tint, consequently giving clearer and brighter lines. A. M. Villon.

(To be continued.)

DEVELOPING.

[Presented at the Buffalo Convention of the P.A. of A.]

"There is a great deal of difference between seeing and observing." There is a mountain of truth in a molehill of words in that quotation, which will apply to developing as well as many other things.

It is merely putting in "brains Q.S.," with the other constituents of the developer, but that makes all the difference (except that through pure luck) between a negative that will make a photograph that is a joy to look at, and a piece of paper with a blotch of silver over it. New developers and new developing agents can be obtained from nearly every one of our photographic journals. They are probably all good, only some may be better than others. It is not so much the formula, but the way it is used that gives the result. There are, probably, no two persons using the same plates and developer that will produce the same quality of negative. One will only see that the image makes its appearance in due course of time, will see that it continues to develop, and, when he sees that it is sufficiently dense, will remove it from the developer. Another will not only see when the image appears, but will observe whether it is too slow or too quick, and will add a little force or apply the brakes as it may need. He will observe the exact time when it should be removed from the developer, and whether it should be washed very quickly before applying the fixing, or whether a longer washing would be better.

Whether pyrogallic acid, eikonogen, hydroquinone, iron, or any of the very latest developers should be used, should depend upon the observation of each one using them. Each one may be better for some special purposes than any or all the others. For general use, however, each person should adopt some special developing agent, learn to use it, and stick to it. Have also a standard developer; but, as there are many exceptions to most rules, so remember that you must look out for these exceptions in the way of different plates, different exposures, and different subjects, and strengthen or weaken your developing agent or your alkali, or add a retarder.

Among all the old or new developing agents "pyro" still holds the lead, and from all appearances will continue to do so. So far as my own observation goes, it gives better strength, better detail, better printing qualities, and, for an over-timed or under-timed plate, a better negative than any of the others. It may not make so handsome a negative as some of the others, but it is not the beauty of the negative itself that is wanted, but the beauty of the print to be made from the negative. It is true it may stain the hands, but that can be remedied by using a pair of rubber gloves. The staining of the negative itself, where it goes so far as to be a detriment to its printing qualities, can be easily remedied; but in most cases, particularly where it only leaves a slight olive colour, it is much preferable to what is called "a wet-plate effect."

You can make with "pyro" a negative as "thick as a board," or one as delicate as the bloom on a young lady's cheek, with the same kind of plate and the same exposure.

With the quickest plate a line drawing can be copied that will leave the lines pure black and the whites white paper, or all the detail in lights and deepest shadows in the portrait of the fairest blonde dressed in her bridal robes. To develop a first-class negative presupposes a correct, or nearly correct, exposure of the plate. Perfectly correct exposures are, and must be, extremely rare. It would take a long mathematical calculation and very sensitive instruments to give the exact strength of light with its shade of colour, and more exact shutters to our lens than we now have, with an operator at the shutter capable of taking advantage of all the mathematical and scientific points, to "touch the button" at the exact instant of time to get that exact exposure.

Such being the case, a "standard developer," while being "handy to have in the house," can be very seldom used without some change, if the very best effects are truly sought for.

Have your sulphite of soda and your alkali of a standard strength, add the pyro only when you are about to use the developer, make a little stronger solution of pyro for emergencies, and have your bromide ready for use; then use all with discretion, not only seeing, but observing.

Have you ever thought how much developing a plate is like creation? Do you ever think that you are creating a little world every plate you develop? The developer is poured over the plate, and soon the tops of the highest mountains appear in the shape of the highest lights, then the lower hills as the lighter shadows, then the rolling and flat earth as it graduates into the deep shadows represented by the seas. Usually we so develop our plates that we can say, when finished, "Behold, it is good!" E. Decker.

THE CHICAGO EXHIBITION, 1893.

The London Chamber of Commerce are circulating the following letter:—"Dear Sir,—At their meeting on July 21 the Council of this Chamber received a deputation of American representatives of the World's Columbian Exposition, to be held in Chicago in 1893—more commonly known as the Chicago Exhibition—who were introduced by Sir Philip Cunliffe Owen, and whose object was to secure the assistance of the London Chamber in obtaining the participation of British manufacturers. The Council ascertained from the deputation that all exhibits forwarded to the Exposition will, as long as they remain unsold, be treated as in bond, and not subject to any Customs charges, so that the duties ruling need in no way interfere with a proper representation of the products of British industry. Under these circumstances, the Council desire to formally draw your attention to this Exposition, in the hope that, if it be in your power to participate as an exhibitor, you will take the necessary steps as early as possible. I am to point out that Her Majesty's Government, in common with those of other countries of the Old World, have accepted the invitation of the United States Government to be officially represented at the Exposition, and, for the purpose of performing the necessary duties entailed by this acceptance, a British Commission has been appointed, consisting of the Council of the Society of Arts. Any communications respecting space, terms, and other details should, therefore, be directed to the Secretary of the British Commission for the World's Columbian Exposition, at the Society of Arts, John-street, Adelphi. In view of the imposing array of industrial products likely to result from the wide acceptances of invitations to exhibit by competitors with British manufacturers in North and South America, and also of possible developments likely to follow in international trade if a more liberal Customs policy be adopted in the near future, the Council will be pleased to learn that British manufacturers decide to earnestly participate in rendering the Exposition worthily representative of the premier position they occupy among commercial nations.—I am, dear sir, yours faithfully, Kenric B. Murray, *Secretary*."

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

Arrangements for Glasgow great International Photographic Exhibition go on apace. That it will be truly international in character is already assured, exhibits having already arrived from the United States of America, Germany, Italy, Austria, Russia, Spain, and France. All the various sub-committees are working with a zeal seldom met with in such undertakings.

The Entertainment Committee have arranged with some of the best-known lecturers of the day, and have erected a magnificent new paper screen at the east end of the large gallery. Limelight entertainments will be given nightly, and a musical promenade on Saturdays.

Something like two thousand cards of invitation to the opening ceremony have been sent out to the leading citizens of the West of Scotland, and a catalogue, unique in its way, is being compiled, which will be found to contain no less than nine full-page illustrations.

Exhibits of more than ordinary interest will be on the walls of the Fine Art Institute during the Exhibition. Among them may be mentioned a series of views taken by Surgeon Newlands during the recent expedition to Manipur.

We would remind intending exhibitors that the last date for

sending in applications for space is the 20th inst. Already a very large amount of wall space has been applied for by trade exhibitors, and any firms desirous of space should lose no time in applying to the Secretary, Mr. William Goodwin. The last day for sending in frames is September 22. M. ARMSTRONG.

Foreign Notes and News.

DR. MUSCHOLD, of Berlin, has been making a new departure in the photography of the larynx. He has succeeded in devising a method of accurately focussing the image of the larynx on a ground-glass screen before exposing, which has not hitherto been done, the effect being that a good result was almost entirely a matter of chance. He, of course, employs flash-light, as his predecessors have done; but the back of the camera is made about treble the width of the plate to be exposed. To the plate is attached a rod, which projects at the side, and at the other end of it is the ground-glass screen. As soon as the image has been accurately focussed on the screen, the projecting rod is shoved in, whereupon the two plates are moved along a groove, in which they slide, the sensitive plate taking up exactly the position previously occupied by the screen. At the same instant the magnesium powder is ignited, and the exposure made.

A VERY prominent member of the photographic profession has recently deceased at Graz, in Austria. Councillor Mariot was a remarkable example of the many-sidedness which is only too uncommon in the modern world. Educated as an artist, he began life as a journalist at the age of seventeen, and with considerable success, too. He then took to the stage, and, after attaining a good reputation as an actor, he undertook the management of three different theatres at the same time. Herr Mariot practised and studied photography with signal success almost from the time of its first discovery. Gradually, but certainly, Herr Mariot's reputation in this new line of activity grew and increased, and in 1867 he was presented with a special gold medal by the Emperor for his successful photographing of the Adelsberger cave by means of magnesium light. For his exhibits at the Universal Exhibition, in the same year, he was presented with the Knight's Cross of the Order of Franz Josef. His later years were mainly occupied in developing the collotype industry.

WITH regard to the Zeiss objectives, we learn from a communication to the *Photographische Correspondenz* that in the triplet apochromate all the glasses employed, with the exception of the flint glass, are pure silicate glasses, the durability of which has often been tested, and proved equal to that of the best crown and flint glass. The borate flint which is employed in the middle for correcting the triplet is, owing to its chemical composition, a glass of very great delicacy, which, however, in temperate climates is not likely to affect the combination, as the glass is enclosed in the middle of the system.

WE are glad to be able to report that the price of platinum has recently been sinking very considerably. We understand that this is due to the operations of the Syndicate in buying up the platinum ore, which we described some time back, having defeated the very object with which they were undertaken. Having raised the price of platinum one hundred per cent., the result was to throw all the old platinum in existence into the market—all those having old evaporating dishes, crucibles, and other precious vessels came and sold them—and so the prices began to drop apace.

PHOTOGRAPHY IN COURT.

WINDING-UP A COMPANY.

August 8. *Before* Mr. Justice Chitty.—*In re the Automatic Photograph (Foreign and Colonial) Company (Limited).*

This was a petition by the Company for a winding-up order.

Mr. Whitehorne, Q.C. (with him Mr. Emden) appeared in support of the petition, and stated that the Company was incorporated to supply foreign countries with those photographs which persons were supposed to get by dropping a penny in a slot and standing in front of a lens.

Mr. Justice Chitty: Supposed?

Mr. Whitehorne was afraid that that was a correct representation, inasmuch as the invention did not work well yet. A petition for the winding-up of the English Company had been presented, but stood over till after the Long Vacation, and an immediate order was not asked in the case of the Foreign and Colonial Company. On August 6 a meeting of shareholders had appointed a committee of investigation, and it was proposed to postpone the petition till that committee had reported. The meeting was attended by seventy-eight shareholders, holding 150,000*l.* worth of shares out of 200,000*l.*, and its decision was unanimous.

Mr. Byrne, Q.C., and Mr. Upjohn, for forty-five holders of 1077 five pound shares, which had been subscribed on the faith of the prospectus and fully paid up, resisted the postponement, and stated that the total number of shares issued to the public was 3,035. The Company had issued to the vendor or his nominees 40,000 ordinary and 500 founders' or deferred shares. It was not possible to carry on the business at a profit, and the only result of continuing would be that the money of the shareholders would be wasted.

Mr. Oswald, for thirty-two cash shareholders, desired the postponement of the petition.

In reply to a question from Mr. Justice Chitty,

Mr. Whitehorne said he would rather take an order to wind up than have the petition dismissed, and

His Lordship, being of opinion that in the circumstances of the case the assistance of the Court was required, made the usual order for a compulsory winding up. He took the opportunity of commenting upon the unfairness to creditors and shareholders of presenting winding-up petitions merely for the purpose of delay.

Our Editorial Table.

FALLOWFIELD'S PHOTOGRAPHIC REMEMBRANCER AND TRAVELLER.

THE current number of this useful *Remembrancer* is replete with all the latest novelties in photographic requirements, including the latest forms of detective cameras, stands, and accessories issued by this firm.

In future the *Remembrancer and Traveller* is to be published every month instead of quarterly as before.

TRADE CATALOGUES.—We have received compendious catalogues from the following firms:—Messrs. Ross & Co., 112 New Bond-street, W. (elegantly got up, with descriptive drawings); Messrs. Morley & Cooper, Islington, N. (a general catalogue, containing everything useful); and Carl Zeiss's list (in English) of Anastigmat and other lenses constructed of Jena glass. Herr Zeiss's London agent is R. Kanshack, 174 Charing Cross-road, W.C.

RECEIVED.—*The Amateur Photographer's Annual* for 1891; Sun Pictures of Norfolk Broads. By Payne Jennings.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,138.—"An Improved Instantaneous and Time Shutter, called a Slot Shutter, to work in the Diaphragm Slot of Photographic Lenses." T. FURNELL.—*Dated August* 4, 1891.

No. 13,229.—"Improvements in Apparatus for Binding or Securing together Sheets of Paper, Photographs, Pattern Cards, and other articles." E. H. DEREPAS and A. E. DEREPAS.—*Dated August* 4, 1891.

No. 13,423.—"Improvements in or connected with Lanterns, more especially for Photographers' use." J. DECOUDUN.—*Dated August* 8, 1891.

No. 13,448.—"A Hand or Detective Photographic Camera." G. F. FRAAS.—*Dated August* 8, 1891.

No. 13,449.—"Improvements in Mounting the Front of a Photographic Camera on its Vase." Complete specification. L. GANDOLFI.—*Dated August* 8, 1891.

PATENTS COMPLETED.

AN IMPROVED DEVICE FOR WASHING PHOTOGRAPHIC NEGATIVES.

No. 6618. Sir CHARLES STEWART FORBES, Bart., 23, Thurloe-square, London, S.W. *July* 18, 1891.

THE object of this invention is to automatically change the water used for washing exposed photographic plates. In all devices hitherto employed for this purpose the hyposulphate of soda is never entirely eliminated from the water in the washing tray or bath, the syphon frequently employed for that purpose being much too small and also continuous in its action, while the fresh water is allowed to continue running; the denser fluid containing the hyposulphate of soda or its equivalent is as a consequence constantly stirred up and again brought into contact with the plates suspended in the bath or tray.

My improvement consists in mounting within the bath or washing tray one, or more than one, intermittent syphon of relatively large diameter to the inflow cock, or equivalent. The longer leg of this syphon passes through the base of the tray, and discharges its contents into a trough so balanced as that by means of suitable mechanism it shall, at the moment of receiving the discharge from the syphon, stop the supply of incoming wash-water until the washing-tray is completely emptied. The balanced trough is perforated with small holes, and upon the water escaping therefrom it is restored by means of a spring, or counterbalance, or a suitable valve operated by the pressure of the supply water to its original position, and fresh water readmitted.

The claims are:—1. The combination in or with a bath for washing photo-

graphic negatives of one, or more than one, intermittent syphon, which discharges the contents of the bath into a perforated and pivoted trough in the way and manner, and for effecting the purposes herein described. 2. In a bath for washing photographic negatives the combination of a perforated, pivoted trough connected to, and alternately closing and opening the inflow cock, or valve, by means of the discharge from the intermittent syphon, or syphons, and the reaction of the counterbalance spring or water pressure in the manner described. 3. In a bath for washing photographic negatives the particular combination and arrangement of parts whereby the supply of clean water is cut off until the bath is emptied by the syphon, or syphons, as set forth.

Improvements in Portable Photographic Cameras.

No. 15,577. Alec Jones, 3, Upper Gilmore-place, Edinburgh.—*July* 18, 1891.

The object of my invention is to arrange a bellows-body camera that can be rapidly and easily fixed in position, and be perfectly rigid and extremely portable, and also to allow for a difference in its length so as to be adapted to the varying foci of the lens.

Into the frame of a bellows-body camera I hinge two strong wire (preferably steel) supports, bent at right angles, and forming three sides of a square, the lower or middle side being the pin of the hinge; the ends being hinge-bound by wedges are adjusted to spring into suitable receptacles fixed on to the front of the camera, either at the top and bottom, or opposite sides as desired.

To adjust the camera to different lengths for focussing the lens, I multiply the number of sets of slots or holes into which the wire sides are fixed on the camera front, to as many as necessary; each set being placed on a different plane permits of the camera being made longer or shorter, as the supports are fitted into these different sets of receptacles.

The claims are:—1. The portable camera with folding wire supports, which are used for keeping the bellows rigidly extended for use, and having means for adjusting the distance between the lens and back plate. 2. The portable camera with folding wire supports which are used for keeping the bellows rigidly extended for use, and having means for tilting the front so as to answer the purpose of the swing back, substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 18.....	North London	Wellington Hall, Islington, N.
,, 19.....	Bury	Temperance Hall.
,, 19.....	Manchester Camera Club	Victoria Hotel.
,, 19.....	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 19.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 6,—Mr. H. M. Smith in the chair.

A circular from the affiliation Committee of the Photographic Society of Great Britain was read, and it was decided that the matter was one that should receive the attention which could only be insured by giving members notice of the date on which it would be discussed. The 20th instant was settled for its consideration.

The Chairman called especial attention to the notice concerning the Leeds Photographic Exhibition, one in which he felt strong personal interest.

Mr. F. A. Bridge showed dishes of zylonite which he found light and convenient. It was also noticed that the shaping of the bottom of the dishes to admit of readily lifting the plate took the form of troughs, instead of the usual ridges, thus requiring a smaller quantity of developer to cover the plate.

In comparing the advantages of different materials for developing dishes, the Hon. Secretary said that he had known, on the Indian Ocean, a vulcanite dish to be so affected by the heat as to lose form and flatten out.

Mr. A. Cowan said that the necessity for backing plates had been disputed by some, who contended that with a plate richly coated with emulsion backing was not required. He had never seen a plate so richly coated that it did not show halation at the rebate of the dark slide if the sky had had a long exposure. Backing was never injurious, and in most cases decidedly beneficial. He had just tried caramel as a backing, and now showed a plate unbacked in part, giving an image lost by halation, with two other images backed respectively by Brunswick black—the best medium he had hitherto used—and caramel. In neither cases was any halation discoverabie.

The Hon. Secretary mentioned that he had recently been working with two well-known orthochromatic workers, who produced very fine results. One of these was Mr. Birt Acres, and he had told him that when using the medium yellow screen he gave eight times the ordinary exposure.

A question was then put by a member as to why, when taking large heads, an exposure was found necessary longer than that indicated by the size of the diaphragm?

Mr. W. E. Debenham replied that the size of the diaphragm must be reckoned in such cases not with relation to the focus of the lens for distant objects, but to the length of focus to which it was actually reached out. Then, again, for large heads full exposure was required in order to avoid large and heavy shadows. When photographing small heads it was permissible to give short exposure, by which means the features, though small, were strongly marked out.

Mr. Cowan said that, no doubt, Mr. Debenham was right, and that one could afford to have a small picture harder than a large one.

It was arranged that on the 20th instant the subject for discussion will be *The Development of Hand-Camera Exposures.* On the 22nd will be the afternoon outing at West Drayton; on the 27th *Blisters on Albumen Prints* will be considered; on September 3, *Dark-Room Appliances* will be the subject; on the 10th *The Keeping Qualities of Plates;* and on September 17 Mr. T. E. Freshwater will give a lecture and demonstration with the lantern microscope.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

August 10,—Mr. H. Staveley in the chair.

After the formal business, objects of interest were called for.

Mr. Gill showed some handy shutters, and a half-plate camera made by Mr. Farrow, of Hornsey-road. Messrs. Adams & Co. sent one of their "Lightning" tripods, a Gilmer lens adaptor, a "Holiday's" lamp, and a metal developing-dish with cover. Mr. Stewart reported that he had tested Mr. Barry's printing meter, and believed that, carefully worked, it would prove useful in carbon and opal printing.

The Chairman called upon Mr. Taylor for his demonstration on *Development* (one of a series for beginners). Mr. Taylor explained the action of the various constituents of the developer, the reducing agent, the restrainer, the accelerator, and the preservative, and, having brought six plates, two fairly exposed, two under-exposed, and two over-exposed, proceeded to treat one of each with a normal developer, and then to develop the remaining under and over-exposed plates with such modifications of the developer as to make the best of them.

A discussion followed.

The usual competition of prints taken at field days took place, Mr. Ainsley receiving the vote of merit for Kingsbury, and Mr. Walker for Beddington.

The President reminded the members that the annual exhibition was approaching, and urged them to prepare work to exhibit, so that it might be representative of the Society.

Mr. Stewart was elected chairman for September 14, when a demonstration on *"Alpha" Paper* will be given by the Britannia Company. Visitors welcome.

RICHMOND CAMERA CLUB.

At the meeting on the 7th inst. Mr. Carolin presided.

Mr. Cembrano's report as delegate to the Photographic Convention being unavoidably postponed till next Friday, the subject of *Home Portraiture* was discussed, and some interesting examples were shown by some of the members present.

Correspondence.

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

THE "HOROPTER."

To the Editor.

Sir,—In your issue of the 31st ult., I am not satisfied with the report as conveying exactly all I had to say. I gave a description of the "Horopter," gathered from authorities such as Helmholtz, Le Conte, and others, and referred those present to the works themselves rather than occupy space by a suggestion that what I had said in this matter need not be fully reported. I showed no photographic method could reproduce the Horopter. I considered Emerson's and Goodall's paper a very important contribution, but was uncertain as to the full bearing of all the experiments on photographic perspective.

Briefly, the drawing by a rectilinear lens and monocular perspective are absolutely identical when taken from the same point of sight and viewed from the same point. What I learnt from Emerson and Goodall to observe and express was, that neither monocular perspective nor its true parallel—the drawing of a photographic lens—really convey the sensuous impressions of vision, and that they become more and more unsatisfactory and unlike the sensuous impressions the wider the angle included, particularly with a lens of short focus, when not viewed at the distance of the focal length of the lens. I found it was not a subject to be discussed and dismissed in a few words that had reference to measurement. That part has been self-evident from the first; but the bearing of work and observations, such as that recently brought forward by Emerson and Goodall, are not those of measurement, but of individual impressions to be arrived at by individuals, in the main similar, though incapable of measurement. They have expressed for us what we have felt, and "balanced the egg," in this subject.

New laws are not given, as they cannot yet be reduced to measurement, if they ever will be. Photographic drawing and monocular perspective are, and always have been, capable of reduction to measurement, and in this difference lies the contention these gentlemen support, that photographic drawing is unsatisfactory, and "small" in its rendering of sensuous impressions.—I am, yours, &c., Thomas R. Dallmeyer.

25, *Newman-street, W., August* 12, 1891.

P.S.—Just received your issue of the 7th inst. Thank you, Mr. Editor, for your footnote to Mr. Chadwick's article quoted in his advertisement on page iii., a proceeding, I presume, you could not prevent. T. R. D.

TESTING MOUNTS.

To the Editor.

Sir,—Your correspondent "S. W.," writing to you last week *re* cardboard suitable for mounting photographs upon, permit me to give a reliable test for such as he requires. Separate in layers a few bits of the

cardboard suspected, place in a small dish, pour over the fragments a little *boiling* water; *when cool* add a few drops of, say, a fifty-grain nitrate of silver solution. If, after a short time, the water becomes discoloured, the cardboard is not fit to mount photographs upon.—I am, yours, &c.,

Liverpool, August 11, 1891. EX FUMO.

[While this will be a test for hyposulphite, it will not prove so for acids or chlorides.—ED.]

THE NEW PHOTOGRAPHY.

To the EDITOR.

SIR,—After the statement of the Britannia Works Company in your last issue, informing me that they "commenced the business of plate-making in 1879," it would be absurd of me to persist in questioning either the accuracy or the justice of their claims, and I therefore beg you to let me withdraw the charge which I made against the Company, and at the same time to express my regret that a misconception of some of the facts of the case should have enticed me into an unwarrantable form of criticism. That criticism, however, was absolutely unprejudiced, a circumstance which I hope will assist the Company in relegating the matter to the realms of forgetfulness.

Anybody can see with half an eye that "Tenaciter's" communication is neither impartial nor spontaneous. He must be painfully young at newspaper controversy; or if he really desired anonymity he would hardly have disclosed his identity so thoroughly as he does in the penultimate paragraphs of his letter. He holds a brief. I commend him for his zeal, but I entirely refuse to carry on a polemic with him under conditions which are unworthy of my own dignity—and his.—I am, yours, &c.,

London, August 10, 1891. R. E. CHESTERMAN, D.Sc.

To the EDITOR.

SIR,—I have only now seen Dr. Chesterman's lively remarks, which appeared in your issue of July 31. Whilst I am flattered by his attentions, may I amuse myself by trying to remove some misapprehensions under which he evidently labours? I do not know Dr. Chesterman, nor how far his opinions are worthy of notice; neither do I care to inquire into the motives of his attack further than to say that there appears to be some prejudice and personal offence somewhere. But let that pass.

What I wish to point to is his mistake in associating my exhibits in last year's Pall Mall exhibition exclusively with what he elegantly terms "fuzzicism." He will, perhaps, be surprised to hear that, out of thirteen exhibits, eight were taken as sharply—in one part or another of the respective pictures—as a Ross's Rapid Symmetrical would give them. He has been misled by the fact that I have been interested to show what excellent qualities, for some subjects, the pineole process yields. I do not tie myself to any one method or process either in camera work or in printing. I find great delight in the minute detail and crisp definition of many negatives, and I am even very fond of the stereoscope; but in artistic attempts we each work in the way we like best. That which pleases us most is our criterion of art, whether it be a trained criticism or not. This prompts the inquiry: "Is Dr. Chesterman's a competent criticism?" On his own confession, what pleases *him* most are his "pieces of paper, smudged, stained, and otherwise discoloured;" and of these he is, no doubt, a competent judge; but in writing of the value, or otherwise, of pictorial efforts he should surely write more modestly and temperately. He says: "The lowest depths of imbecility in picture production were, it is to be hoped, sounded at Pall Mall last year." It may be thought sufficient reply to set the opinion of the appointed judges against that of Dr. Chesterman. Strange to say, too, these were the very photographs in the exhibition in which Mr. Seymour Haden found something special. I am content to leave this matter there with those who know anything whatever of the subject—Mr. Seymour Haden against Dr. Chesterman!—I am, yours, &c., G. DAVISON.

Camera Club, August 8, 1891.

To the EDITOR.

SIR,—Dr. Chesterman, in his contribution to your JOURNAL under the above title, refers to the statement made by Eder at page 9 of the *Chemical Effect of the Spectrum*, "that in 1840 and 1842 Hunt recommended the use of bromine (*Phil. Trans.*). He said on this subject, 'That a new photography ought to be created, the foundation-stone of which would be bromine.'" Since reading the above I have carefully consulted Hunt's *Researches in Light*, and his *Manual of Photography*, without being able to trace any statement that could by any possibility be said to bear out the above dictum. I have also referred to the only contribution of Hunt's in 1840 to 1842 made to the Royal Society—"On the influence of iodine in rendering several argentine compounds spread on paper sensitive to light," and "On a new method of producing with greater distinctness the photographic image," without encountering any observation by the author which has been here accredited to him. My impression is that Eder, in this instance, has been caught tripping, and instead of reading Hunt in the *Chemical Effect of the Spectrum* it ought to be Herschel. My reason for this is the following: Herschel's letter to the Photographic Society in 1853, and wherein he said, "A new photography has to be created, of which bromine is the basis," continues as follows: "This I have proved in my experiments on this substance" (*Phil. Trans.*, 1840, Art. 77). I regret I have not beside me Herschel's memoir to refer to. In the table prepared by Hunt for the British Association in 1850, the author credits Goddard with the application of bromine to the silver plate in 1839.—I am, yours, &c., W. LANG, JUN.

["Who first suggested the use of bromine in photography?" is the title of an article we started writing on receiving the above letter, but which we cannot get finished for the present number. We are able to show that Hunt, Herschel, and even Goddard, must all be asked to stand on one side, and make way for the real first discoverer of the use of bromine in photography.—ED.]

"THE YALLER LIGHT AT THE CONVENTION."

To the EDITOR.

SIR,—Most of us have heard the story of the "Three Black Crows," and the Convention yaller light incident is in a fair way to similar absurd exaggeration.

The facts are these: A lantern and screen were provided by the Local Committee; the latter (although not quite perfection) were used on the opening night. With regard to the lantern, however, it would perhaps be too much to say that possibly an instrument of similar construction was used by Noah to while away the evenings during that somewhat protracted shower; besides, careful students of Genesis vii. and viii. might point out that no mention is there made of anything of the kind; neither does Mr. George Mason allude to the matter in his humorous Convention Dinner ditty; but, at any rate, it would be no exaggeration to say that the lantern in question had seen considerable service, and presented an exceedingly shabby and worn-out appearance. A small new mahogany-bodied lantern was, however, available, and it was decided to use this, although to obtain the best result it was found necessary to keep the jet very far back. All went well for some considerable time; then a very ominous smell of scorched wood was perceptible to the operators, whose only anxiety was to "push on" and conclude the series of about eighty pictures before ignition took place. For about ten minutes the little smouldering line of mahogany was quenched; but there came a time when further disguise was impossible, and, much to the amusement of the audience, the exhibition came to an end, four slides of Hawarden Castle remaining unshown.

It is almost impossible to describe the hilarity of the assemblage—if you had gone round and tickled them all separately, they couldn't have laughed more or looked more pleased. The incident has been commented upon in almost every report I have seen or heard about. One of the Bath local papers talked about Hawarden Castle being evidently "doomed from the first," and its being "reduced to ashes." I am told that newspaper boys were calling out "Alarming fire at the Guildhall!" Humorous allusions have been made to it to brighten the reports of delegates. The *Magic Lantern Journal* for the current month says: "Everything at the Bath Photographic Convention was a success, except the lantern entertainment on the opening evening—the woodwork of the instrument *ended in flames!*" And no doubt, ere the last report is presented, we shall be told that the whole Convention meeting, from start to finish, was an utter failure because four slides of Hawarden Castle were not shown.

The owner of that little mahogany-bodied lantern should certainly have a vote of thanks passed to him; he was indirectly the means of obtaining one of the heartiest laughs during the meeting, for even the few members whose fund of humour is limited saw the yaller light, and ha-ha'd! as loudly as the rest—or louder. "Behold how great a matter a little fire kindleth."—I am, yours, &c., F. A. BRIDGE.

East Lodge, Dalston-lane, London.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

To the EDITOR.

SIR,—In justice to Mr. Robinson and to the Photographic Convention, I think it ought to be explained that Mr. Robinson, though he felt compelled to decline the presidency of the Convention at Edinburgh next year, did so on the sole ground that he is physically incapable of undergoing the necessary exertion. It was certainly from no disinclination to accept the invitation of the Council that Mr. Robinson declined the office.—I am, yours, &c., WILLIAM BEDFORD, *President.*

August 8, 1891.

CAMERA CLUB EXHIBITION.

To the EDITOR.

SIR,—Will you kindly allow me to draw the attention of those interested to the exhibition which is now proceeding at the Camera Club. In addition to the photographs by the Countess Loredana, and the Marquis Dr. Vianna, we now have a collection of photographs by Prince Chotek, Prince Ruffo, and Herr Dreesen, all of which are of such interest that every photographer should seize the opportunity of seeing them together.

The exhibition is open on the usual conditions—namely, admission from 10 a.m. to 4 p.m. by tickets from members, or from the Hon. Sec.—I am, yours, &c., G. DAVISON, *Hon. Sec.*

REDUCTION OF RAILWAY FARES.

To the EDITOR.

SIR,—With reference to the memorial initiated by my Society with a view to obtaining a reduction of fares for photographers and photographic societies, I regret to inform you that, at a meeting of superintendents, held at the Railway Clearing House on May 29 last, it was resolved that the application could not be granted.—I am, yours, &c., H. SELBY,

Hon. Sec. West London Photographic Society.

42, *Ladbroke-grove-road, London, W., August* 6, 1891.

GLASGOW INTERNATIONAL PHOTOGRAPHIC EXHIBITION, 1891.

To the EDITOR.

SIR,—The announcement that we have extended the time for entry till August 20 has brought me a number of inquiries as to the latest date for sending in pictures. I regret that we cannot make any change, and the last day must be August 22, as per prospectus.—I am, yours, &c.,

Glasgow, August 10, 1891. W. GOODWIN, *Hon. Secretary.*

Answers to Correspondents.

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

All matters for the text portion of this JOURNAL, *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

Harry Grayson, Blackburn.—*Photograph of Seven Sisters of Mercy of St. Anne's Blackburn.*

G. Emberson, Chertsey, Surrey.—*Four photographs of Jacques, the Fasting Man at the Aquarium.*

T. Birtles, Warrington.—1. *Letting Water into Canal at Ellesmere Port.* 2. *Dredger at Work.* 3. *Canal at Eastham, with Entrance of Steam Yacht.* 4. *View of Canal, looking to Ellesmere Port, with group of Engineers.*

G. R. C.—You may place the most absolute reliance on the firm named.

CHAPMAN JONES.—A slip from the journal to which your reply was sent would have sufficed.

T. A. MORYSON.—The enamelled prints spoken of have not been received up to the time of going to press.

HERMANN ERNST.—Directions for silvering glass are given on page 760–1 of our ALMANAC for the present year.

EMIGRANT.—There is no photographic paper published in Australia, nor do we think this a good field for a photographic emigrant.

S. B. J.—1. You are confusing curvature of the image with curvature of the field. 2. There is no patent for collodio-bromide emulsion.

BONÂ FIDE.—We do not undertake the valuation of businesses. Apply to Mr. Beasley, Chancery-lane, who makes a speciality of such work.

G. RAY asks which is the best 10×8 lens for an amateur, who wants it for general purposes, a "rapid" or a wide-angle one?—The former decidedly.

AULD REEKIE.—If the Daguerreotypes are sent free to this office, we will ask a suitable dealer to call and see them, and enter into communication with you.

H. BARTHOLOMEW.—The purchase value of portrait lenses by Lerebour & Secretan is in this country rather low, but many of them are very good indeed.

J. NEWTON.—The only work we know of treating only on the production of lantern slides is that published by the Fry Manufacturing Company, Chandos-street, W.C.

R. WILKS.—If the nickel is leaving the rollers of the press, they will have to be re-nickelled. Better send the press to the maker to have this done than try to get the work executed elsewhere.

RETOUCHER.—Crimson lake is by no means a permanent colour; therefore it should not be used for spotting photographs that have to be exposed to a strong light such as that of a showcase.

JOHN C. RODGERS.—We have not seen any of the silvered celluloid mentioned; but by writing to Mr. Thornton, the patentee, whose address is given at the head of the specification, you will doubtless obtain the required information.

No. 49.—1. We shall place your description of the Swiss lamp in the hands of some expert lamp-maker, and ascertain the nature of the oil required. 2. Thanks; but the subject is already selected. 3. For over-exposure bromide of potassium is the panacæa.

O. SARGENT (York, West Australia).—We are sorry to say that the inventor of the camera lies incurably (mentally) ill, and there is little, if any, chance of its being placed upon the market. Knowing the circumstances, and having authority to do so, we opened your letter.

PROFESSIONAL asks: "Is it necessary, when a photograph is registered, that it must not be shown to any person, even the sitters themselves, before the registration is effected?"—Certainly not. But it is a good plan not to part with any copies before the copyright is secured.

BLACK asks how to remove the gloss from gelatino-bromide prints after they are finished. One of the best methods is to take some finely sifted pumice powder, or cuttlefish powder, and rub it over the picture with a piece of soft rag rolled up tightly, or, better still, a piece of thick fine felt.

E. BARUCH BLAKER.—There is only one way by which the reversing can be accounted for, viz., the plate was inserted in the slide with the back next to the lens. The lens possesses sufficient penetrative power to make a sharp image even through the glass. The same thing frequently occurs.

S. S. S.—If you have a legal copyright in the picture, and it is pirated by one of the illustrated papers, you have a remedy at law. The mere fact that you are mentioned as the artist goes for nothing if the picture was reproduced without your consent. The penalty, if enforced in full, is ten pounds for every copy sold.

BLOCKS.—There are few who can produce blocks of the quality of the firm named. Such as can keep their method as a strict trade secret, and only, if at all, give tuition for a very large sum. Ask the terms for tuition of the firm you name. Those who are able to do first-class half-tone blocks have had to work out the details for themselves from what has been published in the journals.

A. BIDGOOD.—For six months' practice in photography, the specimens are good; but we think they are not good enough to exhibit in competition at the forthcoming exhibition of the Photographic Society of Great Britain with any idea of gaining a prize. You might enter them in some of the amateur societies. We have seen worse pictures than yours gain a medal in amateur exhibitions.

C. MORTON, writing regarding amateurs saving the silver from their plate-fixing baths, which was referred to last week, says he fixes about two gross and a half of quarter-plates in the year, which cost him 1*l.* 10*s.* He asks if we consider the fixing baths in his case worth saving when he puts out all his printing to be done? If our correspondent's time be of any value, the fixing baths will certainly not be worth saving.

DAGONET says: "In washing a batch of prints the other day to free them of silver prior to toning as soon as they were placed in the first water they turned it a decided brown. The prints became quite 'metalic-like' in appearance, which they retained after toning and fixing, while, when finished, the lights were a pale yellowish brown." The cause was that the first washing water was contaminated with hyposulphite of soda, probably from an unclean dish; the example sent is a proof of the fact.

P. H. O. S. writes as follows: "A photographer who really does good work, and has been long in business, recently told me that photographs of buildings can be taken with a single landscape lens without any signs of distortion. Can this be true? as I have always understood that buildings taken with a single lens must show distortion. Which is correct?"—Unless the lines of the building come very close to the margin of the plate—provided a narrow-angle lens be used—there will be no palpable distortion. Where a building is included in the centre of a landscape, no distortion at all will be noticeable.

F. MACKENZIE.—The better plan in future will be not to trust to strange dark rooms, unless you carry with you a spectroscope, so as to see if the light is safe for the plates you are using, *i.e.*, that all the rays to which the particular plates you are using are sensitive are stopped off. A window may be perfectly safe with one person's working, but just the reverse with another's. Some people manipulate their plates as near to the source of light as possible, while others, when changing plates, or in the early stages of development, work as far away as possible. Hence the conditions become widely different in the two cases.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 19, *The Diazotype* (*Primuline*) *Process.* 26, *Films.* Outing, Saturday next, August 15, to West Drayton; train from Paddington at thirty-five minutes past two.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, August 20, *Discussion of Affiliation Question, and on the Development of Hand-Camera Exposures.* August 15, Outing to West Drayton; leader, Mr. R. P. Drage. Train from Moorgate-street, fifty-three minutes past one. August 27, *Blisters,* by Mr. J. S. Teape.

THE LATE JOHN MAYALL, JUN.—We are sorry to have to record the death of Mr. John Mayall, jun., photographer, in Regent-street, who died after a few day's illness from acute pneumonia. Mr. John Mayall has not been so well known among photographers as was his father, Mr. J. J. E. Mayall, one of the very earliest professional photographers, who, we are happy to say, still survives, for the idiosyncrasies of the son lay more in the direction of the microscope than the camera. Up to, and for some time previous, to his death, Mr. Mayall was one of the secretaries of the Royal Microscopical Society. His last, and, so far as we recollect, his first appearance before any considerable body of photographers was at the Society of Arts on the occasion of a paper having been read on *Photographic Lenses* in 1888, when he, during the discussion that followed, made some remarks on the subject.

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WHO FIRST SUGGESTED THE USE OF BROMINE IN PHOTOGRAPHY?

In writing history, it is all-important that accuracy be a *sine-qua-non*. A belief seems generally to prevail that the first suggestion and application of bromine in photography was made by J. F. Goddard, an exceedingly talented and clever man, who was a lecturer on science in London. It is in the conviction that we can show he was *not* the first that we give the present contribution to photographic history, and, as we write solely in the interests of historical accuracy, we shall be glad if any one who is possessed of information that can in any way supplement what we say will place the same at the disposal of our readers.

It is, we believe, generally conceded that towards the end of 1840 Goddard discovered the accelerating effect produced on Daguerreotype plates by sensitising with bromine as a supplementary agent to iodine, which had originally been exclusively employed. This discovery was published in the *Literary Gazette*, December 12, 1840; and this, we think, fixes the date at which Mr. Goddard made and published his application of bromine or "bromide of iodine" to the silver plate.

Now, *twenty-one months previous to this*, Mr. Fox Talbot had discovered and published the use of bromine in photography. But we give the details from the *Comptes Rendus* of the French Academy of Sciences, Vol. VIII. p. 409. At the meeting of March 18, 1839, "M. Biot communicates the following letter, which he received yesterday from Mr. Talbot:—

"'*London*, 15*th March*, 1839.

"'Sir,—I have just received the *Compte Rendu* of the 18th February. Seeing there an account of the experiments which you and M. Becquerel are making on electrical and chemical radiations, I perceive the necessity of increasing as much as possible the sensibility of our means of observation, and of varying them in different ways. I will therefore describe to you a new sensitive paper which I have discovered, and which appears to me to offer some advantages.

"'*New Preparation of a Sensitive Paper.*—Take good writing-paper, spread upon it a solution of nitrate of silver, then a solution of bromide of potassium, then again more of the nitrate of silver, drying the paper at the fire between each operation.

"'This paper is of a pale yellow colour; it is very sensitive to the light of the sky, but insensible to artificial heat, and can be held close to the fire without injuring it. Light first turns it to bluish-green colour, then to an olive-green, then almost black.

"'Whether the impressions or images obtained upon this paper can be fixed in the same way as those made upon chloride of silver is a thing which I have not yet determined; but I expect it, since there is the greatest analogy between the chloride, iodide, and bromide of silver. Each of the three becomes insensible to light, having been previously very sensible, if the proportion of silver is diminished below a certain point; and in the case of each of the three this change of state is sudden. I have made many experiments on the chloride relative to this point.

"'As to the degree of sensitiveness of this paper I can only give it in a vague manner, from the want of a fixed unit of comparison. Here are, however, some experiments which I made on it during the bad weather which we have had during the last few days.

"'At four o'clock in the afternoon, month of March, dark, cloudy weather in London, it required seven minutes to obtain an image of a window with the camera obscura. The same evening, at five o'clock, with a better piece of paper, it took six minutes. In the same time the *outlines* of any object projected against the sky would have been obtained. Some minutes after sunset, the weather being dark and very cloudy, the paper was exposed close to the window, and it required from twenty to thirty seconds to become sensibly darkened.'

"After reading this letter M. Biot added the following details:—

"Independently of the optical uses to which Mr. Talbot applies his new preparation, it will be very useful to physical science from the succession of colours which it passes through, for these different phases of its impressionability will offer so many characters of those portions of the atmospheric or terrestrial radiation which produce each of them. I have employed to the same end the changes of colour which radiations of different kinds produce upon guaiacum resin spread in layers sufficiently thick—changes which make it pass successively from yellow to green and blue, then become yellow again, and then green again, by alternations which depend upon the kind of radiation which is made to act upon it, and of which these very changes become a special character. One arrives thus by another road at results altogether similar to those which Wollaston discovered by the solar spectrum. But my experiments on this curious subject are not yet finished.

"Another particular worthy of remark in Mr. Talbot's new preparation is the high degree of impressionability we there find in a product that has been dried at a fire, and, consequently, deprived of free water, which was already the case, though not so distinctly, in the sensitive papers of M. Daguerre and Mr. Talbot.

"Here, then, one meets again a phenomenon known in chemistry, and thought well worthy of attention for its molecular character, which consists in changes of relation and perhaps of combination among particles of a system already solidified.

"M. Pelouze has himself given a curious example of it in the variations of tint which the atmospheric radiation produces upon the new cyanide of iron which he has discovered.

"I have made for myself some of Mr. Talbot's new sensitive paper, and I have found it to possess the great sensitiveness which he attributes to it. In order to know whether the material elements of the paper contributed essentially to the phenomenon, I effected the same operations in the dark by applying the successive layers upon a plate of white unglazed porcelain, and drying them slowly over warm ashes. The product, as finally dried, was a solid dry coating of the colour of sulphur, which I kept for some hours in a closed cupboard. When I took it out to expose it to the radiation this morning, about ten o'clock, it appeared of a beautiful canary yellow

colour, but I had hardly time to present it to the radiation before it turned green, even in its most solid and projecting portions. It afterwards passed rapidly through all the changes which Mr. Talbot indicates.

"Wishing to try if drying at the fire was indispensable in order to produce these phenomena, I placed myself in a dark room, lit only by a single candle, and I dropped one or two drops of nitrate of silver into a solution of bromide of potassium in water. There formed immediately a solid precipitate, which was, no doubt, bromide of silver; it appeared to me white by the light which I employed. I separated the excess of bromide by decantation, and I threw the precipitate upon a porcelain plate, where I left it to dry spontaneously. There resulted a powder which appeared to me white, but, having taken up some small portions of it on paper and on a slip of horn, I had no sooner opened the door of the room to expose it to the light, than it appeared to me to be of a canary yellow colour, and I had hardly time enough to note the phases of its passage to yellowish green, and then to olive green, nearly black.

"I then thought that the solution of the two salts in water was perhaps not indispensable in order to give to the product resulting from their mutual reaction this great sensitiveness. I therefore ground successively in an agate mortar a little nitrate of silver and bromide of potassium, in a dark room. Both powders, observed separately, appeared to me white, and their mixture likewise; but, having placed a small portion on a paper, I had no sooner left the room than these little heaps of powder appeared to me of a canary yellow, and the atmospheric radiation made them pass almost instantaneously through all the phases which had been presented both on paper and porcelain by the product resulting from the successive application of the two salts in a state of solution. Are there not probably other combinations more numerous than are commonly supposed, which, when formed in the dark, possess proper colours, different from those which are generally attributed to them from not having prepared or studied them, except after they have received an impression from the atmospheric radiation? This is a conjecture which I submit to chemists."

We believe that the evidence adduced above leaves no room for doubt that Mr. Fox Talbot was the first to apply bromine to photography. This was at a period when, as yet, he had not discovered the fact that the latent image on paper was capable of being developed by gallic acid, a discovery only made in September, 1840.

VARNISH AND VARNISHING.

Intimately connected with the subject of the keeping qualities of negatives treated last week is that of varnishing, and a careful review of a collection of old negatives affords a valuable opportunity of studying the comparative protective power of different kinds of varnish or other coatings, and gives ample evidence that these are by no means uniform in point of efficiency.

Most of the negatives referred to last week were produced at a period when the question of varnishing gelatine, as distinguished from collodion films, was seriously exercising the minds of those who had just relinquished the one for the other, and amongst them are to be found numerous examples of the different methods at that time under trial for the protection of the image from damp and mechanical injury. It is hardly necessary at this time to further allude to the widely different character of the two kinds of film than by pointing out that the collodion film, being of a porous nature and easily penetrated by the spirituous varnishes up to that period commonly or universally employed, formed with the latter, when properly compounded and applied, a solid and homogeneous layer whose entire thickness was permeated by a waterproof—or practically waterproof—material, the effect of which was to isolate the individual particles of silver forming the image, and thus protect it from not only damp and outside influences, but also in a great measure from the action of any traces of chemical matter remaining in the film from imperfect washing. The comparative impermeability, too, of collodion to aqueous influences rendered such films far less liable to injury from unequal expansion of the film itself and its protective coating, and it was only after very prolonged exposure in a damp atmosphere or a proportionately shorter immersion in water that the varnished collodion negative suffered any serious injury. The extremely delicate nature of the collodion film, however, absolutely called for the application of some protective coating, but it was almost entirely as a safeguard against mechanical injury that it was employed.

In the case of gelatine the circumstances were soon recognised to be wholly different. The film itself possessed, when dry, little, if any, of the porous character of the collodion film, being hard and close in texture, and, when properly prepared and treated, little liable to mechanical injury from scratching and similar causes. Its strong affinity for water, or for moisture in any form, rendered it peculiarly susceptible to injury wherever conditions of dampness prevailed, whether in the atmosphere or in the printing surfaces with which it came in contact. Hence, after complete desiccation, it was again necessary to cover it with a waterproof varnish to at least reduce the danger.

To afford complete protection has, even up to the present time, been found impossible, for the simple reason that no absolutely impervious material suitable for the purpose has yet been discovered. The ordinary alcoholic varnishes, so far from penetrating and thoroughly imbuing the gelatine film, cause it, if possible, to close its pores more tightly, owing to the effect of alcohol in causing it to contract, and consequently the thin layer of gum resin that remains after drying lies completely on the surface. Thus, as the particles of silver are not, as in the case of collodion, surrounded by a protective coating and isolated from the possible action of any foreign matter left in the film, and as the surface layer is, as has been already stated, far from waterproof or impermeable, an imperfectly washed image remains as liable to injury from internal causes as if no varnish had been applied. To this may be added the important fact of the difference in the expansive powers of the two layers, from which it results that, if subjected for any considerable time to a damp atmosphere, or for a much shorter period to actual moisture, the gelatine film expands and ruptures the brittle covering, thus necessitating considerable trouble in re-varnishing, if it does not absolutely ruin the negative. The value of a varnish, as applied to a gelatine film, lies, therefore, entirely in its capability of resisting damp, and it, if anything, perhaps renders the negative more, rather than less, liable to mechanical injury.

The first attempts made to improve matters, so far as gelatine was concerned, took the direction of modifications in the character of the varnish itself, which it was endeavoured to render more truly waterproof or impermeable. Several preparations appeared in the market, claiming to be specially

dapted to gelatine plates; but, so far as we remember, beyond ausing a little more trouble in use, they presented no imme-iate points of difference from those already in use, and the nly hope of benefit to be derived from them lay in their upposed greater resisting powers. Judged by the test of time, ve may say that, so far as plates varnished with these "special" reparations can be identified, they show no difference whatever om those on which the ordinary negative varnishes were used, nless it be in the possession of a thicker and glossier film. At he time of use this extra thickness, arising from greater body, s well, no doubt, as from the addition of some special ingredient, as liable to cause trouble, owing to the length of time the urface took to become thoroughly dry and free from "tacki-ess." The application of heat was of little avail, and we have nown cases where three or four days have elapsed before it as safe to place such negatives in the printing-frame.

After the lapse of years, as might have been expected, all uspicion of tackiness has entirely disappeared, and the surface s now all that could be desired, presenting an appearance of olidity that augured well for a somewhat greater power of re-istance than that possessed by the ordinary films. On laying wo of the negatives side by side, and sprinkling water on them, he underlying gelatine was found in both cases to swell rapidly, ut took a longer time to attain its maximum under the thicker arnish. This might, or might not, promise a longer resistance o the effects of a damp atmosphere; but, at any rate, the ifference is not so great as to be considered any real improve-ent, certainly not such as to warrant the special varnish being alled waterproof.

Upon allowing the two plates to dry spontaneously, they oth showed the peculiar crystalline markings caused by the plitting up of the film of varnish that always follow wet; but he worst effect was given by the "special" varnish, although : was supposed to be more elastic in its character, and there-ore less liable to this form of defect. Upon treatment with arm spirit, and with semi-alcoholic alkaline solutions the pecial varnish proved far more difficult of removal—an exhi-ition of resistance, however, that could scarcely be said to be n a good cause.

So far as deterioration from causes contained within the elatine films themselves is concerned, where it has occurred it as done so with apparent impartiality, neither ordinary nor pecial varnish having succeeded in preventing it, or, perhaps, f seriously modifying the extent of the change. Where vary-ng degrees of discolouration have occurred, the result is to be raced to the circumstances surrounding the preparation of the egative rather than to any effect of the protective coating.

One of several negatives readily distinguishable by their olour, on which a pure shellac varnish had been used, was ubmitted to similar treatment to the above, and passed hrough the ordeal, if not quite successfully, at least much etter than the others. The swelling of the gelatine was much ess, and occupied a considerably longer time, while the dis-uption of the varnish on drying was again less.

The next varnish to be mentioned is one suggested, we elieve, by Mr. A. L. Henderson, and which was favourably re-orted on at the time. It consisted of a mixture of collodion nd ordinary negative varnish, the latter being poured into the ormer as long as the mixture remained clear. This was pplied cold, and, while it was marked by the smoothly flowing nd rapid-setting properties of collodion, it combined the resinous haracter of ordinary varnish with a toughness that was all its wn. It possessed one fault—perhaps not a serious one, as when the cause was known it was easily remedied—namely, that, if the proportion of resinous matter was too large, the film was apt to dry with a good deal of what used to be termed "structure," or, in bad cases, with an opalescent crapiness that greatly marred it, if it did not spoil the printing qualities of the negative. Several of the negatives showed this defect in a more or less marked degree, and it is almost certain that this is a result of deterioration of the varnish, for we have no recollection of having packed away—nor should we be likely to do so—a number of faulty negatives. However, the opalescence, or "stricture," was removable, though with some difficulty, for this combination forms an exceedingly tough coating, that adheres with the utmost tenacity after once drying, and requires a mixed treatment with alcohol, ether, and alkali, in order to effect its solution and removal.

Submitted to the water test, this varnish may be said to have successfully resisted it, for, although after some time the gelatine swelled considerably, though to a less extent than with plain varnish, it dried again without leaving any markings on the film. This is in itself an important recommendation, and, if the defects we have alluded to can be avoided with care in the preparation, this would seem to afford a near approach to what is required. Another advantage arising from the toughness and impermeability of the collodion-varnish mixture may be mentioned in its favour. One negative was found to be badly stained from contact with damp silvered paper, but friction with a plug of cotton wool, moistened with alcohol, entirely removed the stains without in the least moving the varnished surface. The film is, in fact, insoluble in alcohol alone, but softens sufficiently for the purpose named.

As regards deterioration from internal causes, this coating is on all fours with those previously mentioned, except that from its greater protective power the effects of damp would be longer resisted; but, once the insidious foe has penetrated into a gelatine film containing impurities, the damage is as surely done as if no varnish had been used.

Another method of treatment popular at the period we have referred to, and still used by many, consists of a coating of plain collodion without the addition of varnish. This may be applied alone, or may be followed by a second coating of ordinary varnish, though the latter appears a needless complication, without adequate benefit. The plain collodion suffices to protect the surface of the gelatine from injury while in a damp condition, though it is no better than the ordinary varnishes in preventing attacks of moisture. It has the advantage, however, of being sufficiently elastic to stretch with the swelling gelatine, and the injury to the film on redrying is therefore absent. Collodion, followed by a resinous varnish, is, as already stated, a needless complication, for, while it involves two coatings, it presents no additional protection, and, moreover, introduces the troubles and dangers inseparable from varnish of the ordinary kinds. In proof of this, a negative amongst the number under review presented a curious appearance, resembling roughly frosted glass, and on investigation it was found to arise from the "perishing" of an ordinary varnish film—easily removable by alcohol—overlaying one of collodion, the destruction of the resinous coating having occurred apparently spontaneously. Collodion by itself, or mixed with varnish, may be usefully employed, but its advantages are counterbalanced by the after use of a resinous varnish.

One other kind of varnish was found represented, and easily proved itself the worst of the lot, namely, the aqueous solution of shellac and borax, in the proportion of about five to one.

The solvent being water, we have a varnish that is readily absorbed by the gelatine film, which becomes thereby impregnated throughout its whole thickness, as in the case of collodion. But, unfortunately, the film, though insoluble after drying, is not safe from attacks of damp, and these, if they occur, result in the complete destruction of the transparency of the image from disintegration of the varnish. It is by no means certain that this disintegration does not proceed slowly without the aid of damp. Heat also exercises an injurious influence on negatives varnished with aqueous shellac.

On the whole, the negatives that have kept their good qualities best during a period of ten or more years are those that were varnished with the mixture of collodion and resin and those that had not been varnished at all. From this, circumstances being considered, the value of varnishing may be estimated.

"SLIDES" AND "BACKS" FOR CARTES AND CABINETS.

The genesis of the modern studio dark slide may be traced back to the early period of the *carte-de-visite* mania, for such, indeed, is the only name by which to describe the desire to be photographed which seized upon almost every member of the community a quarter of a century ago. Those were, indeed, palmy days for the professional—high prices, no retouching, few "retakes," and printing something far below what is now expected, few, if any, vignettes, for example, being executed at any of the very first studios. *Cartes*, then, were not expected to be sent out in half-dozens or dozens—so much for a score or for half a hundred were the usual terms. "Extra positions" usually meant a difference in the turn of the head only, and as the multiple backs and twin, or quadruple, lenses were used, eight and twelve portraits were taken on plate, and all could be printed from at once. Some photographers charged less if their clients took out their number from all the positions, one sheet of paper then including a dozen pictures. Naturally, the single back became almost extinct in first-class studios, and the now familiar arrangement of sliding back was introduced, used with one, two, or three, or sometimes four accurately "paired" lenses. Many of these cameras are still in existence; but, since the gradual increase in the demand for cabinets, and the universal prevalence of retouching, in preference to *cartes*, backs capable of allowing two *cartes* to be taken on a half-plate with one lens are most in use, with, perhaps, an extra camera for cabinets. Some, again, use one camera with a large slide for two cabinets and inner frame for *cartes*. Much depends, of course, upon the amount of business done and the greater or less necessity for despatch.

The question of cameras and lenses is not only a matter of pounds, shillings, and pence; the length of studio and its roominess have to be considered. There are studios so small that a camera and stand more or less is a matter of moment, and others whose restricted length does not permit the use of any but short-focus lenses. It may be taken for granted that a typically excellent arrangement will be a single camera, capable of being used at a moment's notice for either *carte* or cabinet, with no need for adjustment and no rearrangement of slides, whichever of the two be chosen. *En parenthèse*, it may be remarked that, where there is sufficient length in the studio, there is no need whatever, except in foggy weather, for both *carte* and cabinet lenses. One cabinet lens will do the work of either, though a *carte* lens, even stopped down, is not suitable for cabinets, the perspective distortion is too great.

A photographer is, of all others, what is known as a "faddy" man, and he usually prefers his own fads to any one else's; hence in describing, as we are about to do, a particular form of back, we only do so on account of its novelty, with the idea at the same time that it may be found useful to others. During the visit of the Photographic Convention to Chester last year, we observed at Mr. Watmough Webster's studio an arrangement that commended itself to us for its economy of time and trouble. That gentleman pointed out to us that often when a sitter came into the studio he had no idea whether he would have a *carte* or a cabinet taken, and, as to run out the *carte* camera and run in the cabinet, or *vice versâ*, wasted time and involved some considerable trouble, he determined to use one camera only, with two sliding backs easily exchanged, the one for double *carte* slides and the other for double cabinets. Finding this exchange to be at times burdensome, he abandoned the double-cabinet slides, and took cabinets singly (having, of course, a number of slides). To do this involved a dark slide capacious enough to hold a half-plate either upright or horizontally. These he had constructed and found very useful. Continued use, however, discovered one drawback: if all the slides were charged horizontally they had to be recharged upright if cabinets were required, and *vice versâ*. To avoid this difficulty the slides were charged half and half, which thus halved the available number when a quick succession was required. The camera-makers could not alter the camera back to take the slide either upright or horizontally, as the sliding shutters were rigid.

Eventually he had a still further set of slides made—the set we saw—and which appeared to leave nothing to be desired. These slides, fitting into the old back, take the plate in one direction only; but they are square in form, and so constructed as to go into the back with the plate sideways or upright. They thus possess the double advantage of being able to be used with the plate on its side for cabinet groups and long compositions, or for two *cartes* on a plate. When reducing the opening at the back of the camera for the latter purpose, instead of the usual loose screen, liable to be misplaced, Mr. Watmough Webster limits the cabinet aperture by two long, narrow slips, hinged so as to double out of sight for cabinets, or to close up and lie flush with the level of the back for *cartes*. Finally, it must be explained that the sliding shutters are made roller-blind fashion. We think our description will be full enough to enable any one to see all the points, good or bad, of a piece of apparatus that struck us as being simple, useful, and time-saving.

The unfortunate shareholders of the Automatic Photograph Company Limited, are receiving but small comfort from the financial press. It will be remembered that this affair was issued to the public by the Right Hon. the Earl Kilmorey, the Right Hon. Lord St. John, D.L., Admiral Sir R. J. Macdonald, Captain Chas. Wilson, Allan W. Macdonald, and Ladislas Neivsky. This directorate assured the investors that, at a very moderate estimate, the returns would yield a dividend of thirty-one per cent. on the capital of 100,000*l*. Alas for their confidence! It now turns out that the validity of the patent, which was pronounced good by two eminent counsel on patent matters, necessitated two other people being bought out. According to the report of a recent meeting of the shareholders given in our contemporary, *Trade, Finance, and Recreation*, the developing solutions proved to be so ineffective that no fewer than 11,000 plaques were returned each week upon the hands of the directors. They had,

aid Mr. Macdonald, 150,000 of these plaques packed in barrels. Fancy a piece of ferrotype plate being designated a plaque!

ACCORDING to our contemporary just quoted, the Board accepted pplication for 3000 shares without cheques, and otherwise neglected he interests of the shareholders, and adds: "They do not seem to ave even inspected the bank book, yet in their fifteen months or so f office they have drawn 1300*l.* in fees, besides spending 934*l.* in itigation, and losing 6670*l.* in what they are pleased to call trading." t is a noteworthy fact in the formation of companies, more particularly those in connexion with photography, that titled people, army nd naval officers, and the like, are generally appointed as directors. These men, as a rule, have had no experience in business manners; neither do they know anything whatever of the practical side of the processes to be worked. What is more, often the only interest they ake in the work is the fees they receive. Apparently company promoters find that the public confide more in people with "handles to heir names" than they would if the Board were composed of experienced and commercial men with also a practical acquaintance with the technics of the business. We doubt, however, if such men could be found who would have accepted a seat on the Board of the companies in question.

Is it not a little too bad for the financial papers to be so hard on the two unfortunate companies? At the time they were floated the financial press, with one or two exceptions, lauded the schemes, and did much to bring them into prominence. Now that the thing has collapsed, as every practical photographer knew it would do in a short time, all these papers "round" on the promoters without mercy. This, if their judgment is worth anything, they should have done in the first instance. It is no use being wise after the event. Any photographer could have told them what was sure to happen.

IN the early days of photography it was frequently recommended to iron the prints with a hot laundry iron with the view of rendering them more permanent. At the present time many are under the impression that hot burnished prints should be more stable than those which are cold rolled. Heat may conduce to stability, but it must be borne in mind that the great pressure applied in burnishing forces the print into more intimate contact with the mount than is the case of simple rolling. Therefore, if the mount contain deleterious matter, there will be no advantage, so far as permanence is concerned, in the former treatment.

REFERENCE to the subject of permanence brings to mind that a process is still badly wanted by which a faded paper picture can be restored to its original state. In a faded print, however badly it may have gone, we cannot but imagine that all the material—gold and silver—that once formed the image is still in the paper, though in an altered condition. Why, then, should it be impossible to bring it back to its pristine state? Whoever discovers a method of accomplishing this will be a benefactor to photography.

THE other day, when visiting the "Friday Market," Caledonian-road, we came across several stacks of cabinet-size portrait negatives. They were each in a separate envelope with a number and the name of the sitter upon it. An examination showed that they were pictures of a high order. The sitters were all artistically posed—evidently belonging for the most part to the "upper ten"—and the negatives had been skilfully retouched. Furthermore, the costumes showed by the fashion that they were of quite recent taking. Probably a few pence per dozen would have purchased the lot; and the majority of them would have furnished high-class specimens for the show-cases of unscrupulous photographers. One could not help speculating as to how they found their way to such a place, and to what purposes they would ultimately be put.

IT is no unusual circumstance when a photographer fails in business for his stock in trade, including the negatives, to be disposed of by public auction. This may have been the case with the negatives referred to. Of course the purchaser would have the right to put them to any use he chooses. But this is hard upon the sitters. They may have paid high prices for their portraits in a West End establishment with an implied understanding that the negatives would be retained solely for the execution of their orders. Fancy their feelings on seeing themselves exhibited as specimens in the show-cases of fourth or fifth-rate photographers. This is, doubtless, the purpose to which these pictures will be applied.

THE Secretary of the London and Provincial Photographic Association has received a communication from the firm of Braun & Co. Paris, *àpropos* of a paper by Mr. B. J. Edwards, read before that Association last month, and published in our pages, in which Messrs. Braun & Co. complain that misstatements have been made respecting them. The Association, through Mr. Drage, the Hon. Secretary, having forwarded the letter to us, we perused it with surprise, and have turned to Mr. Edwards's paper to see in what respect he has offended. The whole reference to the French firm is comprised in a few words. Mr. Edwards says that it was the unprecedented success of the firm in copying works of art in our own National Gallery that aroused the interest of English photographers in colour-sensitive processes. Well, was it not so? We affirm most positively that it was. Will Messrs. Braun & Co. assert that the collodion they employed when in London did not contain eosine, or some equivalent, in virtue of which they were enabled to produce the excellent reproductions which they made? Mr. Bird, when exhibiting at the Photographic Society of Great Britain the specimens obtained from abroad, said the process was worked as a secret one. Do Messrs. Braun & Co. affirm the contrary? Mr. Edwards implied that the firm mentioned had been eminently successful in the work of which they made a speciality. Surely Messrs. Braun will scarcely deny this. What, then, is left for them to complain of?

A WRITER in *La Nature* gives some singular instances of the effects of what would have been called shearing stress in experiments with dry plates. Our readers will remember the discussion some half-dozen years ago upon the causes of the effects produced when gelatino-bromide plates were written upon with pencil, and afterwards developed. Here M. Félix Leconte writes with pencil upon a sheet of paper lying on a number of other sheets, then takes the second or third sheet, which to the unaided eye appears utterly unaltered, exposes it to the vapour of iodine, whereupon the markings become developed and stand out in violet brown upon a brown background, but in violet upon deep blue when moistened. A similar effect is produced upon paper which has been written upon and the marks effaced.

ON THE UTILITY OF MODERN PHOTOGRAPHIC APPARATUS.

IT not unfrequently happens that, when a beginner goes in for photography, and makes up his mind to acquire one of the feather-weight set of apparatus, the exact weight of which is carefully noted to an ounce or so, this sort of thing stops short at the camera and tripod, and but little or no consideration is given to the weight of the case which is to be utilised for the carrying of the outfit, and in nearly nine cases out of ten the stereotyped leather case will be trotted out, and finally adopted as the correct thing for a good knock-about outfit. Leather cases, no doubt, are most useful, but they are quite unnecessary, both in respect to weight and cost, and are not nearly so easily carried as a good waterproof canvas hold-all, or the old-fashioned style of basket, lined with green-baize cloth; but, when it has to be taken into consideration as to which is the best means when the outfit has to be carried for, say, five or ten miles over a good stiff mountain district, then the waterproof canvas cover is decidedly the most comfortable, and, when such is supplied with straps to enable the outfit to be carried in knapsack fashion, there is nothing to be desired, and a leather case is at once voted a nuisance. There is, however, a right and a wrong way in the fitting of the straps to the cover when the camera does not exceed whole-plate size and the slides are of the number of three only; then the whole lot can, with comfort, be contained in the same bag, but, when such sizes as 12×10 have to be arranged for, then the slides and camera are best kept in separate

bags of suitable size, the camera cover being so arranged as to buckle over the shoulders and the slides carried in hand.

But the common method of carrying a tourist knapsack is not the best way of fixing the straps. The best lesson I ever got in the way of carrying a photographic outfit I got from a travelling huckster, or, as we say in Scotland, tinker, and I have frequently, when on tour, watched these nomadic groups carrying their huge goods and chattels, until I finally decided to copy their style, and I have never since regretted having adopted it. The generally accepted manner of carrying leather cases or knapsacks is to arrange the straps so as to go over the shoulders and under the armpits without crossing the chest or the leather case, there being a generally accepted idea that to compress the chest by straps crossing it was not the best method for acquiring ease of breathing; but I have found out that this objection is purely fanciful, and that by far the best method is to fix the straps so as they cross both knapsack and chest; by this I mean that the buckle of the strap on the top of the left shoulder passes over the case to the right bottom corner, goes under the right arm, crosses the chest, and is finally buckled on top of the left shoulder, and *vice versâ* with the other strap. Let any one used to the other method of carrying his camera in knapsack fashion just try this nomadic method, and he will rave no more about cross straps confining the chest. I can do my twenty miles a day with my old-fashioned 12 × 10 and three double-backs without turning a hair, and every one I have shown this arrangement to are amazed at the ease and comfort of the arrangement. This leaves the other hand quite free to carry a good tripod. By the way, on a recent occasion I took the opportunity to mention that I would not be surprised to see ere long utility so sacrificed to portability in the way of tripods as to find some ingenious fellow actually putting one on the market that would so fold up as to go into the waistcoat pocket, and by some of my friends here I got a good sound rating for writing, as they supposed, such arrant nonsense; but I have, within the last week, actually come across the very thing I prophesied would happen, and here in Glasgow can be seen tripods for half-plates that will so fold up as to be easily concealed in any pocket. I offer no remarks on their stability when compared with the style of tripod I recently described.

However, in the way of camera cases, a good canvas waterproof holds all. So fitted with straps as to enable same to be carried in knapsack fashion is far and away before the heavy, cumbersome leather cases we see so frequently adopted; whilst, for those whose purse is long enough to permit of their enjoying photography with the aid of carriage, yachts, or other similar means, then the old-fashioned wicker-basket is far better than the leather case, and, when a basket is used, it can be so arranged as to carry the whole outfit. In respect of weight, it licks leather into a cocked hat, and, if provided with a waterproof cover, is quite as effectual against an occasional shower of rain.

So much for a few of the articles photographic in which modern styles have really no advantage over the good old-fashioned kind. In some respects, however, undoubted advances have been made, and in this respect it is only but fair to give credit to those who have worked so indefatigably in the way of placing in the hands of amateurs and others really useful articles, amongst which should be mentioned the roller slide of the Eastman Company. I fancy I see a distinct inclination on the part of several of our more enthusiastic workers in the west of Scotland to return to the roller slide again, seeing the Eastman Company have, I may say, at last perfected their film. I know this summer most excellent negatives have been easily and regularly got by careful workers. At the same time I have met in with cases of complaints of bad spools, &c.; but, taking all into consideration, had the same people been using plates, it is just as likely they would have given bad results also. Doubtless the Eastman Company have done much in the past to utilise films, and have succeeded in a marked manner, and doubtless they will still continue to work out any little points where improvements can be made; but, between the original paper negatives, with the terrible drawback of oiling, &c., to make them semi-transparent, and the almost perfect spools of film of the present day, there is a wide difference, and I know of no greater advance in the way of comfort to a tourist in his outfit for a long tour with the camera than a *good* roller slide and spools that the Eastman Company can safely assert are reliable.

T. N. Armstrong.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

Abstract of Report of the Delegates of the Photographic Club.

[Read at a meeting of the Photographic Club, August 12, 1891.]

The sixth Photographic Convention of the United Kingdom was opened by the Mayor of Bath in the Guildhall of that city. After a speech of welcome from him, Mr. Bothamley, the retiring president, returned thanks, and alluded to the fact that that city was intimately associated with the early history of science and photography by the names of Fox Talbot and Herschel. He then vacated the chair in favour of his successor, Mr. William Bedford. The President, who was received very cordially, delivered his presidential address. He referred to Bath as of special interest to photographers, owing to its vicinity to Lacock Abbey, the first spot in the Kingdom depicted by means of photography by Fox Talbot. After a remark on the increasing number of societies, the spread of literature and journalism, and the success of recent exhibitions, he alluded to the scheme for the formation of a Photographic Institute, somewhat similar to those already existing at Berlin and Vienna. He also spoke of the new premises of the Camera Club, and in connexion therewith of their annual conference and one-man's exhibition, and of the photographic survey now being carried out by the Birmingham societies. He called attention to the investigations by Messrs. Hurter and Driffield, on the effect of development on the ratio of densities of negatives, to the report of Mr. Lippman's discovery of a means of reproducing and fixing the colours of the spectrum, and to Colonel Waterhouse's process for obtaining a reversal of the image by the addition of thiocarbamides to the eikonogen developer. In optics the latest novelty was the lenses recently introduced by Zeiss, upon which Dr. Elder had so favourably commented. The primuline process of Messrs. Green, Cross, and Bevan, and the diazotype process of Feers were then dwelt upon, as well as Mr. Carey Lea's further experiments with allotropic forms of silver. After treating most exhaustively of the scientific discoveries and processes connected with photography, he dealt with the advance made in the artistic direction, not forgetting to comment on the new school, which, notwithstanding the renunciation of its former master, is still living, and, what is more, reaping due recognition of its merits. Even automatic photography was included in the address of our President!

On the following day, Tuesday, the excursion to Tintern and Chepstow took place. On the Wednesday, after the General Meeting and the meeting of the General Committee, the group of the members was taken by Mr. Ashman, and, notwithstanding the rain, resulted in a most satisfactory picture. The afternoon and the evening of that day were devoted to papers, of which we will give but the briefest outline, the full text having been published in all the journals.

The subjects which occupied the Council and General Committee meetings were, principally, the place of meeting for next year's Convention and the Affiliation Scheme. Regarding the former, of the various invitations sent for the 1892 gathering, the one for Edinburgh was accepted. As to the Affiliation Scheme, it having been brought forward only then, it was thought that the members were scarcely in a position to grasp its provisions, and it was therefore resolved that the matter be referred to the Council for consideration.

The first paper read was one by Mr. William Lang, upon *The Photographic Work of Herschel and Talbot*. In it he mentions Fox Talbot's and Herschel's connexion with Bath, and a contribution of the latter to the *Edinburgh Philosophical Journal* on "Hyposulphurous Acid and its Compounds." These experiments, which were the result of an accident, led Herschel to the production of other hyposulphites than those of lime. Referring to the soda salt, he there stated that muriate of silver (now know as chloride of silver), newly precipitated, dissolved in this salt when in a somewhat concentrated solution in large quantity. He further showed that zinc could separate metallic silver on being immersed in the hyposulphite solution. Several other experiments and papers by Herschel and Talbot are here quoted, but it would lengthen so much this report that we refer you to the paper itself, which was printed *in extenso* in the photographic journals. It is worthy of notice that Mr. C. H. Talbot, son of the late Mr. Fox Talbot, was present at the reading of the above paper, and that he made some interesting remarks on his father's work in connexion with photography. A selection of lantern slides from calotype negatives, and portraits of Herschel, Fox Talbot, and interesting scenes connected with them, were then shown on the screen.

Mr. Bothamley's paper on *Recent Developments in Printing Processes* then followed. The processes described are the kallitype, which is based upon Hunt's and Herschel's observations, that when a ferric salt is exposed to light, and thus reduced to a ferrous salt, and the ferrous salt is treated with a solution of nitrate of silver, metallic silver is precipitated in quantity, dependent on the quantity of ferrous salt that has been formed on each part of the surface; the feertype or diazotype, and the primuline process, both of which are based on the use of coal-tar colours.

In the absence of Mr. Debenham, Mr. Traill Taylor read this gentleman's paper on *The Cult of Indistinctness*, which attacks the tenets of the school which has produced such pictures as *The Poacher*, *A Breezy Corner*, and *Dedham Bridge*. Perhaps, through not having been officially

announced in the programme, this paper caused no discussion between the lovers of softness in pictures and the admirers of a superabundance of microscopical detail in photographic prints.

The evening was devoted to a most interesting lecture, given by Mr. Albert Taylor in the absence of Mr. A. A. Common, on *Recent Astronomical Photography*, illustrated most profusely with a large series of lantern slides of astronomical photographic apparatus and reproductions of stellar photographs. Among the latter were some wonderful slides of the nebulæ in Orion and of the moon.

Thursday was a busy day. Two excursions during the day, and report and discussions on Standards in the evening.

The Committee appointed "to consider the adoption of the standard lens fittings recommended by the Photographic Society of Great Britain, or to suggest alterations in that system, presented their report.

Mr. Warnerke opened afterwards the discussion on proposed international standards, and advocated very strongly the adoption of the decimal system and also of international standards. He particularly emphasised the fact that any photographic standard suggested would not confer complete benefit unless it were universally adopted; and he therefore urged that this country be strongly represented at the forthcoming Congress in Brussels.

Friday was a fine photographic day, and the excursions to Wells, Glastonbury, and Lacock Abbey were consequently well patronised.

The annual dinner took place in the evening, the chair being occupied by the President, at whose right sat the Mayor of Bath. After the usual toasts followed a most enjoyable smoking concert.

The last day of the Convention, Saturday, nothing outside the Council meeting was on the programme, but many of the members were busy during the greater part of the day photographing the many remarkable architectural subjects in the town.

Before we come to the second part of our report, we should like to state our deep gratitude to all those gentlemen who, by their kindness and hospitality, made our sojourn in Bath a most enjoyable one: to the Mayor, Mr. Murch, for his courteous reception, to the Local Committees for their untiring energy, which resulted in every arrangement being found perfect, and to the deans, bishops, and other gentlemen for the permissions granted. (Signed) H. M. Hastings.
F. P. Cembrano, jun.

The above report was illustrated by 114 slides made from negatives taken by the delegates during the Convention. The lantern was kindly lent by Mr. C. Lees Curtis. It is the same instrument as was used at the Bath meeting, and looked as perfect as when first made; yet all it has had done to it since the Convention is the placing of a piece of sheet asbestos packing at the back between the woodwork and metal lining to prevent a repetition of the "yaller light" incident. The condenser is quadruple, and was made by Mr. C. Baker from calculations by Mr. E. M. Nelson.

F. A. Bridge,
Hon. Sec. Photographic Club.

"EXPRESSION."

Many writers have sought to show that the *un*photographic portrait painter has an advantage over the photographer in the general truthfulness of his work. This fact has been more clearly manifested, perhaps, than the reason for its existence. Putting individual skill aside, and selecting a fair sample of each class of work, it will be admitted that, though the photograph truthfully represents whatever was before the camera at the time of exposure, the painting approaches nearer to the faithful presentment of living and breathing humanity. It cannot be said that this depends solely and entirely upon colour, as to an observer a well-coloured photograph would be undoubtedly a photograph—the inferiority would still be manifest. The greatest point of difference lies in the expression, the photograph retaining, even through its colouring, the essentially photographic expression.

A visitor from realms unphotographic, on looking through an album, would probably ask, "What race of people are these, whose faces, though dissimilar in detail, are alike in expression?" Not that, speaking literally, the expressions are without dissimilarity, but if we deal with types there are few, and even these preserve something in common. Who does not know the "green-fruit" expression, and the "I-detest-having-my-photograph-taken" expression? Who has not seen the hazy smile showing an "atmospheric" appreciation of the operator's witticism, or the broad smile denoting appreciation to the full. Again, the look of intelligent curiosity, and the palsied or stony glare of the child; the meek, enduring, "against-my-wish" expression, the self-satisfied, always-come-out-well look; the apprehensive, and the brazen. There is yet one other type that should be mentioned, though, as it forms an illustration of the absence of expression, it can hardly come under the same heading. To give two examples—there is the face that seems to say, "My intellectual comprehension has absorbed the fact that I must sit or stand here, fix my eyes on that point and keep still. As the reception of these three facts has strained my intellectual comprehension to its utmost, any attempt to impart further information will be futile." And the other is to be found on the face of the foreigners who understand neither the question nor the language it is given in—a kind of deaf, dumb, blind, and speechless expression that Dickens likens to a "dead wall."

These, then, with a few variations, give an idea of the photographic expression. Is this all we see in the human face? Is this sufficient to give the clue to the thoughts and feelings of those around us? Is this the sum-total of human emotions of which the face is the index?

The painter, let us say, does not give the impression of what he sees at a particular moment, but the combination of the many points he has seen in the course of the sitting or sittings. But if the painter were to attempt to render spring, summer, autumn, and winter (the expression of a landscape) in a single scene, his task would be a gigantic one, and his reward—ridicule. So, then, is it with the face. A photographer may not render the spring, summer, autumn, and winter expression all in one face, but at least he might produce one of them. In the absence of retouching, truthfulness in portraying the features is comparatively simple; but surely there is something more than form and outline in every face. It is easy to reproduce a face in repose, but is it quite certain that "repose" and "wooden" are not synonymous under ordinary circumstances? Would it not be gaining a little on the painter if we discarded "repose," and strove to produce the face in its every-day working order, sparkling with thought and instinct with life and animation? My contention is that photography has for years been working in a groove of expression, peculiar only to itself and visible under no other circumstances. One sees it in the print and in the studio, but nowhere else. If an artist faithfully reproduced a photograph in colour, we should either say he had the true photographic instincts, or that he had copied a photograph.

To summarise, the face in a photographic portrait shows more of the effect of photography than the effect of the mind, and therefore the less the opportunity that is given to the former the greater will be the gain in the latter. The remedy is easily stated, but not so easily applied. Many photographers have advocated the sweeping away of that ghastly torture-chamber, the "studio," and replacing it with an ordinary room—a room distinguished only by the camera and skylight. Why, your ordinary customer on entering the "studio" leaves his personality in the dressing-room, and only reassumes it with his hat! How could it be otherwise when he enters an unknown world without the key to its mysteries, or with just sufficient knowledge to assist his confusion. Surround him with familiar objects and he becomes himself—nearly, for there is yet implanted in his mind an apprehensive fear of posing and arranging. The only remedy for this is to dispense with as much as possible, and render the rest unobtrusive. Don't button up his coat, arrange his tie, cross his legs, and assist his muscles to act naturally; leave him alone—it worries him. You are gaining a picture of his clothes at the expense of his face, and if this is your object tailoring would give you greater satisfaction. Have as little arrangement as possible; tell him what you want, and let him do it himself, unless you have paralysed him. In the latter case a photograph taken in the first stage of the attack is generally the most successful. But supposing you have avoided such an attack, and have preserved his personality up to the time of exposure, just ask him to keep still, and emphasise it by saying "now," and his personality at once departs. You had before you previously an intelligent being; you have now a blighted individual, dejected and dispirited, or bravely striving to smile under difficulties. That period when nothing is heard save the tick of the operator's watch, when the heart wildly throbs and the eyes glare into space, is the dread of old and young, and clearly proves how far less powerful is anguish than vanity. Supposing the operator has by tact and skill succeeded in calling up a pleasing and natural expression, his efforts are negatived at once when the exposure begins. This seems to point to the necessity for instantaneous exposures, against which are opposed several difficulties. The greatest is, that, while a rapid exposure necessitates plenty of light, the most artistic pictures are those that give the fullest value of light by using only the necessary and smallest quantity (not quality) possible. This difficulty may, perhaps, be overcome in the future, and meanwhile it is certainly possible to approach more nearly to such a consummation than is generally done.

It is customary to approach the supreme moment, when a hush falls upon the studio, by stages that finally induce the greatest nerve-tension in the sitter, and at the moment when he or she looks most unlike themselves, to secure a picture. To avoid this, there must be no

supreme moment of appreciable length. The surroundings, instead of being mysterious and therefore disquieting, should be familiar and harmonious. In posing and arranging, only that should be done that is absolutely necessary, and at the same time all fuss, or anything likely to recall to the sitter that he is being photographed, should be avoided, for the greatest difficulty an operator has to contend with is *consciousness of self* on the part of the sitter.

It has been suggested that the present period of stagnation is due to the want of something new and fresh in photography. Might it not be still further suggested that newness and freshness would be exhibited in an unphotographic photograph? It would be extreme to say that no work shows the life and animation of a painting; but the few specimens there are are chiefly due to the peculiar suitability of the subject to photography—in any case are exceptional. Why not make the exception the rule? H. COLEBROOK.

PHOTOGRAPHIC SHUTTERS.

[A Communication to the Boston, Mass., U.S.A., Camera Club.]

I PURPOSE to call your attention to some results obtained in an attempt to devise and make a perfect shutter for quick photographic exposures, to which attempt I have devoted much of my leisure during the last three or four years. The work has been most fascinating, and whatever success has attended it must be fully shared with my friend and kinsman and our fellow-member, Mr. John G. Hubbard, who has been my almost constant companion and coadjutor.

At the outset I will say that the word "shutter" will be used throughout this paper, not because I deem it a correct name for the apparatus, but because more than thirty years of bad usage have so fixed it in the photographic vocabulary that it would be Quixotic to try to displace it. Of course, "opener," would be quite as appropriate, or rather inappropriate, a name as "shutter;" and of course, "exposure" is the proper substitute for both, as its dictionary meaning defines precisely the function of the apparatus.

The earliest mention of shutters with which I am familiar is in a most excellent *Dictionary of Photography*, edited by Thomas Sutton and published at London in 1867.* On page 156, under the heading "Instantaneous Shutters," he says:—"There are many methods of instantaneously admitting and shutting off the light from the sensitive plate. Mr. Wilson, who has been most successful in getting good pictures with rapid exposures, adroitly uses his Highland bonnet placed in front of the lens. Some use flap shutters in front of the lens; some a similar arrangement close behind the lens; and Mr. England and others use a guillotine sort of shutter, with a slot out across it, which falls immediately in front of the sensitive plate. As the slot passes the plate, the parts thus exposed to light receive the full effect of the whole power of the lens. In some respects this is the best instantaneous shutter that has yet been devised, but it is apt to cause a vibration in the camera while in the act of falling."

I have quoted the above because I feel sure that later on you will share with me surprise that the principle of the focal plane shutter, so clearly stated by Sutton, should have been entirely neglected by later workers in the photographic field.

Before beginning original work, it was thought best to test the speeds of the best market shutters. This was done by means of an apparatus which I devised, and had the pleasure of exhibiting to the Boston Camera Club some years ago. The principle of the apparatus is simply photographing the image of the sun as reflected by a freely falling silvered ball, and deducing the time of exposure by applying a law of gravitation to the linear value of the distorted image.

My apparatus consists of a vertical staff, about six feet in height, rigidly attached to an iron bed-plate. The staff is painted dead black, and is graduated downward, on its front face, in white lines to feet and hundredths. At the top of staff is a movable piece readily adjusted to the height, which brings the image of the sun, as seen upon the surface of the ball, exactly in line with the zero of the staff graduation. The silvered brass ball, two and three-eighth inches in diameter and two pounds two ounces in weight, is suspended by a short piece of silk trant-line attached to a small vulcanite ring, which in turn is held by a spring-clip attached to the adjusting piece. On opening this spring-clip the ball is released, and, falling parallel to the graduated staff, is received into a padded box attached to the bed-plate.

It is, perhaps, needless to say that the exposure is made while the ball is falling, and that the length of the exposure is computed from the scale readings of the beginning and end of the black line which marks on the negative the path of the reflected image of the sun.

To facilitate the computation of results, I have prepared the subjoined table, which gives the time of falling to the ten-thousandth part of a second for each hundredth of a foot from 1·00 foot to 5·59 feet. The formula used in computing this table is $t=\sqrt{\frac{d}{g}}$; when t = time; d = distance fallen; and g = 16·083 feet—the gravity constant at our latitude. The manner of using the table will be made apparent by the following example:—An exposure having been made with a Prosch duplex shutter, the beginning of the black line marking the course of the sun's image on the negative was found to be opposite the 4·02 feet staff graduation, and its end opposite the 4·29 feet graduation. Referring to the table, it appears that

	Feet.	Seconds.
Time of falling	4·02	0·5000
,, ,, ,,	4·29	0·5165
,, ,, exposure		0·0165

With a well-made shutter the accordance of the results obtained with this apparatus is remarkable. For example, three consecutive tests for fastest speed of a Prosch duplex shutter gave the following values:—

1st test	0·0164
2nd test	0·0167
3rd test	0·0179
Mean	0·0170

Each test brought into play a different part of the staff graduation.

Table giving the time in ten-thousandths of a second for each hundredth of a foot for a falling body at latitude 42° 20′.

	0	1	2	3	4	5	6	7	8	9
1·0	2494	2506	2518	2531	2543	2555	2567	2579	2592	2603
1·1	2615	2627	2639	2651	2663	2674	2686	2697	2709	2720
1·2	2732	2743	2754	2766	2777	2788	2799	2810	2821	2832
1·3	2843	2854	2865	2876	2887	2897	2908	2919	2929	2940
1·4	2951	2961	2972	2982	2992	3003	3013	3023	3034	3044
1·5	3054	3064	3074	3085	3095	3105	3115	3125	3135	3144
1·6	3154	3164	3174	3184	3193	3203	3213	3223	3232	3242
1·7	3251	3261	3270	3280	3289	3299	3308	3318	3327	3336
1·8	3346	3355	3364	3373	3383	3392	3401	3410	3419	3428
1·9	3437	3446	3455	3464	3473	3482	3491	3500	3509	3518
2·0	3527	3535	3544	3553	3562	3570	3579	3588	3596	3605
2·1	3614	3622	3631	3639	3648	3656	3665	3673	3682	3690
2·2	3699	3707	3716	3724	3732	3741	3749	3757	3765	3774
2·3	3782	3790	3798	3806	3815	3823	3831	3839	3847	3855
2·4	3863	3871	3879	3887	3895	3903	3911	3919	3927	3935
2·5	3943	3951	3959	3966	3974	3982	3990	3998	4005	4013
2·6	4021	4029	4036	4044	4052	4059	4067	4075	4082	4090
2·7	4098	4105	4113	4120	4128	4135	4143	4150	4158	4165
2·8	4173	4180	4188	4195	4202	4210	4217	4225	4232	4239
2·9	4247	4254	4261	4269	4276	4283	4290	4298	4305	4312
3·0	4319	4326	4334	4341	4348	4355	4362	4369	4376	4383
3·1	4391	4398	4405	4412	4419	4426	4433	4440	4447	4454
3·2	4461	4468	4475	4482	4489	4496	4502	4509	4516	4523
3·3	4530	4537	4544	4551	4557	4564	4571	4578	4585	4591
3·4	4598	4605	4612	4618	4625	4632	4639	4645	4652	4659
3·5	4665	4672	4679	4685	4692	4698	4705	4712	4718	4725
3·6	4731	4738	4745	4751	4758	4764	4771	4777	4784	4790
3·7	4797	4803	4810	4816	4823	4829	4835	4842	4848	4855
3·8	4861	4867	4874	4880	4887	4893	4899	4906	4912	4918
3·9	4925	4931	4937	4944	4950	4956	4962	4968	4975	4981
4·0	4987	4994	5000	5006	5012	5018	5025	5031	5037	5043
4·1	5049	5055	5062	5068	5074	5080	5086	5092	5098	5104
4·2	5111	5117	5123	5129	5135	5141	5147	5153	5159	5165
4·3	5171	5177	5183	5189	5195	5201	5207	5213	5219	5225
4·4	5231	5237	5243	5249	5255	5260	5266	5272	5278	5284
4·5	5290	5296	5302	5308	5313	5319	5325	5331	5337	5343
4·6	5348	5354	5360	5366	5372	5377	5383	5389	5395	5400
4·7	5406	5412	5418	5423	5429	5435	5441	5446	5452	5458
4·8	5463	5469	5475	5480	5486	5492	5497	5503	5509	5514
4·9	5520	5526	5531	5537	5542	5548	5554	5559	5565	5570
5·0	5576	5582	5587	5593	5598	5604	5609	5615	5620	5626
5·1	5632	5637	5643	5648	5654	5659	5665	5670	5676	5681
5·2	5686	5692	5697	5703	5708	5714	5719	5725	5730	5735
5·3	5741	5746	5752	5757	5763	5768	5773	5779	5784	5789
5·4	5795	5800	5806	5811	5816	5822	5827	5832	5838	5843
5·5	5848	5854	5859	5864	5869	5875	5880	5885	5891	5896

I shall now give the results obtained for speed of a number of well-known shutters tested with the apparatus just described.

1. *Common Wooden Guillotine Drop, with Four Rubber Bands.*—1¼-inch slot, passing 1¼-inch lens.

	S.
1st test	0·009
2nd test	0·009

This shutter passes only fifty per cent. of the light which would fall on the lens if it were wholly uncovered during the action of the shutter. Moreover, it is highly objectionable on account of the violent jar it gives to lenses, often reducing the balsam with which they are sealed to a fine powder.

* The author here alludes to the second edition of the *Dictionary*; the first edition was published in 1858.—ED.

2. *Gregg Shutter.*—In front of No. 3 Euryscope lens. Spring with two turns.

	S.
1st test	0·034
2nd test	0·035

3. *Prosch Extra Rapid Shutter.*—Attached to 00′ Euryscope lens. Fastest speed.

	S.
1st test	0·0028
2nd test	0·0027
3rd test	0·0021

This is a special form of shutter, in which a single narrow radial slot passes across the centre of the lens tube. So little light is passed that I cannot regard this shutter as of any practical use.

4. *Hoover Shutter.*—3 D Dallmeyer lens. *D*-0 is the full and *d*-8 the smallest opening.

Quickest speed. S.		Slowest speed. S.
D-0. 0 058		0·195
1. 0·043		
2. 0·036		0·130
3. 0·031		
4. 0·025		
5. 0·022		
6. 0·017		
7. 0·013		
8. 0·008		

For want of light, anything less than *d*-3 would be of no practical use, so that the quickest effective speed of this shutter may be placed at

S.		S.
0·03	With a range up to	0·20

5. *Hoover Shutter.*—Large size made for Falk, the well-known professional photographer at New York. Euryscope No. 6 lens.

	Fastest. S.	Slowest. S.
D-1	0·055	0·146
4		0·096
5	0·029	
7	0·017	

6. *Prosch Duplex Shutter.*—3-D Dallmeyer lens, full opening; about equal to *d*-2:—

	Fastest speed. Strong spring. S.	Slowest speed Weak spring. S.
1st test	0·0164	0·0302
2nd test	0·0167	0·0288

7. *Prosch Duplex Shutter.*—Euryscope No. 2 lens:—

Notch.	Strong spring.	Weak spring.
1	0·021	0·032
2	0·016	0·028
3	0·013	0·027
4	0·012	0·026
5	0·010	0·025

8. *Prosch Duplex Shutter.*—00 A Euryscope lens; strong spring.—The tests with this shutter were very interesting, as they disclosed a second exposure due to the rebound of the shutter wings after closing. Mr. Ed. H. Lyon had been unable to obtain satisfactory pictures with this shutter, and returned it to the maker immediately after the tests. The reputation of Messrs. Prosch & Co. for good mechanical work renders it almost unnecessary to remark that the subjoined results are unique:—

Notch.		Time from beginning of first to end of second exposure. S.
1	1st exposure 0·0122, closed for 0·0036, 2nd exposure 0·0104	0·0262
2	1st exposure 0·0100, closed for 0·0030, 2nd exposure 0·0089	0·0219
3	1st exposure 0·0084, closed for 0·0029, 2nd exposure 0·0077	0·0190
4	1st exposure 0·0077, closed for 0·0031, 2nd exposure 0·0061	0·0169

9. *Newman Shutter.*—Attached to back lens. Property of Mr. W. G. Read. Set at exposure marked one-hundredth of a second:—

1st test	0·045.
2nd test	0·048.

On February 3 of this year I tested a number of market shutters which were sent to me for the purpose by our President, Mr. Sweet. Of them all it seems to me that for "all around work," where the limit of speed is not desired, the Bausch and Lamb, new style, is the best adapted to an amateur's use. It is exceedingly well made, and has a very large range of automatic exposure extending up to two or three seconds.

10. *Bausch and Lamb (New Style).*—Full opening about $1\frac{1}{16}$ inch.

Graduated Time.		S.
$\frac{1}{100}$	1st test	0·016
	2nd test	0·018
$\frac{1}{50}$	1st test	0·050
	2nd test	0.043
$\frac{1}{10}$		0·047
$\frac{1}{100}$ ($\frac{1}{2}$ inch opening)		0·013

11. *Hand Release, Brass Shutter.*—Full opening $1\frac{5}{8}$ inch.

	S.
1st test	0·031
2nd test	0·029

Shutter jars camera badly.

12. *English Two-winged Shutter.*—Two rubber bands. Full opening, $1\frac{3}{8}$ inch.

	S.
1st test	0·036
2nd test	0·034

Shutter jars camera slightly.

13. *French Flap Shutter.*—One rubber band. Full opening, $1\frac{3}{8}$ inch.

	S.
1st test	0·038
2nd test	0·035

Shutter jars camera slightly.

14. *Single-fan Shutter.*—Full opening, $1\frac{1}{2}$ inch.

	S.
1st test	0·029
2nd test	3·030

Shutter jars camera slightly.

15. *Long Single-slot Shutter.*—Full opening, $1\frac{3}{4}$ inch.

	S.
One test	0·052

16. *Round Black Brass Shutter.*—Full opening, $1\frac{1}{2}$ inch. This shutter was so slow that the ball in both tests reached the box before exposure was finished. I estimate its speed at about one-quarter of a second.

17. *Plunge "Patent" Shutter.*—Perkins, Son, & Rayment, London. Property of Dr. Tarbell.

	S.
Fastest speed, notch 5	0·054
Slowest ,, ,, 1	0·064

18. *Haake & Albert, Frankfort, a/m.*—Thury & Amey, Geneve, 645. Euryscope No. 3 lens. Received from Messrs. Benj. French & Co.

Fastest speed. S.		Slowest speed. S.
1st test ..... 0·009		1st test ..... 0·103
2nd test ..... 0·009		2nd test ..... 0·117
3rd test ..... 0·009		

An exceedingly well-made shutter with a good range of automatic exposures.

19. *Prosch (Special) Duplex.*—Made to order for Euryscope wide-angle lenses.

	S.
Time exposure, squeezing the bulb as quickly as possible	0·211
Instantaneous exposure, direct compression of bulb	0·031
Instantaneous exposure, released compression of bulb.	
1st test	0·020
2nd test	0·021

This is a most conveniently arranged shutter, as it is attached to the front board of the camera, and carries on its front face a flange which receives any one of a set of wide-angle lenses.

Now, the results which have just been given hurriedly have probably made but little impression on the minds of those who are present. A few of you may have had an intelligent interest in the statement of results obtained with some particular shutters with which you are

familiar, but in general you probably have but an indistinct memory of a lot of unintelligible figures. Nevertheless, if you had had time to carefully digest the results obtained, I feel sure that you would have reached the conclusion that the average working speed of commercial shutters is about three-hundredths of a second; and that, while a few of these shutters may be forced to come well within this average speed for test purposes, they are made to do so at the expense of so great a loss of light that they are of but little practical use when so forced.

Three-hundredths of a second is too slow a speed for photographing the quickest motions of animate or inanimate nature; and the successful pictures obtained with shutters of that speed are due to the fortunate coincidence between the moment of exposure and a slower phase of motion. Thus, with such a shutter, the most rapid phases of motion produce blurred plates which are thrown into the waste-box; and science receives but a few special—and therefore misleading—data in place of the many which the art of photography should be made to yield. This generalisation forced itself upon Mr. Hubbard and myself after two years of patient experimentation with every conceivable form of shutter applied before, between, or immediately behind the lens; and, at his suggestion, we then abandoned all work in that direction and devoted ourselves to the perfection of the focal-plane shutter as described in the quotation from Sutton at the beginning of this paper.

I have known of no commercial shutter which passes more than fifty per cent. of the light which falls on the lens during its action, while the focal-plane shutter has been lying idle for twenty-five years, in spite of its ability to pass close on to 100 per cent. What may be called the "light advantage" of the focal plane over an ordinary shutter is well indicated by the following considerations.

With any form of shutter in which a slot one inch in width passes at a uniform velocity behind a lens one inch in diameter, the sensitive plate will receive but fifty per cent. of the light which falls on the lens during the action of the shutter. Supposing the lens to be five inches in focal length, if the slot is merely moved backward to within one quarter of an inch of the plate, ninety-five per cent. of the light falling on the lens during the action of the shutter will reach the plate.

Further consideration of the subject shows that in any single shutter placed immediately before, between, or behind a lens of one inch opening, the percentage of light passed is equal to the number of inches of slot travels less one, times the units of light per inch. Thus a one-inch slot travels two inches in uncovering and covering the lens. Calling the total light falling on the lens during the action of the shutter equal to 100 units, we have fifty units to each inch of slot travel. Slot travel two inches minus one = 1 inch × 50 = 50 which is the *percentage* of light passed.

A two-inch slot would travel three inches and there would be thirty-three one-third units of light to each inch:—$3 - 1 = 2 \times 33\frac{1}{3} = 66\frac{2}{3}$ the *percentage* of light passed. Continuing the computation, it will be seen that a three-inch slot would pass seventy-five per cent.; a four-inch slot eighty per cent.; and so on until, in order to pass ninety per cent. of the light, it would be necessary to have a slot nineteen inches long pass by the lens in the same time that the focal plane slot passes over five-hundredths of an inch, which is the diameter of the cone of rays from a one-inch lens of five inches focus at a point one-quarter of an inch in front of the sensitive plate. Opposed to this tremendous advantage there is only one theoretical objection to the principle of the focal-plane shutter, and that is that all parts of the sensitive plate are not exposed at the same time. But practically this objection does not hold good, since the velocity of slot motion may be made so great that there is no sensible distention of the phase of motion of the moving object. Moreover, the possibility of any distention may be eliminated by setting up the camera at such a distance from the moving object that the angular value of its image on the sensitive plate shall be equal to or slightly less than the width of the shutter slot.

The focal-plane shutter which I now show you is the outcome of the experimental work carried on by Mr. Hubbard and myself during the last four years. It consists of a mahogany case attached to the backboard of a $6\frac{1}{2} \times 8\frac{1}{2}$ camera. The case is $18\frac{1}{2}$ inches long, $9\frac{1}{2}$ inches high, and $\frac{7}{8}$ inch thick, outside measurements. At its centre is an opening in which may be placed a focussing screen on a 4×5 plate holder. Within the case are two screens $5\frac{1}{2} \times 5\frac{3}{4}$, and $4\frac{1}{2} \times 5\frac{3}{4}$ inches in size. They are made of a very light framework of bamboo, covered with thin tissue paper, rendered thoroughly light-proof by the application of a mixture of lamp-black and shellac. These screens run freely on two brass wires strained lengthwise across the wooden case above and below the plate-holder opening.

Attached to the lower base of the larger screen is a piece of thin sheet steel, pivoted to the corner of the base at one end, and divided on its lower edge into ten notches one-tenth of an inch apart. Attached to the opposite corner of the base of the smaller screen is a screw stud over which the notched piece may be slipped. By this simple bit of mechanism the two screens may be at will attached to each other with a slot between them varying from one-tenth of an inch to one inch in width by tenths. The exposure is made while this slot is passing over the sensitive plate, motion being imparted to the screens by means of a steel pin connecting them with a wooden piston, which in turn is driven through a brass tube by compressed air.

With a one-tenth inch slot in connexion with a 2 D Dallmeyer lens three tests for speed of this shutter have given the following results:—

	S.
1st test	0·0006
2nd test	0·0006
3rd	0·0005
Mean	0·0006

This speed, which we may call half a thousandth of a second, is a severe tax upon the ability of the most rapid lenses and plates to produce pictures. It is obvious that the speed of the shutter may be increased to any desired extent by simply narrowing the width of the slot; but, until the market affords us quicker lenses or plates, there will be no practical advantage in making exposures of less than half a thousandth of a second.

The lantern slides of pigeons in flight which will now be thrown upon the screen were made from negatives taken with this shutter, using a slot two-tenths of an inch wide. The length of the exposure was, therefore one-thousandth of a second; but you will note that the eyes and feathers of the birds are as sharp as if they had been standing still.

FRANCIS BLAKE.

PHOTOGRAPHY AND FICTION.

INVISIBLE TO THE NAKED EYE—PROVED BY THE CLOCK.

THE following sketch shows that the writer knew his subject, or, at least, had taken the trouble to get together the information, so that the narrative on the face of it might bear probability. The story appeared in the *Leisure Hour* of 1878, photography proving an agent of value in working out the plot, the whole action turning on the photographing of things quite invisible to the naked eye.

Old Jones, sitting at his desk, was pouring over his books, with a puzzled expression on his face.

Adolphus, entering, exclaims: "Halloa, Jones, are you going to sit there all night?"

"No," said Jones; "but I've got puzzled over these figures, and I may as well stay on a bit."

"Give it up for to-night, and come to it fresh in the morning, old man."

"No, Mr. Adolphus, I have spent several evenings over these books already, and I don't get any nearer to the solution. Sometimes I think some one has been tampering with the books, but I dare not hint at such a thing unless I can prove it, and I can't find any indication of it in the figures or the writing—not the slightest—only they won't come right!"

"Have you spoken to Mr. Goldie about it?"

"No; that would be no use. I must find it out myself. I must get it right. I can't bear to have it said I left the books in disorder."

"Why, they are copperplate and artist-proof," said Adolphus, "except where Huxtable marked them."

"There's no erasure—not the slightest trace of any!" said Jones, in a doubtful tone.

"I suppose nobody gets at the books but Huxtable?"

"Nobody else."

"Does he ever come to the office out of hours?"

"Oh, yes; he often stays late."

"I would get into the cupboard some evening, and keep an eye on him through the keyhole."

"That's not in my way, Mr. Adolphus."

"Then employ a detective."

"What, a detective in Goldie Brothers! That wouldn't do. Well, come on home and get a rest, and begin again to-morrow."

"I have no rest," said the old man wearily, as he looked up and left the office with his friend.

They parted at London Bridge, each going his own way.

"Huxtable has a hand in this," said Adolphus to himself as he hurried along. "It will be the death of Jones if he does not find it out, or somebody for him. I suppose there is money to account for. I wish I could help him. I'll go round and see Captain Chubb, and see what he thinks of it."

After hearing the story, the Captain thought for a little, and then remarked, "There's a man down below who may give us a hint."

"What, you mean Robbins, the photographer?"

"Yes. We'll call him up, and let us consult him."

"You want to know," said Mr. Robbins, after he had been called up and had entered into the particulars of the case in hand—"you want to know

whether ink can be erased without leaving a mark. Of course it can. I've seen documents from which a name or a figure has been taken out so neatly that no expert ever could discover it. I am an expert myself. I couldn't tell you the means by which it is done, but I know it's done."

"And without soiling the paper or the page?"

"Without a mark, so that you could never guess that there had been any tampering with it."

"Then, how was it found out?"

"By art, sir, art. Photography will find out anything. A good photograph will show marks that can't be seen in the original."

Adolphus, who was an amateur photographer, said, "That's true. I know it by experience."

Mr. Robbins, who was a great enthusiast, said, "Yes, photography can do it, for one thing is certain, that light is reflected or absorbed in different degrees from different substances. Paper which has once been written upon shows differently from paper which has not. It produces a different effect upon the chemicals, and by that means characters which have been written and obliterated can be reproduced and made to show themselves."

"Do you think I could photograph the pages?" asked Adolphus, eagerly.

"Yes, with some little instruction," Mr. Robbins said; "your little camera won't do, but I will give you a larger one that will answer the purpose."

Arrangements were made by Adolphus to take the ledgers up to the top flat of the office, where page after page of the ledgers was photographed, and the negatives were pronounced by Adolphus to be good; examining them with a magnifying-glass, upon some of them he fancied he could discover traces of figures and characters which were not in the book.

"I'm sure I see something!" exclaimed Adolphus; "I can't quite read it, or make out what it is; but there are lines and figures in that space, I'm certain. I see it, I see it, but it will come out plainer in the printing." And so it turned out.

Thus, through the aid of photography, the books were proved to have been falsified, which led to the tracing of embezzlement, and Huxtable was the culprit.

In the same year as the foregoing, another story was published in which photography is introduced as a witness, that helps wonderfully to prove the prisoner's innocence at a point where evidence was much needed to clear up matters.

A young man is charged with passing a forged cheque. The bank-teller identifies him, and swears to his personality, and the hour at which the prisoner had tendered the cheque for payment. Also one or two witnesses testified to having seen the prisoner near the bank at one o'clock.

Things looked black for the present, for, unfortunately for him, he was sitting in a friend's office somewhere about the hour in question. The prosecuting attorney, in recounting the strong points of the case, asserted that the prisoner could not show, to the satisfaction of the Court, that he was elsewhere than at the bank at the moment of the crime, when a voice in the middle of the Court called out, "I can tell where he was." "Silence!" the Court crier called out, as he saw a rough, uncouth boy stand up, with mouth wide open, clutching his cap in his hands.

"You sit down," said the crier.

"No, I guess not," replied the boy.

The magistrate thought the boy would not be fooling in such a place at such a time, so he called on him to approach. The judge leaned forward and said something to him in a low tone, which the boy answered in a whisper, when the judge said that the boy would produce important evidence for the defence.

The boy left the Court, and returned again in about ten minutes, and in his hand he had some mounted photographs. The boy was an amateur photographer, and the pictures were his own taking.

The judge looked at one of the pictures and then at the prisoner. Then, turning to the clerk, he said, "Administer the oath to this boy." This was done. Then, from the evidence and the picture, it was proved that the prisoner at the bar was standing at a shop window, in such a place that it was impossible for him to have had anything to do with the forgery; but then there came a question of the time the picture was taken, when the boy turned and pointed out the clock on St. Luke's Church, which showed that it was just one o'clock when the picture was taken.

Of course the prisoner was acquitted, the photograph being the silent witness that obtained the victory. MARK OUTE.

REPRODUCTION OF WRITING AND DESIGNS BY THE CHEMICAL METHODS.*

CYANOTYPY: MARION PROCESS.—In the dark closet sheets of paper are coated on one side only with a solution composed of—

Water	1000	parts.
Citrate of iron	121	,,
Red cyanide	195	,,

* Continued from page 524.

This is dried in obscurity. When dry, these papers should be kept out of the light and damp.

In using them, either cutting them in the frames or taking them out, as when washing, the operation must be performed quickly and in a half-light, or, again, by lamp or candlelight, not to injure their properties. These papers bear the name of *ferro-prussiate* paper. M. Marion offers them, ready for use, at the price of 10 francs per roll, 10 metres long by 75 centimetres wide.

This sheet of paper, cut the requisite size, is placed under the drawing in the press frame, and it is exposed to broad daylight, or, better, to the sun.

The action of the light is followed on a band of sensitised paper, fixed in the frame and exceeding, so as to take it off without opening the planchette. Towards the end of the operation, one side of the frame is opened, to judge of the appearance of the proof on the part of the paper covered by the draught. Twenty to thirty minutes generally suffice. Ferro-prussiate paper, exposed to the light, takes the following tints successively:—Greenish-yellow, bluish-green, deep grey-blue, and bright olive-grey, with metallic reflections. It is at this last point the exposition must be stopped to have a fine blue after washing.

In a place sheltered from the broad daylight the proof is taken from the frame; it is dipped into a copious bath of pure water, and the basin is moved to and fro to shake the water. This last becomes yellow, and the image appears. The water is changed, and the washing stopped as soon as it has the clearness and tone desired. By continuing, the intensity of the blue colour would be diminished; by the employment of hot water from twenty to thirty-five degrees, the discharge is accelerated and rendered more complete.

The proof is dried either across a rod, or hung on a rack fitted with nails, or suspended to a string with clasps.

The too-pale blue colour is revived by dipping the proof into a bath of acidulated waters with two or three per cent. of sulphuric acid, leaving it there some minutes, and then washing to take away the acid.

Then one has a proof in which the black or opaque parts of the document to reproduce are indicated in white, and the transparent or translucent parts in blue, the deeper according as the light has been able to traverse these parts better.

HERSCHEL PROCESS.—This method is identical with the preceding; the composition of the sensitive liquid alone is different, and is composed of—

Water	65·0	grammes.
Ammoniacal acetate of iron	90	,,
Red cyanide	80	,,

One also gets white lines on a blue ground. When a proof requires retouching by effacing certain white lines, a solution of carbonate of potassium is used (salt of potash) in the water at five per cent.

PIZZAGHILLI PROCESS.—This method, like the Pellet, gives blue designs on white ground. The sensitising liquid is formed of 8 parts of a solution of 1 part of citrate of iron, 2 parts of water; 5 parts of a solution of 1 part of perchloride of iron, 2 parts of water; 30 parts of a solution of 5 parts of gum, 25 parts of water. The mixture remains limpid at first, but it soon grows troubled, and it must be employed as soon as possible after making. After isolating, it is developed in the following bath:—

Water	100	grammes.
Ferrocyanide of potassium	20	,,

The proof is quickly washed and passed through an acid bath:—

Water	100	grammes.
Chlorhydric acid	12	,,

And finally it is washed in water and dried.

FISCH PROCESS.—This author indicates the following proportions:—

A. Pure water	600	grammes.
Arabic gum	170	,,
B. Water	100	,,
Tartaric acid	40	,,
C. Water	100	,,
Ferric sulphate	20	,,
D. Solution of perchloride of iron at 40° B.	125	,,

These four solutions are mixed in the order indicated, and the product is left for twenty-four hours in obscurity. It is next diluted with distilled water until it marks no more than 11° Baumé, and it is passed over the paper coated with amidine.

It is developed with ferrocyanide at eight per cent. or ten per cent., washed and fixed with sulphuric acid at three per cent., and, finally, well washed with water. A. M. VILLON.

To be continued.

PHOTOGRAPHIC EXHIBITION IN GLASGOW.

GLASGOW is to have an International Photographic Exhibition on a scale never yet approached by any other city in the Kingdom. In 1883 a small coterie of gentlemen formed themselves into the Glasgow and West of Scotland Amateur Photography Association, and it was soon obvious that the movement was to be attended with more than ordinary success.

The roll of members steadily increased year by year; a large and well-ventilated suite of rooms was eventually engaged, where members could develop their plates, hold business meetings, read technical papers, and give practical demonstrations; and so popular did the movement become that ere long the executive found it necessary to extend, not only their premises, but also the time of such meetings from a limited portion of the year to all the year round. Informal meetings of the members are now held almost nightly, whilst during the winter season lime-light entertainments form an attractive feature of the association's programme. The outcome of all this has been an ever-increasing number of members to the roll, until from about a dozen or so in 1883 the list has increased to over two hundred, amongst whom will be found the names of many of the most prominent merchants and manufacturers in the West of Scotland. For some time there has been a strong desire on the part of several of the leading members that Glasgow should not be behind other photographic centres in the way of affording the public ample opportunities of seeing on a large scale the class of work that amateurs from all parts of the world can turn out, alongside that of well-recognised professional workers; and the thanks of the public are due to the indefatigable exertions of Mr. John Morison, jun., the president of the association and the enterprising Council, who are at present directing the association, for their endeavours to organise in Glasgow an exhibition which will exceed in importance any such exhibition hitherto held. A large guarantee fund has been subscribed, chiefly among the two-hundred members of the association, and the executive have wisely called to their aid the services of several of the most experienced professional workers in the district, the result being that the movement has assumed dimensions of no ordinary character, and will embrace several novelties not previously seen at similar undertakings. The entire suite of rooms forming the Fine Art Institute has been engaged for the whole of the month of September, and the exhibition of work will not only be of a truly international character, but will embrace some special features in the way of photo-mechanical exhibits. Among other numerous interesting exhibits will be found a series of photographs taken by Surgeon Newlands during the recent Manipur Expedition. Arrangements have also been concluded with well-known lecturers, who will give nightly lime-light entertainments in the large hall; and, to insure the success of this branch of the exhibition, a special twenty-feet opaque screen has been erected at the west end of the room for the projection of photographic transparencies. The list of lectures, both amateur and professional, will be found to contain the names of Mr. Andrew Pringle (with his Life and Songs of Robert Burns), Mr. Thos. N. Armstrong (with an entirely new lecture-set of a Caravan Tour through the Trossachs), Mr. Ralph Elder (with the outcome of this year's holidays, spent on the Continent), Mr. Paul Lange (with his popular tour in Iceland), Mr. George Napier, Mr. Wm. Lang, Mr. John Morison, jun., Mr. Wm. Scotland (the originator of caravan touring in the West of Scotland), and Mr. Charles Reid, of Wishaw (with his admirable animal studies). Kindred photographic associations are lending a helping hand, and all are working with a zeal that must insure an exhibition of more than ordinary interest, not only in pictures, but likewise in the latest novelties in the way of apparatus, ample space for which has been provided by the executive. The exhibition will open on 1st September with a full-dress evening conversazione, at which the Lord Provost will preside, and invitations to a very large number of professional and leading citizens of the West of Scotland have been issued. Musical promenades will be given at intervals, and Messrs. Ferguson & Forrester will take charge of the refreshment stalls. Altogether the month of September should be a very attractive time for those desirous of spending a profitable and pleasant day or evening at the Fine Art Institute. Mr. Wm. Gordon, the secretary of the association, will readily furnish information regarding the undertaking on application to him at 3 Lynedoch-street. Intending exhibitors should note that the last date for receiving entry forms is the 20th inst., and the last day for sending in exhibits is the 22nd inst. (to-morrow).—*North British Daily Mail.*

CARDIFF PHOTOGRAPHIC EXHIBITION.

OPEN AUGUST 12 TO 26.

LIST OF AWARDS.

All the Classes are Professional and Amateur unless specially indicated.

CLASS 1. PORTRAITURE.—W. W. Winter, *Six Cabinet Portraits*, silver medal; Prince Ruffo, *Portrait Study*, bronze medal; J. H. Hogg, *Finishing Touches*, certificate.

CLASS 2. LANDSCAPE.—J. P. Gibson, *Autumn on the Tyne*, silver medal; H. P. Robinson, *May-fly Time*, bronze medal; T. Birtles, *Views of Manchester Ship Canal*, certificate.

CLASS 3. ARCHITECTURE.—C. Court Cole, *Christ Church Cathedral, Choir*, silver medal; T. H. Faulks, *Banqueting Hall, Cardiff Castle*, bronze medal; A. J. Loughton, *Southwell Cathedral Choir*, certificate.

CLASS 4. GENRE.—Robt. Terras, *The Engagement Ring*, silver medal; J. E. Austin, *The Love Letter*, bronze medal; Shapoor N. Bhedwar, *Butterflies*, certificate.

CLASS 5. ENLARGEMENTS.—West & Son, *Yacht "Mohawk,"* silver medal; W. H. Kitchin, *Fireplace in Tower, Cardiff Castle*, bronze medal; T. B. Sutton, *Stepping Stones*, certificate.

CLASS 6. HAND CAMERA WORK.—Percy Morris, *On the Taff*, silver medal; J. D. Lysaght, bronze medal; W. D. Welford, *Foggy Weather, &c.*, certificate.

CLASS 7. ANIMALS.—Bernard Alfieri, *Four Animals*, silver medal; W. D. Welford, *Calf Feeding—"What Funny-looking Things!"—&c.*, bronze medal; Mrs. Pollard, *Pomeranian Puppies*, certificate.

CLASS 8. INSTANTANEOUS. — Hy. Symonds, *Amphitrite Yacht*, silver medal; W. H. Kitchin, *A Cutter Race*, bronze medal; A. R. Dresser, *Leap Frog*, certificate.

CLASS 9. LANTERN SLIDES (Genre).—Jno. E. Austin, *Set of Six Slides*, silver medal; Mr. and Mrs. Auckorn, No. 2 set, *ditto*, bronze medal; J. D. Lysaght, No. 2 set, *ditto*, certificate.

CLASS 9A. LANTERN SLIDES (Landscape).—E. G. Lee, *Set of Six Slides*, silver medal; Jas. Dore, *ditto*, bronze medal; A. Pringle, *ditto*, certificate.

CLASS 9B. LANTERN SLIDES (Architecture).—A. Pringle, *Set of Six Slides*, silver medal; E. Beck, *ditto*, bronze medal; T. H. Faulks, *ditto*, certificate.

CLASS 9C. LANTERN SLIDES (Instantaneous).—Priestly & Sons, *Set of Six Slides*, silver medal; West & Sons, *ditto*, bronze medal; Jas. Dore, *ditto*, certificate.

CLASS 10. CHAMPION CLASS.—Shapoor N. Bhedwar, gold medal for series *Feast of Roses.*

CLASS 11. PORTRAITURE (Amateur).—Miss Rose Collier, *Four Portraits*, silver medal; W. J. Jenkins, *Portraits*, bronze medal; Clarence B. Moore, *Laughing Darkey*, certificate.

CLASS 12. LANDSCAPE (Amateur).—A Horsley Hinton, *By Reedy Ways*, silver medal; Hamilton Emmons, *Sunset on the Nile*, silver medal; A. R. Dresser, *A Rough Day*, bronze medal; Hy. Holt, *A Ferry, Windermere*, certificate.

CLASS 13. GENRE (Amateur).—J. E. Austin, *Chaff*, silver medal; J. E. Dumont, *A Good Hand*, bronze medal; T. M. Brownrigg, *An Alpine Spinner*, certificate.

CLASS 14. LANDSCAPE, SIX QUARTER PLATES (Amateur).—W. L. Howie, *Six Landscapes*, silver medal; W. H. Kitchin, *ditto*, bronze medal; Jno. E. Austin, *ditto*, certificate.

CLASS 15. SOCIETY COMPETITION, LANTERN SLIDES.—No competition.

CLASS 16. PRESIDENT'S PRIZE.—W. H. Kitchen, *Rambles with Cardiff Photographic Society;* C. H. Murrell, *ditto*, equal first.

SPECIAL AWARD.—W. L. Howie, bronze medal for geographical photographs, Nos. 543, 544, 545.

THE SURVEY COMPETITION.

Classes competing for the medals offered by the Committee of the Free Library and Museum in reference to the Photographic Survey of Glamorganshire and part of Monmouthshire.

CLASS 1. (Collection illustrating Glamorganshire, past and present).—T. M. Franklen, gold medal; W. Booth, silver medal; A. McKinnon, bronze medal.

CLASS 2. (Collections illustrating Monmouthshire, within twelve miles of Cardiff).—W. Herbert, silver medal; N. R. Corfield, bronze medal.

CLASS 3. (Collections of photographs of churches and chapels of Glamorganshire).—Silver medal withheld; W. Booth, bronze medal.

CLASS 4. (Collection of photographs of Cardiff, past and present).—G. Wills, silver medal; F. W. Simpson, bronze medal.

CLASS, 5. (Collections of photographs of Glamorganshire castles, mansions, religious houses, and crosses).—T. M. Franklin, silver medal; F. H. Faulks, bronze medal.

The adjudicators look upon the collections exhibited as satisfactory, considering the short time during which the survey has been going on, and the unfavourable weather of the past and present seasons. The number of views of the same object taken by members of the Society is to be regretted as a waste of energy, while many subjects within the purvicio of the survey remain unrepresented.

The western portion of the county, too, is quite unworked. Sufficient, however, is shown to indicate that great energy and skill have been devoted to the task and to promote the completion of the survey in a satisfactory manner.

It has occurred to the adjudicators whether it would be thought advisable by the Committee to award the silver medal withheld to the best selection of views illustrating the castles immediately around Cardiff—viz., Cardiff St. Fagan's and Castell Coch.

In such case they would recommend the five series exhibited by Mr. Dighton, which, being confined to the castles named, does not conform to either of the clauses described in the schedule.

W. H. JOHNSTON.
T. H. THOMAS.

Foreign Notes and News.

Two young Englishmen were recently travelling per steamboat along one of the French rivers in the neighbourhood of Epinal. When about six miles from the fort of St. Barbe, they proceeded to take a few photographs of the river banks. What was their surprise to receive on their arrival at Epinal a visit from the Chief Commissary of Police and a summons to attend before the Criminal Tribunal at Nancy! On arriving at Nancy

they were let out on bail, but their photographic apparatus was confiscated, and they were ultimately fined one franc and costs, which, although not a heavy punishment when reckoned in with the delay and annoyance, was quite serious enough. It appears from the law of 1886—a fact not generally known in this country—that no one may photograph any object within *six miles* of a fortification without a permit from either the military or naval authorities. It would be of interest to know where one can find a spot in France more than six miles from a fortress.

Last year a more daring individual braved death and imprisonment by calmly striking up his camera a few hundred yards from the fort of Belgarde (Ain). He was just getting his apparatus focussed when the gallant defenders let fly a couple of rounds of ball cartridge at him. It is needless to state that they didn't hit him. The French Tommy Atkins is not a much better marksman than our own. Finally, the courageous photographer retired in safety with his booty—two excellent negatives—and did not suffer further molestation.

We have heard a good deal of talk lately about the various devices for making photographic images visible at a distance. One of the most scientific, and consequently *theoretically* practicable, of methods has, as we learn from the *Revue Suisse*, been recently proposed by M. Serrin. His method depends in part upon the action of light upon selenium in varying its electrical resistance.

M. Serrin's method is, on the whole, one of considerable complication. He makes use of a small piece of selenium, which is moved up and down behind the first image. Through it flows an electric current, which varies consequently in intensity as the light to which the selenium is exposed. This current is then employed to rotate the plane of polarisation of polarised light passing through a suitable liquid at the receiving end. These variations in the plane of polarisation can, by suitable optical arrangements, be made to give place to variations in the brightness of a luminous image, and so the problem is at any rate solved in principle.

BRITISH ASSOCIATION.

The meeting this year is at Cardiff, under the presidency of Dr. Huggins, F.R.S., the eminent astronomer. The proceedings commenced on Wednesday evening by the usual presidential address, from which we give an extract relative to the important services rendered to astronomical science by photography. He said:—

"Though I have already spoken incidentally of the invaluable aid which is furnished by photography in some of the applications of the spectroscope to the heavenly bodies, the new power which modern photography has put into the hands of the astronomer is so great, and has led already, within the last few years, to new acquisitions of knowledge of such vast importance, that it is fitting that a few sentences should be specially devoted to the subject.

"Photography is no new discovery, being about half a century old. It may excite surprise, and indeed possibly suggest some apathy on the part of the astronomers, that though the suggestion of the application of photography to the heavenly bodies dates from the memorable occasion when, in 1839, Arago, announcing to the Académie des Sciences the great discovery of Niepce and Daguerre, spoke of the possibility of taking pictures of the sun and moon by the new process, yet that it is only within a few years that notable advances in astronomical methods and discovery have been made by its aid.

"The explanation is to be found in the comparative unsuitability of the earlier photographic methods for use in the observatory. In justice to the early workers in astronomical photography, among whom Bond, De la Rue, J. W. Draper, Rutherfurd, Gould, hold a foremost place, it is needful to state clearly that the recent great successes in astronomical photography are not due to greater skill nor, to any great extent, to superior instruments, but to the very great advantages which the modern gelatine dry plate possesses for use in the observatory over the methods of Daguerre, and even over the wet collodion film on glass which, though a great advance on the silver plate, went but a little way towards putting into the hands of the astronomer a photographic surface adapted fully to his wants.

"The modern silver-bromide gelatine plate, except for its grained texture, meets the needs of the astronomer at all points. It possesses extreme sensitiveness; it is always ready for use; it can be placed in any position; it can be exposed for hours; lastly, it does not need immediate development, and for this reason can be exposed again to the same object on succeeding nights, so as to make up by several instalments, as the weather may permit, the total time of exposure which is deemed necessary. Without the assistance of photography, however greatly the resources of genius might overcome the optical and mechanical difficulties of constructing large telescopes, the astronomer would have to depend in the last resource upon his eye. Now we cannot, by the force of continued looking, bring into view an object too feebly luminous to be seen at the first and keenest moment of vision. But the feeblest light which falls upon the plate is not lost, but is taken in and stored up continuously. Each hour the plate gathers up 3600 times the light energy which it received during the first second. It is by this power of accumulation that the photographic plate may be said to increase, almost without limit, though not in separating power, the optical means at the disposal of the astronomer for the discovery or the observation of faint objects.

"Two principal directions may be pointed out in which photography is of great service to the astronomer. It enables him within the comparatively short time of a single exposure to secure permanently, with great exactness, the relative positions of hundreds or even of thousands of stars, or the minute features of nebulæ or other objects, or the phenomena of a passing eclipse, a task which by means of the eye and hand could only be accomplished, if done at all, after a very great expenditure of time and labour. Photography puts it in the power of the astronomer to accomplish in the short span of his own life, and so enter into their fruition, great works which otherwise must have been passed on by him as an heritage of labour to succeeding generations.

"The second great service which photography renders is not simply an aid to the powers the astronomer already possesses. On the contrary, the plate, by recording light waves which are both too small and too large to excite vision in the eye, brings him into a new region of knowledge, such as the infra-red and the ultra-violet parts of the spectrum, which must have remained for ever unknown but for artificial help."

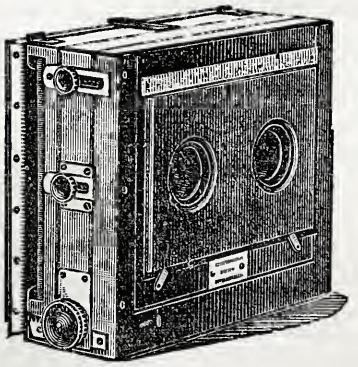
Our Editorial Table.

Chadwick's Stereoscopic Camera.

After a careful examination and trial of the stereoscopic camera of Mr. W. I. Chadwick, St. Mary's-street, Manchester, we conclude that if the same skill in devising, and care in constructing, the various stereoscopic requisites had always been taken as have been displayed by Mr. Chadwick in such of his stereoscopic appliances as we have seen—the camera before us, for example—binocular photography would not have sunk so low as it has during the past two decades. The energy with which Mr. Chadwick has thrown himself into the breach in furtherance of his endeavour to resuscitate this neglected, but fascinating, branch of photography is most commendable, and is directed by a sound acquaintance with its principles.

The camera is intended, first of all, for binocular pictures, although single ones can also be taken by it. The size of plate selected is the original half-plate, which is $6\frac{1}{2} \times 4\frac{1}{4}$, or equal to two quarter-plates placed side by side. This is only so much larger than a finished stereoscopic slide as to permit of a quarter of an inch or so being trimmed from off the ends, by which marginal defects are removed. The dark slides employed are Barnett's patent. With a view to test the reliability of this dark slide we placed a plate in one, and laid it on a bench in the garden, exposed to light for over a quarter of an hour, only to find, on applying a developer, that the light had failed to reach the plate.

The camera itself is very compact, and, when folded up, presents the appearance shown in the cut. The front is of the kind we have



invariably seen in American cameras, and of which we have often written approvingly, that is, the portion on which the lenses are screwed "ships" into the front, and is retained *in situ* by a brass band above and buttons below; thus, when folded up, the lens board is unshipped and reversed, and the lenses are now inside of the camera, to be restored to their proper position in a few seconds

without entailing either a screwing or sliding movement. The construction of the folding tailboard is such that it can be opened out and rendered rigid almost by one movement of the hand. When expanded, it can be used either with a swing back or in rigid form. The patent spring-roller division is a charming appliance, and the best thing of the kind we have ever seen. No matter what is the focus of the lens, or even if the body is pushed closely in, the division is invariably correct.

A separate front enables a lens to be used by which the plate is covered by a single picture, the division, in this case being removed.

The whole get-up of Chadwick's camera is excellent.

Sun Pictures of Norfolk Broads.

By Payne Jennings.

This volume contains 100 pictures of the Rivers and Broads of Norfolk and Suffolk. The mere mention that they are by Payne Jennings is quite a sufficient guarantee of their excellence, both as works of art and as technically perfect photographs. They are all uniform in size, being nearly five inches in longitudinal dimensions, and are printed at the Permanent Photo-Printing Works, Ashtead, Surrey. Where all are so excellent, it is difficult to point to any for special commendation, but the selective skill of the artist is well exemplified in *On Hickling Broad*, *Dyke on Hoveton Broad*, *On Salhouse Broad*, *Wherries leaving Yarmouth*, and, indeed, many others.

This handsome volume, for which we are indebted to the manager of the Great Eastern Railway Company, is procurable at Smith's bookstalls. It must prove an incentive to many to visit the Broads.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,466.—"Improved Walking-stick Tripod Stand for Photographic Surveying or other Purposes." T. Burton.—*Dated August* 10, 1891.

No. 13,467.—"A Repeat Photographic Dark Slide and Improved Camera Back." E. Dunmore.—*Dated August* 10, 1891.

No. 13,538.—"Improvements in Means or Apparatus Employed in Photography." A. P. A. Beau.—*Dated August* 11, 1891.

No. 13,643.—"Displaying Stereoscopic Photographs by means of a Machine called the 'Automatic Rotating Stereoscope.'" E. Ireland.—*Dated August* 13, 1891.

No. 13,674.—"Improvements in or Connected with Photographic Shutters." A. C. Jackson.—*Dated August* 13, 1891.

No. 13,686.—"An Improved Portable Photographic Camera and Stand combined." A. Campbell.—*Dated August* 14, 1891.

No. 13,737.—"Improvements in Photographic Hand Cameras." R. Smith.—*Dated August* 14, 1891.

No. 13,764.—"Improvements in Lantern Slides." A. Pumphery.—*Dated August* 15, 1891.

No. 13,765.—"Improvements in Magic Lantern Slides." G. F. Lutticke.—*Dated August* 15, 1891.

No. 13,799.—"An Improved Apparatus for the Development of Photographic Pictures." Complete specification. O. P. Olvik and H. O. Morken.—*Dated August* 15, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 15,127.—"Photographic Camera." Communicated by Bullard. Bayly.—Price 8*d*.

No. 18,081.—"Photographic Changing Cases." Krügener.—Price 6*d*.

PATENTS COMPLETED.

Improved Photographic Camera.

(A Communication from Edgar Bullard, of Wheeling, West Virginia, U.S.A.)

No. 15,127. John Pitt Bayly, 18, Fulham-place, Paddington.—*July* 25, 1891.

This invention relates to an improved photographic camera of that class known as "detective cameras." The invention has in part for its object to provide a camera which is simple in construction, neat in appearance, and more convenient for use than those at present made and sold.

By this invention, the whole of the mechanism is contained within a box or casing, having a glazed aperture in its forward end. At the rear of this glazed aperture is the lens tube of the camera, which lens tube is provided with an adjustable lens. A slotted shutter is arranged to move transversely of and with the lens, and suitable means stationary relative to the lens is provided for operating a suitable shutter. This shutter consists of a curved and slotted plate, which is arranged to move between the lenses, and which plate is provided with a radial arm pivotally mounted to a suitable support. A suitable slotted toe is attached to said arm, and a longitudinally movable rod provided with a pin engages said toe. A pawl is arranged to engage a tooth portion of said rod, and another rod is connected to the pawl, and operates the same. A horizontal rod is pivoted at one end, and engages a vertically movable rod—which projects beneath the box or casing—at the opposite end, and a spring exerts a downward force upon the horizontal rod. By this means the camera may be adjusted.

Improvements in Photographic Changing Cases.

No. 18,081. Dr. Rudolf Krügener, Bockenheim, near Frankfort-on-the-Main, in the Empire of Germany.—*July* 25, 1891.

My invention relates to photographic changing cases.

In the improved case, constructed according to this invention, the plates are changed in a very simple manner by drawing from the case a small box which contains the plates, so that the front plate will remain in the case, fall upon the bottom of the latter, and pass behind the last plate when the small box is pushed back into the case.

This principle of changing plates is known, and is already carried into practice in such a manner that, before the small box is drawn out, the front plate is separated from the other plates by a special slide which closes the said box, whereupon the whole box is pulled out, the separated plate falling upon the bottom, and being placed behind the other plates when the box is pushed back.

In my improved changing case the slide, which never closes the box quite hermetically, is dispensed with, and use is made of a kind of folding bag surrounding the entire box. This bag excludes the light on every side, and entirely obviates leakages, that are liable to occur when slides are employed. In order that, when the box is drawn out, the front plate shall alone remain in the case, at the end of one side of the case is arranged a metallic bar, which protrudes a distance corresponding exactly to the thickness of a plate beyond the bearing plate provided on the side of the case. Against the aforesaid metallic bar always bears the lower edge of the front plate. On pulling the box from the changing case, the front plate is retained in the case and drops upon the bottom if the case is held so that the plates are placed in a horizontal position.

When the box is pushed into the case again, the plate which was originally in front is caused to pass behind the last plate in the box. The box is adapted to be drawn from the case only to such an extent that the front end of the upper plate will not slide from the above-mentioned metallic bar, as otherwise it would be impossible to push the small box back into the case.

The plates are held in metallic frames, so that in reality these frames are changed.

Springs are provided which tend to force the frames or plates continually to the front into the focus.

My improved arrangement is extremely simple, and it is sufficient to move the small box into and from the case in order to change a plate, for which, in the changing cases heretofore used, which are very liable to allow the access of light, double the number of manipulations are needed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 25	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 26	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 26	Burnley	Bank Chambers, Hargreaves-street.
,, 26	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 27	Halifax Photographic Club	Mechanics' Hall.
,, 27	Liverpool Amateur	Crescent Chambers, 3, Lord-street.
,, 27	Oldham	The Lyceum, Union-st., Oldham.
,, 27	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 13,—Mr. A. L. Henderson in the chair.

A letter from Messrs. Braun, of Dornach, was read, complaining of the use of their name in connexion with a statement not in accordance with fact, contained in a recent communication to the Association by Mr. B. J. Edwards.

Mr. E. Dunmore showed a series of prints made from negatives taken with spectacle lenses, combined so as to form doublets and triplets of various foci. He had used a very small diaphragm, and had not found any necessity for making a correction on account of the lenses not being achromatised. The stop being so small, he had focussed with a large aperture before inserting it.

Mr. W. E. Debenham said that with a lens of that character the focus was lengthened by inserting a small stop, and it might be arranged, as with the Zentmayer lens, that this lengthening should just be as much as required to bring the chemical focus on the same plane that the visual focus had occupied with the larger opening.

Mr. Dunmore then showed a sheath or light metal dark slide, a number of which could be packed in a small space.

Mr. A. Haddon said that a similar arrangement had been patented some time since by Mr. Atkinson.

Mr. H. M. Smith then introduced the subject arranged for the discussion of the evening, *The Value of Enlargements* versus *Large Direct Photographs*. The first thing against large direct work was, he said, the expense of the apparatus necessary. Then the expense of the plates was large also, and this, when several might have to be exposed to get exactly what was wanted, was a serious item. He had never seen large direct photographs that would compare for definition with what could be produced by enlargement from small negatives. For portraiture, the expense was not limited to the plates and apparatus; the retouching of a large head was very expensive, and, when done, it would very likely be rejected by the sitter from some cause that the photographer could not provide against. Over and over again it had been said that it is not

possible to produce enlargements so good as direct pictures, and a good many photographers say that they do not want to produce bromide enlargements, but direct work. He thought this was a mistake, and that better work could be made by enlarging than of large size direct. He showed an enlargement from a negative taken at the last outing of the Association, and did not think he could have obtained such good definition throughout if photographing that size direct.

Mr. F. A. BRIDGE said that he thought the question should not be put, Which is the best, enlargement or direct work? But that for some things it was expedient to use the one, and for some things the other method. He showed some examples of direct portraiture up to 24 × 18 inches, kindly sent by Mr. Barry, of Hull. For himself, he would not attempt to take anything larger than 15 × 12 direct. There were also shown a few enlargements by Mr. Barry, toned, and very similar in appearance to albumen prints, also some enlargements made by himself on bromide paper. He believed that photographers who did take large portraits direct did not find it pay except in the way of advertisement.

Mr. J. B. B. WELLINGTON said that it was possible to obtain the same definition in a large portrait as in a small one if the same size stop were used, but the exposure would be so much longer.

Mr. DEBENHAM said that there were advantages attending each method. With a small negative, definition in the out of focus planes might easily be kept something like fine, but with a large direct negative the diaphragm, to give as good definition, must be so small as to necessitate an enormous exposure. He did not think photographers at all realised the very much greater exposure that would be necessary. On the other hand, with bromide enlargements there was generally, if not always, a loss of gradation in the deep shadows, and with albumen prints or carbon prints made from enlarged negatives there was some loss of gradation due to each repetition of the photographic process. There was also the enlargement of the texture of the film, generally most evident with rapid plates, and of any small defects from dust, &c.

Mr. BRIDGE admitted that bromide enlargements generally did fail in reproducing the gradation in the shadows, but he thought that when made with a glossy surface they could be produced equal in gradation to albumen or carbon prints.

Mr. COOKE agreed with Mr. Debenham that bromide prints were deficient in gradation.

A vote of thanks was passed to Mr. Barry for sending the collection of large work.

The Saturday outing of the Society on the 22nd inst. will be at West Drayton. Meet at the railway station there at fifteen minutes past three; train leaves Paddington at thirty-five minutes past two.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

AT a meeting held at 55, Chancery-lane, on the 14th inst., Mr. John Spiller in the chair, four applications for assistance were considered and granted. Mr. W. J. Tabrum, solicitor, was elected Assistant Hon. Secretary; Miss Walker and Mr. James Sharp, 16 and 17, Poultry, were elected subscribers.

Note.—All subscriptions are now due, and will be gladly received, as the funds are very low.

HACKNEY PHOTOGRAPHIC SOCIETY.

AUGUST 13,—Dr. Roland Smith (the President) in the chair.

The Secretary announced that the exhibition would be held in the Morley Hall on October 21 and 22, and that there would be open classes, trade exhibits, lantern shows, organ recitals, concerts, &c., and that Mr. Andrew Pringle and Mr. Traill Taylor would act as judges. *Photography* had placed two medals at the Society's disposal, and Mr. Crouch had kindly offered a pair of stereoscopic lenses for competition.

Mr. A. Barker and Mr. Harverson then passed round work executed by them on their holidays.

Mr. B. Foulkes Winks was nominated for membership.

The Hon. Secretary apologised for the absence of Mr. Adams, who was to have dealt with "Hand Cameras" from a manufacturer's point of view, owing to business matters. A good show of hand cameras was, however, made by Mr. Roberts, who showed his, the changing being effected by the dropping of a plate through a slot; it could be used on a stand, and focussed as an ordinary camera; no sheaths. Messrs. Phillip, Harris, & Co., of Birmingham, showed the Cytox, a very neat and cheap camera. Dr. Roland Smith showed the one he had patented, which set the shutter and changed the plate with one movement. Messrs. Mercer, of Birmingham, sent the Alert (a rough model); this was a very nicely arranged and compact camera, very small, but taking quarter-plates, and on the magazine principle. Messrs. Harling sent the Cusworth repeater, which set the shutter and changed the plate with the one movement. The Hon. Secretary showed Adams's Ideal, fitted with self-acting Newman shutter, regulatable from one-hundredth of a second to a year, with Iris diaphragm. The President handed around a new hand camera lens, made by Mr. Crouch, having a focal length of five inches, and working at *f*-5. It was made from the Abbé Schott glass, and gave splendid results. He showed his results of work done with lens. The "Dresser" shutter was also shown, which could be made to give any exposure.

RICHMOND CAMERA CLUB.

AUGUST 14th,—Mr. Faulkner in the chair.

Mr. Cembrano, as delegate of the Club at the late meeting of the Photographic Convention at Bath, read a concise but comprehensive report of the proceedings of the Convention, calling special attention to the recommendation made by the Lens Standard Committee with a view to securing uniformity in the matter of lenses, diaphragms, screws, and fittings of cameras, and winding up with expressions of warm appreciation of the kind reception which had been accorded to the Convention at Bath. The presentation of the report had been deferred for a fortnight to enable Mr. Cembrano to prepare his illustrations, in the shape of lantern slides, with the result that no less than 120 pictures were thrown upon the screen, the slides being for the most part the work of Mr. Cembrano himself, and the rest by Mr. H. M. Hastings. They covered the whole ground of the Convention's rambles—Bath, Clifton, Bristol, Tintern, Chepstow, Salisbury, Glastonbury, Wells, and comprised architecture and landscape, shipping, cattle and figure subjects, including in the last sundry unconventional groups of members of the Convention. The whole were of the highest interest, and Mr. Cembrano was warmly thanked by the meeting for his "illustrated report."

ENFIELD CAMERA CLUB.

AUGUST 13.—The subject for the evening was *A Discussion on Negatives*, and about a hundred negatives were brought by various members for mutual criticism. A couple of hours were very profitably spent in comparing notes with reference to exposures given, developers, &c. The President (Mr. D. G. Pinkney) brought with him the latest pattern of the Beck-Newman time and instantaneous shutter, and said he had used it during a recent holiday, and that exposures of a fractional part of a second were made with certainty and without any vibration.

MANCHESTER PHOTOGRAPHIC SOCIETY.

AUGUST 13,—The President (Mr. A. Garnett) occupied the chair.

Attention was called to the nomination paper to receive the names of members from which to elect the Council at the annual meeting in October. This paper must be filled up before the close of the September meeting.

The kallitype process was introduced by the Hon. Secretary, who explained the improvements which had been made in the paper during the last twelve months, and which were made manifest by the excellent specimens kindly lent by the makers (the Birmingham Photographic Company).

The rest of the evening was devoted to general topics and exhibition of results of summer work, Mr. Blakeley contributing a very good series of photographs of the completed portion of the Ship Canal.

Correspondence.

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

AUTOMATIC WASHING TROUGHS.

To the EDITOR.

SIR,—I was very much surprised at seeing in your JOURNAL, August 14, page 525, a description of an automatic washing apparatus for plates, *just patented*. This description will also apply to an apparatus invented by myself, and used by me *many years ago* in the city of Norwich. I exhibited the apparatus to the members of the Norwich Photographic Society, who were very much interested in its performance, filling and emptying itself, washing prints, guncotton, plates, or anything else required. There is a full description of it, also a drawing, in No. 59 of the *Journal of the Photographic Society*, published in London. It is the first automatic washing apparatus brought before the public, and I believe it is the most efficient, excepting perhaps the patented article, which I have not seen.

I should like to know if the above patent will prohibit me from using or selling my own machine, which has been in use for so many years.—I am, yours, &c., H. THOMPSON, *formerly of Norwich.*

[We have carefully read the account of your washing trough, published in 1857. It is certainly ingenious, and you may go on using, making, or selling it, despite of all subsequent patents.—ED.]

ENCAUSTIC PASTE FOR PRESERVING PRINTS.

To the EDITOR.

SIR,—The advantage of this as a preservative of silver prints on albumenised paper was very strikingly brought before me the other day when I examined a collection of photographs that I had left behind me with my sister when I married, now some sixteen years ago. I had not seen them for many years; but during a recent visit I hunted them up, and very much surprised I was to find the bulk in very good condition, and many as good as the day they were done; indeed, I would not undertake to print better ones now, as in those days I sensitised my own paper, whereas I now use the commercial article to save time.

The prints were mounted on ordinary tinted cardboard with gelatine, and on examining them carefully I found that those which were good had been rubbed with encaustic paste without exception, and almost all those that had faded had not received this treatment.

I know that my present plan of washing is far before the system I then had; but now a year or two will take all freshness from my prints. Whether this is the only reason for the permanency I cannot say. The fact that those not so treated have faded badly points very strongly to that conclusion. I may say that when I opened the case the prints felt quite damp, and some of the mounts were mouldy. I have just prepared a fresh supply of the paste, and enclose two prints from hand-camera negatives to show the effect.—I am, yours, &c., F. W.

AN EXPLANATION.

To the EDITOR.

SIR,—It may save some discussion on a merely verbal matter if you will allow me to specify more precisely the meaning of an expression

contained in the fourth paragraph of my communication in your last issue. The words "vertical measure [or height], as before stated, does not enter into the question of binocular perspective" are intended to apply to anything that may be stated of binocular perspective or vision as differing from the monocular.

That this was the intention will probably be obvious to any one who reads the whole paragraph from the commencement.—I am, yours, &c.,

W. E. DEBENHAM.

Exchange Column.

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

Will exchange Safety, balls all over, for 12×10 camera and three donble slides. Address, The Beeches, Park-road, Sutton Coldfield.

I will exchange quarter-plate camera, lens, tripod, and two double dark slides, with instantaneous shutter and interior background, for a half-plate camera and slide or slides.—Address, F. C. O. HURD, Shepton Mallet.

Good quarter-plate bellows camera, double dark slide, and ball-socket tripod head, excellent condition, and rapid portrait lens; exchange for whole-plate rapid rectilinear lens.—Address, ROUT, Bookstall, East Finchley.

Vever's six and a half inch burnisher, Fallowfield's whole-plate and half-plate light-tight boxes, fitted with lock and key, in exchange for backgrounds or hand camera.—Address, H. BARTHOLOMEW, Linford, Newport Pagnell.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, unbound, from February 17, 1888, to present date, for half-plate studio camera with dark slide, or good cabinet lens.—Address, G. D. GRANGER, Photographer, Rotherham.

Wanted, six dozen ordinary studio portraits, mounted or unmounted; exchange portable light-tight dark box, nearly new, quarter-plate lens, and other accessories.—Address, ARTHUR HOPKINS, Photographer, 6, Berachah-road, Torquay.

Will exchange whole-plate studio camera, bellows body, rack and pinion adjustment, repeating and swing back, for a whole-plate rapid rectilinear lens by good maker, or half-plate set, complete.—Address, W. R. FAIREY, Photographer, Harrold, Bedford.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

COLESWEGEN.—We shall treat the subject in a short article very soon.

S. L. DOBIE.—By waiting a few weeks longer you will obtain what you want in a very complete form.

R. MICHELL.—The stains are due to insufficient washing between the different operations in the intensification.

JOHN COLSON.—The Architectural Photographic Association does not now exist, and we are unable to indicate where their works are procurable.

SKINNER.—1. We advise the slow plates. 2. With a little previous practice you will find the Watkins' exposure meter serve your purpose. It is reliable.

GEORGE.—If the negative sent is a fair sample of the lot, it is clear the plates have been exposed to light. The makers would not issue plates that fog like these. See to your light.

DELTA.—We know nothing more of the process than that we published. The article is a translation from a foreign contemporary, and we gave it in full. It is in no way a photographic process; hence we have not experimented with it ourselves.

E. LLOYD.—If the bath be made as directed, it will certainly yield good tones. If black ones are desired, the prints must be made from vigorous negatives and on strongly sensitised paper. Probably these conditions have not been fulfilled, hence the failure. No modification of the formula is required.

S. S. C.—For taking a group of about one hundred, and fifty people in a group on a 12×10 plate, a lens of the "Rapid" type of about eighteen inches focus will be most suitable. If a lens of shorter focus be used, it will have to be worked with a smaller stop, thereby entailing a longer exposure and greater risk of movement with the people.

OXON asks if the value *f*-8 affixed to the full aperture of a lens of twelve inches focus supplied to him from London is not a variable quantity?—Certainly it is, being accurate only for objects situated at a distance. When once, by the proximity of the object, the camera has to be expanded to secure a sharp focus, then does the aperture, although mechanically the same, become effectively diminished, until, when object and image are the same size, the focus of the lens is lengthened to twenty-four inches.

ELDOR writes: "I give you facts of a case in point, which are briefly as stated below:—A sitter was photographed by invitation of the photographer, and had two copies presented him free of charge. On the receipt of the above he gave an order for six more, and paid for them in March, 1890, for which a receipt was given. This gentleman died in September, 1890. This photograph was made copyright in November of the same year. I am asked to execute a commission from this photograph. Is there any infringement if any of these photographs are copied now?"—Possibly some of our legal friends will supply the desired information. We are not quite sure on the point ourselves.

ELY.—1. The quantity of gelatine must depend upon the sample used. The proportions are not very important. Only one layer is required. 2. If you cannot get thin canvas wide enough for the background, use "unbleached sheeting." That can be had two yards and a half wide. 3. We should advise ground glass for the south side and clear for the north. Eight feet of glass at the sides is scarcely sufficient; ten feet would be better. The sketch shows that, with these amendments, you will have an excellent studio.

A CORRESPONDENT, who has omitted his name, but gives his address at Douglas, Isle of Man, writes: "I have a large mug filled with fixing baths. I have been adding potassium sulphurate, which does not throw all the silver down. Ought the water to go clear? Which is the best method to throw the silver down?"—We presume sulphide of potassium is meant; that is the precipitant for silver in the fixing bath. If sufficient be added, all the silver will be thrown down. It must be added till no turbidity is caused by a further addition.

J. W. C. writes as follows: "With regard to the saving of silver from fixing baths, I should be glad if you can give me any information as to the best way to save it, and what would be the probable result, providing it was done properly. At this branch (which is under my management) I develop over fifty gross of half-plates in a year besides odd sizes, working a hydroquinone developer. I make up a strong solution of hypo—not a great quantity—which I make fix about a gross of plates, keeping it in use about four days, when it becomes a dark brown, with a metallic scum upon it. Seeing that the cost is over 60*l.* for plates, I am convinced that, if done the right way, good results should follow.—It would certainly pay to recover the silver from the fixing solution. Pour the baths from time to time into a large vessel—say, a paraffin task—and, when full, precipitate the silver with sulphide of potassium (liver of sulphur), collect the residue, and send to the refiner.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting on August 25, at eight p.m. Subject for discussion, *Printing Processes.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, August 27, *Blisters;* opened by Mr. J. S. Teape. September 3, *Dark-Room Appliances.* September 5, Outing to Greenwich Hospital; leader, Mr. A. Haddon.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 26, *Films.* September 2, *Testing Lenses.* Outing, Saturday next, August 22, to Cobham (Surrey); train from Waterloo at twenty-seven minutes past two.

WE have received from Mr. Jonathan Fallowfield an admirable set of snap-shot pictures taken by Mr. Frederick W. Hindley during the Bath Convention. The pictures are all the more valuable in that they contain well-recognisable portraits of friends taken "on the sly." Verily a good hand camera is a great power in the hands of one who knows how to use it.

HOUGHTON'S PORTABLE TENT.—Messrs. George Houghton & Son write: "One of our portable tent studios (16×12 ft.) has been put to serviceable use during the last fortnight by Messrs. Barraud, Limited, of London and Liverpool, first at Canterbury, during the Jubilee Cricket Week, and afterwards at Burlington House, Piccadilly, during the Hygienic Congress, at both of which Messrs. Barraud have taken many hundreds of portraits for the composition pictures they are producing of both events. The portability of the studio is evidenced by the fact that it was in use at Canterbury up till four o'clock on Friday, and ready for use at Burlington House on Saturday, the 8th inst., by twelve o'clock."

WAYZEGOOSE AND PRESENTATION.—On Saturday, August 15, the *employés* of Messrs. Percy Lund & Co. held their annual wayzegoose at Morecambe. Two saloon carriages were engaged, and the railway journey from Bradford was enlivened with songs and recitations. In the evening tea was served in a marquee in the gardens, and sixty *employés* and friends sat down. After tea short speeches were made by Messrs. Percy Lund, H. Snowden Ward, W. Ethelbert Henry, and others. Mr. F. Rodger and Mr. E. Cullingford, on behalf of their fellow-workers, presented to Mr. H. Snowden Ward a handsome inscribed travelling writing-case, on the occasion of his leaving Bradford to take the management of the London branch of the business. In making the presentation, Mr. Rodger gave a sketch of the history of the firm, and of Mr. Ward's connexion with it since its commencement in 1884.

PHOTOGRAPHY IN COURT.—In the High Court of Justice, Queen's Benc Division. Gambier Bolton *versus* H. R. Baines & Co., Limited. Photographic Copyright.—The action brought by Mr. Gambier Bolton, F.Z.S., against the Proprietors of the *Daily Graphic* for infringement of copyright in his photograph of Lady Florence Dixie's Jaguar (lately deceased) has been settled out of Court, on the payment of damages and all costs by the defendants. The following apology appeared in the *Daily Graphic*, Tuesday, August 11, 1891:—"Lady Florence Dixie's Jaguar. We regret that we should have inadvertently issued a portrait of Lady Dixie's Jaguar, drawn from a photographic study made by Mr. Gambier Bolton, F.Z.S., and included in his copyright collection of 'Animal Studies.' Mr. Gambier Bolton's studies are so widely known and in such general request that this acknowledgment is due to him for the use of what is, without doubt, a valuable property."

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THE "TEXTURE" OF GELATINE PLATES.

It was to have been expected that the presidential address delivered to the members of the British Association by Dr. Huggins would contain more than a mere passing allusion to photography, for Dr. Huggins is himself one of those who have, so to say, wrestled with photography in order to break it in to the service of science. Though many of his greatest achievements were performed in the wet-plate days, he was one of if not the first to turn to gelatine as offering far greater facilities than collodion at its best, and it is upwards of ten years since Dr. Huggins read a paper on *Photography of Star-spectra* at one of the meetings of the Photographic Society.

Perhaps in no branch of photography is there required such a combination of scientific knowledge, manipulative skill, and patience as in that which Dr. Huggins has made so specially his own. To very many, even amongst our readers, one of his star-spectrographs would represent little more than an insignificant bit of glass, with a curiously marked black band in the centre, and if picked up promiscuously would be instantly dropped as not worth examination. But that insignificant little piece of glass probably involved in its production, even after numerous previous failures, the concentration of his whole attention for several consecutive hours upon the work in hand, while its value to the practical astronomer has been incalculable. Dr. Huggins, too, beyond being a merely scientific worker with the camera, possesses no mean skill as an artist, and has been awarded more than one medal for his productions in the landscape class; so that he may be fairly said to be in a position to express an opinion on photographic matters, which, by the way, is more than can be said of some of his contemporaries of equal scientific eminence. Dr. Huggins has compared collodion and gelatine, and declares that the only fault of the latter is its "grained texture;" otherwise it "meets the needs of the astronomer at all points." But unfortunately it is on this one point that the needs of the astronomer differ most from those of the ordinary photographer. Both seek for the greatest sensitiveness they can get, at least for some purposes, and each equally appreciates the general convenience of the gelatine plate; but a film whose granularity would probably be looked upon as an "artistic" improvement by one class of photographers would be wholly useless to his scientific *confrère*. It is the entire absence of granularity that renders the daguerreotype plate so valuable in astronomical work, and which, despite its vastly higher cost, causes it still to be used for the best class of work. The granularity of the image, when magnified to magnification, was the great complaint against wet collodion, yet that fault, in addition to its slowness, did not prevent Warren de la Rue and Rutherford producing some of the finest work that has yet been done. In like manner, may that the increased rapidity of gelatine has opened up such entirely new fields, its equally increased—almost visible—granularity has not prevented Mr. Roberts and the Brothers Henry from achieving performances that would have been deemed impossible half a generation ago. That being the case, the question arises, "How much better might be the results if the granularity were absent?" and the further one, "Cannot sensitiveness be retained without granularity?"

In a leading article, only a fortnight back, we spoke of some old negatives of ten years ago as possessing images "clear and almost transparent, without any symptom of granularity," and went on to show that the growth of granularity accompanied the increase of sensitiveness, or, it would perhaps be more correct to put it, it came with the introduction of new processes of manufacture which give rapidity with greater ease. In the early days we speak of, the only method of emulsification in general use was that known as the "Bennett," or "prolonged emulsification" process. In this the whole quantity of gelatine to be used was just softened and dissolved, and the soluble bromide dissolved; the silver nitrate in solution was then carefully added to this strong solution (of gelatine), with the result that an extremely fine precipitation of the silver bromide took place, so fine, indeed, that, when allowed to set upon glass in this condition, the film was absolutely free from "grain" arising from the silver salt, unless a very high microscopic power were employed for its examination.

But in this state the emulsion would be extremely slow—that is, as compared with the sensitiveness ultimately attained in the subsequent treatment. This consisted in keeping the emulsion fluid for a more or less prolonged period, according to the degree of rapidity required up to six or seven days for very high sensitiveness, using only just sufficient heat to keep up the fluid state so as to do as little injury to the gelatine as possible. Now, the result of this treatment was that the colour and the transparency of the emulsion altered with the prolongation of the digestion, or "cooking," as it came to be called. At first perfectly transparent, even in a comparatively thick layer, the colour by transmitted light was a deep rich ruby orange; but in process of digestion the red tinge gradually disappears, leaving at the end a tint varying from pale orange to light yellow, greenish yellow, green, or, perhaps, in extreme cases, steel blue, according to the length of cooking. With the change of colours came an increase in the opacity of the emulsion, which gradually lost its pure transparent appearance, and appeared to possess more "body," except where the colour had gone to the green or blue stage, when the opposite was the result.

It was very seldom with the "Bennett" process that the blue stage was reached, and then it was almost invariably the result of "something having gone wrong," either the employment of too much heat or the decomposition of the gelatine by

some means or other, and in such cases the emulsion was usually defective. If an emulsion prepared in this manner be microscopically examined at intervals during the period of digestion, it will be found that the particles of silver bromide gradually increase in size, though not to a sufficient degree to cause what may be termed "granularity," except in the event of the blue colour by transmitted light being produced. In fact, the viscosity of the thick gelatine solution, when not destroyed by excessive heat, too prolonged cooking, or other causes, seems to prevent the coarse formation. Hence it is that the plates of 1878–1880 were almost invariably extremely fine in texture.

In 1879 the "boiling process" was introduced in these columns as a means of simplifying and shortening the preparation of the emulsion. In this a minute portion only of the gelatine was first employed, about two grains to each ounce of emulsion, the soluble bromide being next dissolved in this thin gelatine solution, which was kept at as high a temperature as possible. The silver nitrate was dissolved in boiling water, and forced into the hot gelatine in the form of fine sprays, the whole being violently stirred to secure rapid and thorough mixture; or, if the necessary mechanical means were not at hand for the spray method, the silver solution was added very slowly, but still with vigorous stirring, the object being to have the silver taken up by the bromide as quickly as possible, and not to be presented in a mass of concentrated solution to form a coarse deposit.

A vast amount of ingenuity was expended in the invention of apparatus for the mixing of the emulsion, for in those days almost every amateur worthy the name—as well as many professionals—made his own emulsion; and it is sadly to be feared that very many of the elaborate arrangements devised did more to defeat than to effect the object in view. Certain it is that the results, both as regards sensitiveness and physical character of film, varied so much with different individuals as to raise a doubt as to the possibility of attaining uniformity of result by this method of manufacture. That such could be obtained within narrow limits was, however, amply proved by many careful workers operating in an intelligent and systematic manner, and the process became very generally adopted.

It was at first imagined by the chief workers of the older process that the result—the inevitable result—would be coarseness of film; but such did not prove to be the case, for it was found that with care a film almost as fine, if not quite, could be made as by the "Bennett" method, so far, that is, as the precipitation of the silver bromide was concerned, for the "cooking" introduced a new set of conditions altogether. The emulsion after "sensitising," if the process had been properly conducted, consisted of a very thin solution of gelatine, too thin to "set," carrying the silver bromide in so fine a state of division as to appear almost in solution. The cooking was performed, not by prolonged digestion at a low temperature, but by actually boiling in a jacketed vessel for a short period varying with different operators from ten minutes to half an hour, when a degree of sensitiveness was obtained equalling, and later on excelling, the "Bennett" emulsion after seven days cooking.

It was, however, in the physical nature of the films rather than their sensitiveness that they differed most from the older style of plate, for, whereas formerly the "blue stage—as the transmitted blue tint of the film was called—was looked upon as a bad sign, it came to be considered that a boiled emulsion had not attained its highest degree of sensitiveness until that stage was reached. The "blue stage" of the boiled emulsion was, however, free from fog, of the "Bennett" emulsion rarely or never so. This difference could be traced to the fact that in the one case it was due solely to the rearrangement of the molecules of silver bromide produced by heat; in the latter, modification was produced and accompanied by decomposition of the gelatine.

The alteration in size of the particles of silver bromide was found to be not only more rapid, but also much greater, in the case of the boiled than of the simply digested emulsion; indeed, with many operators, the trouble was to prevent granularity. In fact, this is where the granularity of gelatine plates took its origin, though, as we shall show, the boiling process is not to be blamed for the extremely coarse and granular films that are sometimes met with under the alluring title of "extra rapid." Dr. Eder and others have investigated the question of colour as affecting granularity, and of sensitiveness as affected by both, and it has come to be accepted as an axiom that the most rapid plate must be of the green and granular character. How far this may be true of the class of films to be next described we cannot say, but we have seen films produced by the boiling process that have been as rapid as anything now on the market, and which still retained the red colour by transmitted light, and were as fine in grain as any modern plate, or finer.

The process which conduces most certainly to the production of granularity, and the one which also gives the greatest sensitiveness with least trouble, for which reason it is unfortunately very generally used, is the "ammonia process" of Monckhoven, also introduced in 1879. There are several modifications of the process too intricate to describe; but, in all, the sensitiveness is produced by the action of free ammonia without heat, or no more than is necessary to keep the emulsion fluid. Under the action of ammonia the molecular alteration of the silver bromide takes place with excessive rapidity, and is carried to a degree not attained in other processes which give equal rapidity, and, though the sensitiveness is all that can be desired, the texture of the image is eminently unsuited for such purposes as those of astronomical photography.

In another article we propose to discuss the question as to whether granularity is a necessary accompaniment of extremely rapid plates. We are of opinion that it is not, for, as we have said above, we have had ocular evidence of the fact. If a *transparent*, *rapid* plate *can* be made, why should not the makers be asked to supply it?

PRINTING ON TEXTILE FABRICS.

THERE is, perhaps, no department of photographic printing more neglected than that which requires the provision of silk, linen, calico, or similar fabrics for the support of the picture, nor possibly one which, on the whole, is so well calculated to exhibit photography in its most attractive as well as its most useful aspects. For decorative purposes alone fabric-printing opens up a wide field to amateur workers, especially ladies, who are naturally fitted to employ it to the best advantage. We shall briefly point out on the present occasion some of the methods that are easily adaptable to this class of picture. The working details differ only slightly from paper-printing.

No doubt the fact that ready-sensitised fabrics are not very well-known articles of commerce has something to do with the apathy with which fabric-printing has so far been treated; but the fault is not with the manufacturers, two, at least, of whom at this moment are ready to supply the material ready sensitised. Fabric-printing has not been written or talked about very much, while, to the best of our recollection, no pictures of the kind have ever been publicly exhibited, in recent years

at all events, so that here, in all probability, we have some explanation of the indifference and ignorance that generally prevail with regard to this process. We should be glad if we were instrumental in drawing a little attention to the subject.

As we understand that facilities for practising the primuline process, which was introduced last autumn, are shortly to be placed within common reach, we shall look for a decided fillip to fabric-printing before long on that account. This process, as many of our readers are aware, is one which gives a positive from a positive, and thus it will be necessary to make a transparency from the negative which it is desired to print. In our issue of October 17 last we gave a full description of the primuline process in the state in which it then stood. We do not know whether it has since been modified; but, for the purposes of the present article, we will give a *résumé* of the method, in order that it may be compared as regards working details with other and older processes.

Calico, or a similar fabric, is immersed in a warm solution of primuline for a few minutes, and is then passed through plain water, and partly dried by wringing. The dyed calico is next placed in a bath consisting of sodium nitrite, hydrochloric acid, and water, and is finally rinsed in water, and dried between blotting-boards. The fabric is now sensitised, and is of a reddish-brown tint. Exposure is made in the ordinary way. Those parts where the light acts are changed to a kind of yellow; but it will be evident that, as this is a positive process, the unaltered portions only are amenable to development. This operation is of the simplest nature, and a number of different solutions may be employed capable of giving a variety of coloured pictures. After development, the printed fabric is well washed, and is finally ironed out between paper or linen. The foregoing must not be accepted as working instructions, which will, doubtless, be different and more complete when the primuline process is fairly before the world, but it will, possibly, convey a sufficiently clear idea to our amateur readers who are thinking of taking up fabric-printing. We suppose that the "sensitised" fabric will be sold in standard sizes, and that the developing solutions will be of a cheap and simple description. The kind of positive picture best suited for the process is one which possesses strong contrasts of lights and shades, and no great fineness of detail, or reproductions of subjects which do not require the expression of any delicacy of gradation or half-tone.

The albumen-printing method is one which easily lends itself to fabric work. If calico or a similar fabric be chosen, it will be necessary to remove all the dressing by first boiling it in water containing a little caustic potash, drying, and ironing between linen. It is salted and albumenised with ammonium chloride, 2 grammes; water, 250 c.c.; and the white of two eggs, all beaten thoroughly well together. It is necessary to sensitise on a strong bath, say 70 grains; and the printing, toning, fixing, and washing are precisely the same as with the paper. A variety of tones can, of course, be obtained. When finally washed, and before it is quite dry, the fabric should again be ironed out. The albumen may, however, be omitted in the process, a few grains of gelatine per ounce of solution being substituted for it; the results being analogous to plain paper pictures. Messrs. Marion & Co., we believe, supply a silk specially prepared and ready sensitised, upon which pictures may be taken according to the ordinary method just referred to. As a rule, silk pictures have a richness all their own, and are characterised by a charm of softness which renders them peculiarly attractive for decorative purposes.

We may here note that in fabric-printing a preliminary boiling or washing of the calico, whenever it is employed, is an absolute necessity, whether silver, platinum, or primuline is to be used as the sensitiser. With linen it is advisable to wash with soap and water, while silk and sateen, which should not be boiled, may also receive the same treatment. Before sensitising it will generally be found advantageous to pass the iron over the fabric, duly protected by an intermediate sheet of paper or other suitable material, and the same course is desirable after the final washing of the finished print.

There are none if any of the modern processes of printing in silver which are primarily unsuitable for producing pictures on textile supports, so that the amateur, with a little leisure and skill, has still several worlds to conquer, in this branch of photography at any rate. In our article upon *Decorative Applications of Photography* of a few months, we touched upon certain of the many uses to which fabric-printing could be put without by any means exhausting them. We allow that to most amateurs want of time stands in the way of their preparing their own sensitive surfaces; but, as we have already stated, one house supplies sensitised silk for silver printing, while the Platinotype Company also coat muslin, linen, sateen, and silk with the sensitive mixture used in their hot-bath process.

A few choice examples of printing on textile fabrics on the walls of one or two of our exhibitions would, we are sure, give a lead to the method, which we have little doubt would in such a case attract many workers. There is certainly room for novelties of this kind at the present time, when the cry of sameness and monotony begins to be heard *àpropos* of the beginning of the exhibition season.

GOLD-PRINTED MOUNTS.

Photographers whose connexion with the art is comparatively recent, say, since the last ten or twelve years, may be excused for being ignorant of what may be termed the great bronze scare that occurred that length of time ago; yet it may be observed that every one ought to be acquainted with the possible dangers attending the use of the so-called "gold printing." We are led to make some remarks on this subject through being shown some mounts which the owner informed us he had been assured by the manufacturer were painted in "real gold." A very simple examination sufficed to show that the "gold printing" was neither more nor less than gold-bronze printing, which is something of an entirely different nature, and against which every one who has any concern for his reputation should be strictly on guard.

In the early days of gold-bronze printing, commonly known by the dealers as gold printing, far less care was taken than is now the case against any loose particles of the bronze powder used being left upon the mounts. There are, doubtless, almost hundreds of photographers now in business who could tell of damaged prints from the presence of these innocent-looking particles. It is desirable to point out that there are two distinct kinds of gold-looking lettering employed for photographic mounts, one innocuous, the other most injurious. The former involves the use of real gold; the latter, artificial gold powder, technically known as "bronze powder." As far as our experience goes, the former is only used when the lettering or design is impressed into the card by a hard stamp, the process being termed "gold relief printing." Gold leaf is used, and is pressed by heated metal blocks into the card. A sufficient purity may be confidently anticipated in the gold leaf, seeing

that as the only object of adding a foreign metal to it would be to cheapen the price of each sheet or "leaf," any considerable addition would defeat its own end, for then the metal could not be beaten out to nearly so thin a leaf; hence the gain in one direction would be cancelled by the loss in another, as it must be understood gold leaf is sold not by weight but at so much per thousand leaves. It, therefore, follows that when gold stamped letters are used no ill effects need be apprehended. It is, of course, possible to use "gold bronze" for stamping, but we may say that this is unusual.

Let us now examine the so-called gold printing, which is merely the employment of "gold bronze," or other powder, in lieu of the ordinary pigments of the printer's ink, black, &c. First let the ground be cleared by understanding that, in the vast majority of cases, the "gold" is not gold, it is bronze. That particles of this bronze may become detached during the various processes of packing, subsequent handling, and passing through the press or burnisher, and that some of these particles may attach themselves to the surface of the photograph itself, is absolutely certain. But the extent to which this may take place is governed very considerably by the care and skill with which the printing is carried out. If these particles do become attached, those of our readers who are unfamiliar with the fact may be assured that they will ultimately result in producing spotted prints, each minute piece of metal destroying the photograph in its immediate vicinity, and causing a white mark. It may be asked why such an effect should result? A simple reply is found in examining the formula for the manufacture of bronze. The actual mode employed by each maker is a trade secret, but there are recipes published which may be taken as sufficiently near the mark for the present purpose. The cheapest form of bronze is made according to the following instructions:—"melt together in a crucible over a clear fire equal parts of sulphur and the white oxide of tin. Keep them continually stirred with the stem of an earthenware pipe or glass rod till they assume the appearance of a yellow flaky powder." Again we find: "Take quicksilver, tin, sulphur, and sal-ammoniac equal parts. First melt the tin, then pour the quicksilver into it; afterwards grind up with the amalgam just made the sulphur and sal-ammoniac. Place the mixture in a crucible, and heat until the powder in the crucible becomes gold-coloured and until no fumes of quicksilver arise." Sometimes the well-known "Dutch metal" is ground up and made into a powder.

A glance at these typical formulæ should convince the most sceptical of the danger to the print from continued contact with them, especially when a trace of moisture is present. We know many "old hands" who would not have a gold-printed mount on the premises. Some difficulty may be experienced by those who desire to have gold printing, but executed in real gold, in ascertaining whether they possess the genuine metal. There need be no trouble in the matter. Let a photograph be pasted over the printing on the suspected mount, and then kept in a damp place for a month. If artificial gold has been employed, it will show its presence at once in the form of white letters upon the ground of photograph, the silver of the image having been completely altered. In conclusion, we cannot but advise all photographers to be most chary of using any gold letters at all that are not in relief.

THE British Association for the Advancement of Science will meet next year in Edinburgh, and the year following in Nottingham. During the Cardiff meeting nothing of a specially interesting photographic nature has been brought forward. True, as reported in our last week's issue, the President gave eloquent testimony to the services rendered by photography in recording the existence and places of stars which are invisible to the eye and in mapping out the heavens; but this has been known to our readers for a considerable period to be counted by years, although it may probably be new to the local *habitués* of the Association. In the geographic section Mr. J. Thomson emphasised the growing importance of photography in its application to science, and especially to exploration, and urged travellers in remote or unfamiliar regions to avail themselves more largely of its advantages. If explorers in new countries would photograph conspicuous features, such as hill ranges, lakes, &c., these results might greatly promote accuracy in subsequent surveys.

TIME was when the meetings of the British Association were looked forward to by photographers as the media through which the more startling novelties of the year were promulgated; but, presumably owing to the many societies and clubs now existing, the first information of discoveries and inventions is preferably made through them rather than through a body of which one of our London daily papers suggests that it has outlived its usefulness. Its scientific value is getting less and less; the special congresses are killing it; so that, unless it chooses to be a huge picnic of intelligent folk with a veneer of the "ologies," it must become a representative meeting, composed of delegates sent by the learned societies, universities, and similar bodies.

REVERTING to the subject of amateurs obtaining their material on the same terms as the professional, a printer for the trade told us that when an amateur was complaining of the prices, and was assured that they were the same as charged to the profession, he replied that he ought to have better terms than him. The reason assigned for this was that the professional disposed of his prints at a large profit, whereas he, the amateur, for the most part, gave his prints away, hence he should have them at a cheaper rate. What do our professional friends say to this?

THERE appears to be a growing tendency to employ fugitive colours nowadays for almost every purpose to which they may be applied. We have been forcibly reminded of this when noticing in a stationer's window a card bearing the inscription, "red tape," so much a piece. The tape was there, but the red had gone, and, but for the announcement, there was nothing to indicate that it had ever been anything but what it then was—a rather dirty white. Many of the coloured inks used for posters lose their brilliancy with a few hours' exposure to sunlight, and sometimes the greater part of the colour is entirely discharged in a few days. One of the principals in a large firm of poster-printers tells us that most of their customers will have nothing but the most brilliant colours, notwithstanding that they are aware of their fugitiveness. This is the case, also, with some of the photo-mechanical processes. The public demand warm tones, and they can only be supplied by the use of more or less fugitive pigments. More is the pity.

SEPIA TONES ON BROMIDE PRINTS.

IT has been stated, although I do not know upon what evidence, that bromide printing is on the decline, particularly among amateur photographers; and, if this is the case, we may reasonably assume that it is owing to the difficulty of easily substituting a warmer colour of picture for the cold greys and blacks which the process yields. By the method of uranium toning which Mr. Weir Brown recently brought before us, the power of obtaining considerable command over the colour of the picture is placed within our reach, although it involves more trouble than that gentleman seems to recognise. In the first place, it is apparently necessary to produce a deposit of a particular hue, in order that the toning solution may have a suitable colorific base to work upon, while doubts have been cast upon the resistance of the final deposit to ordinary water unless that agent be employed with unusual care, as well as upon the immediate stability of the pictures under the action of light. I have not repeated Mr. Brown's experiments, my conclusions being drawn from his own and others' experiences; but, some two or three years ago, when using an ordinary uranium intensifying solution for toning some bromide prints, I believe I noticed that the toned image appeared to be soluble

water to such an extent as to render the method very unreliable in respect of the precise effects desired.

Mr. Warnerke, some little time ago, drew attention to the fact that the tone of a developed picture in silver might be altered by converting the image into chloride, and subjecting it to re-development. A weak iron developer, or one containing hydroquinone, he said, gave red image that was amenable to ordinary gold toning. Whatever the nature of the results so obtained might be, it could not be urged that, as a working method, it was as simple as it ought to be, and hence I do not think we need be surprised that the process has failed to find much favour. By the time a bromide print is developed, chlorised, redeveloped, toned, and fixed, to say nothing of the intermediate washings, there would be an outlay of far too much trouble for all but the very few. Would it not be possible to secure, by the *first* development of the picture, an image of such a colour as would allow of gold toning? If so, the chlorising and redevelopment would appear to be really unnecessary. The idea seems to have occurred to Mr. Weir Brown in reference to uranium toning, as he lays stress on the fact that a brown picture is necessary for success.

For sepia tones I find no method easier or simpler than the following adaptation of an old intensification process. Having developed the positive with iron in the ordinary way, as well as thoroughly washed and cleared it, I flood it with a solution of bichloride of mercury, which, as is well known, bleaches it by converting it into the double chloride of mercury and silver. I do not allow the bleaching to proceed to so great an extent as is required for intensification purposes. After washing, it is fixed in the usual manner, the "blackening" of the picture proceeding, of course, simultaneously with the dissolution of the unaltered bromide. When washed and dried, I find that the characteristic black colour of the bromide prints is changed to a very agreeable sepia tone. By deferring the bleaching of the picture until after fixation and washing, and "blackening" with sulphite of sodium, or ammonia, a brown tone, often of great richness, is to be obtained; but the alternative is obviously more troublesome, and, moreover, is just as likely as not to yield a heavier black than before.

The first of the two plans referred to does not, I believe, in any way endanger the permanency of the image, the resulting compound being, I suppose, stable under all ordinary conditions. I make this slight contribution to the literature of the subject in the hope that others may be induced to repeat the experiment, for it appears to me—as, indeed, it has been my experience both in this and other methods—that the difficulty of obtaining bromide prints in warm tones is not so great as that of arriving at a method of insuring regularity of results. This, I fear, can only be achieved when it is proved practicable to develop the image to an invariable colour, so as to render the subsequent toning action almost automatic in its operation. I have always found, and I believe many others have also found, that when departing from the system of development which yields the normal greys and blacks, regularity of result, so far as the colour of the picture is concerned, is extremely difficult to get, no matter how skilfully the development may be conducted. As I suggested above, if by a given method of development—such as that by iron for ordinary black pictures—bromide prints can unfailingly be produced of a certain reddish tone, analogous in appearance to an untoned albumen print, then the chief difficulty will be overcome, and gold toning for bromide prints will be as easy as it is desirable. Writing under correction, I do not think we have yet reached this stage of knowledge, and hence I tender these small experiments and suggestions with the object of eliciting information on the point. Rapid bromide printing, both for small work and enlargements, would, I think, be more popular than it is, if a ready means of toning the pictures, according to individual tastes, was forthcoming. Both platinotype and kallitype allow of some variety of tone, while alpha paper has most unique properties in this regard. The rapid bromide process, almost alone among modern printing processes, does not permit of a variety of tone being readily obtained.

THOMAS BEDDING.

ON THE PRODUCTION OF INTRODUCTORY SLIDES FOR LECTURE SETS.

THE ease with which amateur workers can now produce entire lecture sets from negatives taken when spending a holiday has within recent years largely swelled the ranks of those who in winter time are to be found willing to lend a helping hand to very many charitable and other entertainments where the lime light forms the chief source of attraction; and, where the lecturer is able to turn out a complete set of lecture slides, doubtless a very attractive form of entertainment is the result, and one at all times appreciated by the public, for at all times the knowledge that the lecturer is showing and describing only such pictures or objects that have come under his own personal observation goes a very long way to rivet the attention of those who are witnesses of the entertainment. Much of the success attendant on such exhibitions, however, will be found to lie not only in the racy description of the various views projected on the screen, but also in the care bestowed on the judicious selection of and clever distribution of the pictures in such order as will permit of their being laid before the audience in a pleasing manner, free from too much sameness of character or subject, or, in other words, a judicious intermingling of character sketches with sea or landscape subjects, so as to unwittingly rivet the attention of the audience and free it from the tiresomeness of seeing too many subjects of a similar character projected on the screen one after another at or about the same time. Doubtless this is one of the prime essentials, and a clever lecturer knows well how to so intersperse his pictures as to at all times prevent a languid or wearisome feeling taking possession of his hearers.

But there are other minor points to be considered when a lecturer aspires to pose before the public, even when the modest but clever dodge of a collection in silver is resorted to as the open-sesame to the entertainment. I say nothing about the necessity of his transparencies being of a high order. Nowadays, alas! we see so much absolute gelatine trash thrown upon the screen, and these even so muddled up in such a mixter-maxter style of masks that hardly two are mounted in the same way, or of similar shape (an idea having got abroad that every individual picture should have a special shape and size of mask to itself). Such, in my opinion, is utter nonsense, and has arisen like many other recent fads from a sentimental idea of art which is in no wise applicable to a lecture set of slides.

Old and well-tried lantern-slide makers know better than fall into this error, and no matter what shape they adopt they take good care that all their pictures are similarly mounted, and never projected on the screen or handed to the public in such a slipshod manner.

Next in importance to such uniformity lies the attention to a few careful details, such as the use of a good lantern, provided with a rolling curtain effect, with its accompanying *introductory slide*. But how many amateur slide-makers of the present day are to be found who pride themselves on their expertness in slide-making who really know how to set about the production of an introductory slide to their lecture sets? So long as the work is confined to a mere pulling off of a transparency from a negative, they are quite in touch with the operation, and can get along right enough; but, the moment they begin to entertain the idea of the necessity of combination printing through the camera, they begin to look upon the work with a different pair of spectacles, and imagine they are face to face with a job of some considerable difficulty (and, in some respects, doubtless they are); but, once a proper knowledge of how to set about the work be grasped, much that was previously considered almost an insuperable difficulty becomes a question of much simplicity, and the making of introductory slides is found to be one of the most enjoyable of all matters photographic—enjoyable because of the very wide range of artistic taste which it offers to an imaginative mind in the way of designing a suitable combination of varied subjects when grouped together by combination printing, as well as the wide scope it gives a careful worker for clever manipulation in the production of the resulting slide.

I have no hesitation in saying that such work offers no insuperable difficulty to a smart worker, and, provided he does not fly at too high game to start with by endeavouring to embrace too much into the slide, he will, after a very few attempts, see success crown his efforts, and be able to gaze with more than an ordinary amount of pride upon his not only mechanical but artistic production.

There are, however, a few simple rules to follow, and, in the short articles which it is my privilege to submit to those desirous of undertaking such an operation, I shall endeavour to lay before them, in a purely practical manner, an easy method of making such transparencies.

First in importance comes the selection of an appropriate or suitable design, so as to lead the minds of the different people in the audience on to what is to follow. A very little consideration will be needed to see the importance of this. Let us take an imaginative case. Say an amateur makes up his mind to compile a lecture set of slides on the life and times of some of our noted poets or travellers. Here it will be at once obvious that a simple and appropriate design would be merely to embrace in the introduction a bust or other portrait of the celebrity in question, surrounded with an appropriate inscription of the subject which is to be submitted to the audience. Such does not require any high flight of imagination to design, and, as a rule, the plainer and simpler such designs are conceived the better; but at the outset it entails upon the worker the necessity of fixing upon and choosing an entire uniformity in the style of his

masks which are to follow, for nothing looks worse than an introductory slide set up in a square or cushion-shaped mount, and then all sorts and shapes of masks to follow.

If it be decided to use round masks for the entire lecture set, then let the design on the inscription portion of it be of a similar form, and once this first step is decided upon the foundation is, so to speak, laid, and all the rest will follow in order.

Where a suitable lettering or printing is to form part of the subject, a worker should never undertake the job himself, unless an expert in the way of hand-printing. A far better plan is to draw out, in a rough, sketchy form, a drawing in the shape and size of the design he wishes to photograph; let him take this rough sketch to a ticket-writer, and explain to him the particulars of what is required. Ticket-writers employ a special ticketing ink, that is very suitable for giving clear glass negatives and yielding good contrast when the photographic stage of the design be reached. Any ticket-writer will turn out a nice card of, say, twenty or thirty sorts, for a matter of ninepence or a shilling, and that in such a finished, business-like manner that no one unaccustomed to the work could for a moment hope to compete with. Let this be black lettering on a white card, and the size need not be very large, only the bolder the style of letter that is employed the better. The size of card need not be over six or eight inches, which is quite large enough to copy with the camera.

Having got the foundation, some attention must then be given to the selection of as good a portrait as it is possible to obtain of the celebrity in question, and when this is provided all is in hand for the photographic part of the job, which I hope to treat of in my next article.

T. N. Armstrong.

THE CLAIMS OF PHOTOGRAPHY TO RECOGNITION AS ART.

[A Communication to the Camera Club, and printed in their Journal.]

When, on the occasion of the Camera Club Conference of the present year, a paper was announced to be read on *Photography as a Hindrance and a Help to Art*, I confess that the subject did not strike me as one in which I felt capable of taking any particular interest. With regard to those who decline to concede to photography a place of its own amongst the fine arts, it is a matter of indifference to me whether or no they choose to consider it as an aid or a hindrance. If they look upon it as a hindrance to other artists, that is an affair which affects these only. They need not make use of it. If they grudgingly and somewhat contemptuously admit that it is an assistance, well—*merci du compliment*—I am not one of those who are content to accept photography as being the handmaid of art, a sentiment adopted, I believe, by some as a motto which fitly expresses its value and position. It is not, however, a matter of indifference to me whether or not one aspect of photography has claims to be considered in itself an art; and when, therefore, Mr. Pennell went, I think, somewhat out of his way to denounce these claims, his individual experience leading him finally to the conclusion that photography is not a fine art and never can be, I felt that, widely read as his paper was likely to be, it was incumbent upon us to endeavour to correct the misapprehensions upon which this conclusion was founded. As, also, Mr. Pennell was unfortunately unable personally to read his paper to the meeting, and to answer the arguments brought against it, I thought that a further discussion, at which he might be present, was in the highest degree desirable.

The question between us is not whether photography can claim to rank as high as any other graphic art—about this there can be no dispute, and it follows that the advantages which painting or etching possess over photography must be admitted—but it is to show in what way the results produced by photography fail as to artistic rendering of the truth of nature, and whether the fault is inherent in the men who use the implements or in the implements themselves. If the latter has to be conceded, the case on our side, of course, is hopeless.

It will be unnecessary to pursue further the question of Mr. Pennell's individual knowledge of photography, concerning which some doubts were raised at the meeting of the Cnference. He himself has, in his reply in the *Camera Club Journal*, given us to understand that he is well acquainted with the practice and theories; at the same time, when he tells us that his own practice was usually limited to the mechanical proceeding of making exposures with a hand camera, it seems to me that he has not applied himself to the study of photography from the same point of view as those who, with me, endeavour to discover capabilities of artistic expression.

It will be as well, perhaps, with regard to Mr. Pennell's lecture at the Conference, first of all to clear the ground, so that the points at issue may be properly understood. It is evident that a certain amount of misunderstanding exists on both sides, and I must confess that I have been unable quite to follow the lecturer either in his first paper or in his subsequent reply. In his answer to my criticism, Mr. Pennell tells us that he never said that a photograph would look altogether wrong if turned into a drawing. Now, his spoken and reported words were:—"This is a curious fact which I do not understand; a photograph may look quite right as a photographic print, but, if you turn it literally into a drawing, it looks altogether wrong." The difference of opinion with regard to the comparative costs of producing an etching or a photograph is, perhaps, a trifling one; but, as Mr. Pennell has again referred to it, I should like to remind him that an expensive lens is not an essential, that the only requisites for the production of a negative of the highest artistic quality are a light-tight box, with a hole in it, and a sensitive film, and that, against the cost of the after process of printing, it is reasonable to set the not inconsiderable expense attending an etching printing-press. Again, as to his assertion that, if six cameras of the same size are used by six different artists, under the same conditions, the results should be so similar that there should not be any choice between them, I admit that, as Mr. Pennell says, I completely failed to understand his meaning. I should be grateful if he would kindly help me to do so.

The extent of ground to be covered in an argument which has for its object the establishment of a claim on the part of photography to artistic recognition is so great, that the temptation to wander into side issues is almost irresistible. I shall endeavour to confine myself, therefore, to a few of the principal considerations which I venture to submit to Mr. Pennell's criticism, in the hope that they may at least achieve something towards abating in his mind, and in the minds of those who think with him, their attitude of uncompromising hostility.

If we take the paper read at the Conference, we shall find that the strictures on photography as an art were not very numerous, and they may be, I think, summarised as follows:—Firstly, photography is not a fine art, and never can be. Secondly, the photographer uses an unintelligent machine. Thirdly, the nearer a machine-made photograph seeks to approach artistically produced art, the more glaring are its defects, and the more evident its shortcomings. Fourthly, photography never does, and never can, make selection. Fifthly, photographic perspective is wrong—from the artistic standpoint. Sixthly, the painter's tools are everything to him, and the photographer tries to make a machine equal them, and does not succeed. Seventhly, photography is incapable of correctly rendering tones or values. Eighthly, it is a mechanical method, and therefore not art. Ninthly, it is incapable of individual expression, and consequently cannot produce a work of art. These are, I think, the principal heads of his accusation, and of them all the most important is the last one which I have stated, viz., that photography is incapable of individuality. It is upon the refutation of this assumption that I shall rest my case, for to my mind it is upon this point that photography as an art must stand or fall.

In the considerations which I intend to offer, I would remind my opponents that I wish my remarks to apply to what has been called the new school in photography. It is incontestable that there is such a school, even if the number who compose it is a small one, and if even they themselves would readily acknowledge that their education is not perfected, and that they look more at what it is possible to accomplish than to what has already been done. I have in one of my communications to the photographic press referred to this school as an attempt at a renaissance of photographic art, a protest against the trivialities, the narrowness of aim, the commonplace, the pandering to the taste of the public, the emphasis of detail, the evidence of mere mechanical work, the mere transcript of nature—all, in fact, which has constituted the photograph of former days. That such efforts have already produced their effect is evident, I think, from the accounts received of the Exhibition now in Vienna, where these works have been received with enthusiasm, and where a jury of artists, whose names, I think, Mr. Pennell himself will admit deserves respect, have considered them worthy of recognition as art. Be that as it may, it is to this class of photograph that I wish my remarks to apply. I will leave to others the defence of older methods, and I doubt not that they also will be capable of making a good fight.

It is said that photography is mechanical, that the camera is a machine which cannot be intelligently used, and that the results, therefore, cannot be artistic. Mechanical—to a certain extent, yes; but it is mechanism under control, and the advantage is, that Nature herself, by the agency of light, in a mechanical manner, forms the groundwork of the picture, and, if properly controlled, will effect this in such a way, with such delicate and true gradations of light and shade as would require the hand of the greatest master of the

brush to rival. It is, therefore, no slur upon photography to say that it is mechanical, so long as the mechanism can be controlled by intelligence; on the contrary, it is a glory that by its means we can convert Nature into a docile and obedient servant. The extent to which we can control her measures our claim to be considered artists. Some —and amongst these are even photographers — deny this power of control, others limit it, but the degree of limit is one which day by day appears to become less restraining. It must ever be remembered that the art is in its youthful days. It has no centuries of learning and experience to fall back upon, some mysteries remain yet to be fathomed, the implements we use are not perfected, and the education of those who are to wield them requires yet more time and practice for its development. Possibly we are making our claim to consideration too soon; that I will willingly concede, but I will plead all the more earnestly for a recognition of those qualities which hold out promise for the future.

The subject of the mechanical use of the camera and the means we have at our disposal for controlling and correcting it is one which is intimately connected with the power which we are able to use, to truly render, as far as is possible, tones or values in their proper relations; and it is in this respect, principally, that artistic perception triumphs over the use of a purely mechanical tool. If faults are made, they are due as much to want of intelligence in the worker as to the tools he uses. That judgment and discrimination to which I have alluded we assert to be at our command and within our powers. If it be not conceded, the position becomes, we must admit, untenable. I would, however, here inquire whether Mr. Pennell has completely made up his mind that under no circumstances whatever, even if some of its faults be cured, can photography ever be admitted within the pale of the fine arts. I wish to lay the greatest stress on the question which I put to him, whether, notwithstanding the *results* which may be produced, the fact that these results are to some extent mechanical is to his mind a quite sufficient ground for its exclusion. If he holds this opinion absolutely, it would, of course, be useless further to continue the argument with him; but I think that he almost conceded the point in his lecture when he said, "Results remarkably near being artistic have been obtained by a few photographers, either because they used artistic methods, thus proving that they were artists and not photographers, or by successful flukes." If this is admitted, the faults are evidently in the men and not in the system; the more artistic the worker, the more artistic will be his work, and consequently, the *power* of artistic expression being admitted, it becomes only a question of degree, dependent on the talent of the artist.

With regard to the statement that the defects of photography are the more apparent the more it seeks to approach artistically produced art, such an expression appears to me to be somewhat in the nature of a paradox, and to demand some examples by way of illustration. I, on the contrary, cannot help thinking that the more we depart from the mechanical use of photography, which gives us the photographic view of the generally accepted kind, the more do we appear capable of employing a certain amount of convention which, after all, is art; of making a representation of nature which shall not, perhaps, appear faithful to the untrained eye, but which, by the impression, suggestion, and sentiment conveyed by it, shall delight that one which is educated in the methods which photography permits us to use. I have before now attracted a certain amount of derision because I have asserted that a photographic picture is a better and more artistic production the less it bears resemblance to a photograph. Of course, such a statement must be intelligently understood; but it is true, nevertheless. The art of being artistic in photography consists, in great measure, in concealing the method by which the effect is produced. It is the old story over again—"Ars est celare artem," or, if I quote Mr. Whistler aright, a picture is finished when all trace of the method of making it has been lost. So with us, provided we have used the legitimate tools of our craft, it is a merit if the result does not show on the face of it—boldly, broadly, brazen-like asserting itself—the means employed. Let those sneer who will; it is a legitimate pleasure to hear it said that one's work in photography is not photographic.

We are told that the photographer uses an unintelligent machine. Well—the brush and the palette, are they intelligent? Of course, in both cases, the intelligence is, or should be, in the user. Again, he tries to make a machine equal the painter's tools, and does not succeed. Does not succeed? Perhaps; but the question is, will he, can he? That depends more on himself than on the machine, and this is again an argument against the stigma of mechanism. Why, may I ask *en passant*, this depreciatory expression—a machine? If we reduce the necessary implements of the photographer to their simplest expression, we have a darkened room with an aperture to admit light as required (which we call a camera), a prepared surface, and a method of treating that surface so as to develop the impression. The painter has his canvas and his pigments, which he applies by means of bristles on the end of a stick; simpler machinery perhaps, but still machinery.

With regard to perspective, the necessity for brevity compels me to limit myself to saying that I concede that artistic perspective is not always photographic perspective, at the same time that I maintain that photographic perspective (with a pin-hole, at least) is mathematically true, and that I admit it to be a drawback that we may not sometimes substitute for it apparent perspective.

I will not say that I am prepared to accept Mr. Pennell's challenge on the subject of tones and values. I will not assert that I am acquainted with any photograph in which fault cannot be found in respect of these. Neither in photography nor in painting can we reproduce the highest lights of nature as they are in reality, and in photography especially our inability to prevent the shadows from being too dark is an admitted grave restriction. But, in the same way as in painting, a compromise being accepted, it is often the fault of the artist himself, rather than of the method, if relative values are not as well expressed as they might be. We are not called upon to reject either one or the other because it is not perfect. I can call to mind more than one, in some respects highly meritorious, picture in which are false relations of tone which are due to the artist himself, which, indeed, he would be the first to acknowledge. If photographic art were purely mechanical, if the machine did everything, this would not be so; but if the worker, by his artistic perception, may so use the tools at his command, both in the process of developing and in the process of printing, as to produce greater artistic truth and character than a lesser artist could do, surely here is evidence of something more than that which is merely mechanical. It is this faculty for which we contend—which is, indeed, the very key-note of the question at issue. We cannot say, Let your artistically educated eye select the subject, the machine will do the rest; if it were so, half our position at least would have to be surrendered. The education of our artistic faculties must follow us into our developing room and into our printing room. There we must use our substitutes for brushes, colours, inks, and etching tools with judgment and discrimination equal to that exercised by the wielders of pen and pencil. It is, after all, but another, if perhaps a less noble, method of staining paper and canvas; less noble, because it demands a lesser order of talent, and because, we are willing to concede, it relies partly on mechanical assistance.

I have said that I rest my case for the power of artistic expression in photography principally upon the evidence of its capability of individuality, and it was my intention to leave this consideration to the last, because it would involve scarcely more than a summing up of my arguments. Again, it is scarcely so much a matter for argument as for the conviction which, I trust, work achieved will succeed in producing in many minds, as it has already succeeded in doing in the minds of not a few who are capable of judging. There are those, I know, who discredit this power in photography, who think themselves justified in depreciating the merits of a certain class of photographic picture in which, if it ever does so, individuality asserts itself strongly, by comparing them to third-rate sepia drawings. They are wrong, I think. It would require, not a third-rate drawing painted by a third-rate artist, but the power of a past master in the craft to produce by hand a translation from nature of such quality, with such approach at least to fidelity of tone, with such effects of light, and with such impressions of truth as a photographer of cultivated intelligence has it within his power to do. And may it not be said that it is a legitimate ambition for one who feels within him a desire to give to others his impressions of nature, but who yet acknowledges his feeble powers with the brush, may it not be said that photography is for him, if he is able forcibly to use it, a legitimate means of artistic expression? Is it not better for us, instead of flooding the world with specimens of misdirected talent, honestly to accept the assistance which photography gives us? We can, at least, by so doing, produce work which is capable of affording æsthetic pleasure—work which will attract many and satisfy even trained minds as it hangs on the walls of our galleries and exhibitions.

I must leave to others the task of replying to Mr. Pennell's charge of want of power of selection, and content myself with admitting the disability under which we suffer, at the same time that I contend that we have often means of overcoming or counteracting it; amongst others we have considerable powers of suppression.

To pass to another consideration (not to be confounded, of course, with the expression "power of selection"), I must say that I am not disinclined to minimise the importance which some attach to the faculty of selecting a subject. It is not here that the chief evidence of artistic talent is shown. Most people have an appreciation of the beautiful to a greater or less extent, but immeasurably more important are the power and manner of expressing it. We are too apt, I think,

in photography to give credit for artistic faculties to those who, by good luck, having come across a telling subject, prove to us, no doubt, their capability of appreciating such beauty or effect, but who rarely do more than utilise the mechanical method of the camera in presenting it to us. Others there are, again, who, by infinite patience and an apt grasp of opportunity, succeed in arranging a stage grouping of some well-known poetical idea; at the nick of time the models are still, the lens is uncapped, and forthwith we are asked to admire the talent of the *artist*, whose work shines henceforth bemedalled at numberless exhibitions. I cannot find fault with those who see in this little more than a faculty for arranging effective *tableaux vivants*. It is the treatment of the subject which is all-important; and here, again, comes in that question of individuality which, I contend, is open to photographers, and upon the evidence of which our works should be judged. I will not be so hardy as to find a new definition and say that art is individuality, but I will say that, where there is evidence of individuality of treatment, there is art; and, contrariwise, there is no art without this evidence.

I should very much like to have alluded to the subject of orthochromatic methods in photography, but the question is such an important one that I should detain you too long by referring to it. I wish, however, to say that, in respect to landscape photography, it is neither sufficiently appreciated, understood, nor practised.

That there is much that is mechanical achieved by photography cannot, of course, be denied, but it is not upon this that the artist prides himself. Technical skill is not the form of perfection in which the hand of the master is shown, for it may be taken for granted as a matter of course. It is the most easily acquired portion of the art, and is in no way to be identified with genius. Take the fine portrait of a gentleman in a suit of etched armour, by Burchett, which hangs on these walls. The conception, the pose of the figure, the lighting, the background, all testify to the skill of an artist, and, if the result is due to artistic feeling, I wish to know why that result may not be called art, for it is not due to a machine alone, but to a mind. True, the pattern of the armour, the flutings and the etchings, or what not, are mechanically reproduced, but these are details for which the artist asks no credit. Is it not well known that the great masters employed specialists to execute for them such marvels of mechanical workmanship as are, for instance, the lace and ruffles on some Dutch portraits?

My subject is not by any means exhausted, but it has carried me to a greater length than I at first intended, or than your patience would warrant. In his criticism of my views, I would ask Mr. Pennell to consider, not what has been wrongly done in photography, but what the best examples of good work show it to be capable of doing. Not the instances of distortion produced by lenses wrongly applied; not the telescopic definition of the lens unduly stopped down; not the mere topographical transcripts of the tourists' album of views; not the misuse of brilliant, shiny paper; not the false relations of tone due to the uncorrected mechanical effect of light—all this, in competent hands, is capable of amelioration—but I would ask him carefully to distinguish what faults may be due to the method, and what to the worker. From this point of view, as I have continually urged in all my communications on the subject, we ought to look more upon what may be attained by study and practice than upon what has hitherto been achieved. He may possibly reply that, as an artist, he can only judge by what has been done. Such a reply would be reasonable from some critics, but it is Mr. Pennell who himself tells us that he is not ignorant of photography either in practice or theory, and it is to such a one only that we may reasonably appeal.

To many of us this question is one of the highest interest and importance; we have a serious struggle to engage in, for, if the high opinion we have formed of the standard and capabilities of our art is not endorsed by those who in another and higher branch are competent judges, it would be impossible to continue the work with spirit and hopefulness. Safe in the assured position which the labour of centuries has secured to his own art, I must say that I am inclined to envy Mr. Pennell the calm serenity with which he is able to contemplate the arguments which we may put before him, and the indifference with which he may reasonably regard the opinion of this meeting, or the one which he lately addressed at the Society of Arts; yet I would ask him and others who know the powers given to us by photography to concede the possibilities of success, and to assist us by their counsel rather than to depress our efforts by hasty and wholesale depreciation. If he asks me what grounds I have for such hopes, I will answer that I ground them on the fact that men of undoubted artistic perception now endeavour to reduce the mechanism of photography to its simplest expression, to treat its mechanical triumphs as of scientific interest only, and to make individuality and character the chief aim to be attained. They know well the disabilities, and they look forward to a greater perfection of the method. The most important question at issue is, whether the faults are inherent in the system, or whether they are due to the worker—artist, if I may be allowed to call him so. If to the former the case would be hopeless, but if to the latter there is more than ground for hope, there is certainty of success; and, although we may have an uphill battle to fight, although we cannot anticipate that we shall succeed in silencing all opposition at once, yet it is our duty to make ourselves heard, to press our claims, to break down prejudice, to enlighten ignorance, and to trust with confidence that the work we produce will eventually more fully succeed in establishing the claim which I have endeavoured, however incompetently, to advocate.

A. Maskell.

PHOTOGRAPHY AND FICTION.

The Envoy's Daughter.

Some years ago there appeared a story in *All the Year Round* entitled "The Envoy's Daughter," in which some photographic manipulations are described that I was much struck with at the time, they were so foreign to any kind of photographic work I had ever seen or heard of.

It reminded me of the boy who made the fiddle, he had made it all out of his own head; and certainly the author in this case had made his photography all out of his own head, and so wonderfully made.

The relating of the following incidents are necessary to the better understanding of the photographic process afterwards described.

The Envoy, Sir A. Brook, unexpectedly returns to England, having lost some papers of importance, the recovery of which are of much moment to him.

Barrington, his secretary, suggests that a Greek who had been in their employment, and had now gone on to Constantinople, might have purloined them, and he goes on his track.

Robinson, Sir A. Brook's personal attendant and friend, was the only person who had charge of the key of the safe in which the papers were kept, and he feels that naturally there was some suspicion attached to him in the matter, and resolves to find the documents, believing at the same time that Barrington was the culprit.

When he returns to England with Sir A. Brook, unknown to any one, he disguises himself as a poor negro, the easier to prosecute his investigations.

When in this disguise, he comes upon Mrs. Barrington (young Barrington's mother) out photographing, and, knowing her to be a bit of an intriguer, resolves to accost her and offer to carry her apparatus; and, if he is successful, it might lead to his finding out something about the missing papers.

His services are accepted by the lady.

Mrs. Barrington and her follower go on to Pevensey Castle, the lady's ostensible business to photograph the ruins, her real errand to meet her son.

Robinson, on reaching the ruin, pitched the lady's camera in a good position for a picture, and then went away to inspect the ruins. Amidst the ruins he takes out a field glass to make a survey of the surrounding country, when, to his surprise, he sees Mr. Barrington approaching. He who was supposed to be in Constantinople was hurrying up the road to meet his mother.

Robinson resolved to be one at that interview.

Down from the castle wall he came, and hid himself near enough to overhear the conversation.

There was no affection shown in the greeting between mother and son; it was evidently a matter of business that had brought them to this spot.

Now comes the extraordinary photographic manipulation. Young Barrington produced from his pocket some official-looking papers, which his mother took and carefully placed in a case with some photographic plates. These were exposed to the light, and, watch in hand, she walked slowly up and down, conversing with her son. "In restoring these papers to Sir A. Brook," she said, "you will place him under an obligation, and it will be your own fault if you do not succeed in winning his daughter," &c.

"I see the whole situation, mother. As for the girl, leave her to me. But about the ready money—is that secure?"

"Perfectly." Pointing to the cases, she continued, "For these plates I am promised one thousand pounds. To-night I shall be in Paris—to-morrow I shall touch the money. The next day Europe will ring with the perfidy of the British Government. Then we share."

She then went back to the frame, took out the plates, and examined them under the hood of the camera. Then she handed back the official-looking papers to her son, who placed them in his bag, and hurried away to the station. The mother, her work completed, shut up her plates in a little mahogany case, which she placed carefully on one side. Now Robinson came into view, and Mrs. Barrington called to him, telling him that he would have to take her things to the station after partaking of some refreshment, which she gave him. A noise amongst the ruins

attracting her attention, she goes to see what it is, and for a little she is out of sight.

At that moment Robinson sprang to the mahogany case, turned out the plates, rubbed off the photographic film with a handkerchief dipped in acid, and replaced the now useless plates in their case. When Mrs. Barrington appeared he was sitting quietly eating his sandwiches.

Then Mrs. Barrington crosses the Channel before she finds out that she has been outwitted, and this photography extraordinary ends here.

The foregoing is told in dead earnest, not a bit of burlesque intended.

Would it not have been much better, under the circumstances, to find out from some photographer how the thing was likely to work out?

Even half an hour spent in reading up a "shilling instructor" would have been useful before beginning to put these despatches into the case beside the plates, where they seem to go on producing pictures like magic, and these pictures appear on plates that you can take out and examine, to see if they are right. This is done by placing them under the hood of the camera, whatever that may mean—and then how handy the negro had the handkerchief and the acid, especially the acid—and how easily the films came off!—why he just gave a little rub—oh, my!

MARK OUTE.

PHOTOGRAPHY AND THE INVISIBLE SOLAR PROMINENCES.

IN 1868 a new field of investigation was opened to astronomers by the discovery of a method of observing the solar prominences in full sunshine. Hidden by the overpowering glare of the atmosphere, the prominences had remained invisible, except when a total eclipse allowed them to be seen rising above the limb of the moon. But in the hands of Janssen and Lockyer the great dispersion of powerful spectroscopes weakened the atmospheric spectrum until the bright prominence lines could be seen upon it, and it was then only necessary to open the slit of the spectroscope, thus bringing to view the prominences themselves. Many astronomers took up the new method of research, and countless phenomena of the greatest interest and value became the objects of systematic investigation. In the course of time it naturally occurred to some that the prominences might be photographed, and several methods were devised for accomplishing this result. One of these is described by Dr. Braun in the *Berichten von dem Haynald-Observatorium in Kalocsa*, but it required apparatus of a special nature, and has never been tried in practice. Dr. Lohse, of Potsdam, devoted considerable attention to the problem, and invented a "rotating spectroscope" of such ponderous proportions that mechanical difficulties alone would easily account for its failure. In 1870 Professor Young obtained photographs of two prominences through the Hγ line and a wide slit; but the evident defects of the method were visible in the pictures thus made, and nothing more was done in this direction. Thus, for many years, nothing was learned about the prominences by the aid of photography.

This was the situation in the summer of 1889. The important advances accomplished by the use of photographic processes in other fields of astronomical research led me to the conclusion that another attempt should be made to photograph the prominences, and I accordingly devised two new methods for this purpose. In the first of these the image of the sun was to drift across the radial slit of a powerful spectroscope, the driving-clock of the telescope being slowed to produce the drift. It is evident that, if the prominence were on the limb, the length of any bright line at the focus of the spectroscope would define the height of the prominence, and as the sun drifted across the slit this line would continually change in length. If, now, the line in use were made to pass through a slit just within the focus of the observing telescope of the spectroscope (called hereafter the "second slit") so as to be in focus on the plate beyond the slit, it is easily seen that all that is required to photograph the prominence is to move the plate slowly at right angles to the second slit. Fresh portions of the plate are thus exposed to corresponding portions of the prominence, and the prominence image is built up from a succession of bright line images of the slit.

The second method proposed accomplishing a similar result in a different manner. The clock of the equatorial is so adjusted that the image of the sun is kept in a fixed position. The plate on the end of the collimator which carries the slit is then slowly moved across the sun's limb at the point where the prominence is present, and a second slit, moving at the same speed before a stationary plate, excludes the light from the spectrum on either side of the line in use, and reduces fogging to a minimum.

The investigations carried on at the Harvard Observatory in 1889 and 1890, with the apparatus as originally designed, has been already described,* and need not be referred to at length here. The eighteen-inch silvered mirror of the horizontal telescope employed was so greatly distorted by the sun's heat that as a rule no trace of the chromosphere or prominences could be seen, and, of course, photography under such conditions was out of the question. It soon became evident that an equatorial refractor of sufficient size to carry my large diffraction spectroscope was needed for the work, and instruments of the highest class became available through the kindness of Professor Holden and Professor Young, who offered the use of the thirty-six-inch Lick telescope, and the twenty-three-inch Princeton refractor. It was decided at this time, however, to complete the equipment of the Kenwood Physical Observatory by the addition of a twelve-inch equatorial refractor built especially for spectroscopic work, and this instrument was completed and ready for use early in April of the present year. An excellent object-glass of 12·2 inches aperture was furnished by Brashear in an incredibly short time, and the very satisfactory dome and mounting were made by Warner & Swasey. The telescope and spectroscope are practically united into a single instrument, and for rigidity and convenience nothing better could be desired. The prominences are shown with the greatest perfection of detail, and the principal difficulty encountered with the horizontal telescope is thus entirely eliminated.

Meanwhile the apparatus originally designed for moving the plate at the focus of the spectroscope has undergone important modifications, and great improvements have been effected. All experiments so far made have been with the first method described above. This requires a moving plate at the focus of the spectroscope, and in the first apparatus a small plate-holder was held by a spring clip in a light frame of brass tubing sliding between V-shaped guides. After many experiments the steadiest motion that could be obtained was derived by a fine wire from the clock of the horizontal telescope; but this was very unsatisfactory, and the friction of the guides of the sliding-plate-holder made it impossible to obtain a perfectly smooth and uniform motion. In August, 1890, I planned a new form of sliding-plate-holder, in which the friction was relieved by wheels running on knife edges, a simple change giving a stationary slit and moving plate, or a moving slit and a stationary plate. But this apparatus was never constructed, for a new idea occurred to me which was carried out in an apparatus made by Mr. Brashear. In the place of a sliding-plate-holder a rotating cylinder was substituted, and around this a strip of thin celluloid photographic film is wrapped, and held by a spring clip. The cylinder is held in a small brass box attached to the end of the observing telescope of the spectroscope, the axis of the cylinder passing through the top of the box, and carrying the pulley by which the cylinder is rotated. The bottom of the box is hinged, so that the cylinder can be removed in order to allow the second slit to be observed with a positive eye-piece passing through the back of the box. This slit can be opened or closed by turning a head at the side of the box, and by means of a slide passing before the slit the box can be closed and removed from the spectroscope without danger of exposing the film to the light.

A means of producing a slow and uniform motion is the other requisite of the method, and a modified form of clepsydra is attached to the observing telescope for this purpose. A well-packed piston slides in a smoothly bored and polished brass cylinder, the piston-rod passing through stuffing-boxes in each head. The cylinder is filled with a mixture of equal parts of glycerine and water, and by the motion of the piston this fluid is forced through a small brass tube connecting the two ends of the cylinder. A valve in the centre of the tube regulates the rate of flow, and this is controlled by a pointer moving over a divided arc. A ten-pound weight is attached to one end of the piston-rod by a flexible cord of braided wires, and the other end of the rod is connected with the pulley on the axis of the rotating film carrier by means of a silk cord. A small "snap-rubber" passes around the pulley in the opposite direction, and supplies the necessary tension. It has been found that below a certain speed the motion of the small clepsydra used cannot be relied upon as being entirely uniform, so that it is advantageous, in the case of a very slow drift of the sun across the slit, to attach an arm about ten inches long in place of the pulley on the axis of the film-cylinder. The thread from the end of the piston-rod is looped over a pin on the circumference of an arc at the extremity of the arm, and, as the radius of the film cylinder is only an inch, the linear velocity at the point on its surface will be only one-tenth that of the end of the arm. By means of this reduction of speed the clepsydra can run ten times as fast as when a small pulley is used, and a smooth and uniform motion is easily secured. There are some disadvantages, however, in the present form of the valve, and some changes and further improvements will be embodied in the more convenient and practical type of apparatus now being worked out.

In my previous publications on the subject of prominence photography

* *Technology Quarterly*, Vol. III., No. 4, 1890. Astronomische Nachrichten, 3006.

I have advocated the use of the C line on account of the sharp and bright images seen through it. Its position at the red end of the spectrum precludes the employment of ordinary silver bromide dry plates, and I have consequently tested a number of sensitisers for red light, but none of them have given a sufficient degree of sensitiveness. Cyanin, alizarin blue, and fresh alcoholic solutions of grass chlorophyll increase by greater or less amounts the sensitiveness of ordinary plates to red light, and are consequently very useful in some branches of spectroscopic work, but all fall short of the requirements of prominence photography. For the yellow region of the spectrum erythosin is a most valuable dye, and it is probable that prominence photographs through D_3 may be obtained by its use as a sensitiser. F has not yet been employed in this work with much success, but it is expected to prove useful. Hγ and h, though in the region where ordinary plates are most sensitive, are rarely very bright, and the nebulous character of the lines is much against them. It was through Hγ, however, that my first prominence photograph was made.

But let us consider for a moment the two lines which to my mind form the most interesting group in the solar spectrum. Situated in the extreme violet, the H and K lines are at about the limit of the ordinary vision. Each lies almost hidden at the centre of a dark nebulous shade within which are also included a number of other lines. Both H and K are due to calcium, and, though they are probably produced at all temperatures from the Bunsen flame to the hottest star (as I soon hope to show in a paper on this subject), they undergo great variations in intensity. Everything tends to show that calcium plays a most important part in all solar phenomena. It was found by Professor Young at Mount Sherman in 1872 that both H and K were always bright in the chromosphere and prominences, and the same thing is shown in a large number of photographs of the chromosphere and prominence spectrum recently made here. Professor Young also observed the reversal of both lines in spots, and in all photographs which I have made of spot spectra in this region both lines have been strongly reversed, in many cases when none of the hydrogen lines were seen bright over the spots. It is thus evident that either H or K is well suited for photographing the prominences by my method, especially as the dark shade allows the use of a wider second slit with less fogging of the plate than with any other line in the spectrum.

But most important of all are the means thus afforded of photographing prominences which cannot be seen by the spectroscopic method, and are consequently only known through photographs taken at a total eclipse. In his report of the eclipse of August 29, 1886, observed at the island of Grenada, Professor W. H. Pickering writes as follows:—"Turning now to the spectrum of the prominences, most of them showed the usual hydrogen lines accompanied by H and K. In all cases the latter were the prominent lines, the hydrogen lines F, G, and h being decidedly weaker and less conspicuous, as is the case in the spectrum of the sun. But in the largest prominence of all—one that rose apparently in a somewhat spiral form to the altitude of 150,000 miles—the only lines visible were the H and K, and a faint trace of an ultra-violet line, about halfway between K and L. These, in addition to a brilliant continuous spectrum in the visible region, comprised the whole of its light. It was therefore quite visible, before and after totality, by the usual spectroscopic method, as was, in fact, noted at the time by Professor Tacchini. It is highly probable that a great number of prominences pass by entirely unnoticed, because we rely solely upon visual instead of photographic methods of observation."*

Other observations bearing on the same point might be quoted, but the above is sufficient to show that the invisible prominences play no unimportant part among solar phenomena. Daily records are kept of the number and general forms of the spots and prominences visible on the sun, and, in discussing the relation between the two, the invisible prominences are necessarily left out of account, simply because up to the present time there has been no method by which they could be observed or photographed. It is evident, however, that my method takes no account of the visibility or invisibility of a prominence, but will photograph one as well as the other if either H or K is used. In fact, as H and K are so bright in the invisible prominences, they will be the easier photographed. The following record of results will show that we are now in possession of a method perfectly capable of recording the forms of any invisible prominences which may appear upon the sun.

Work on the prominences was commenced with the 12·2-inch equatorial on April 7, 1891, and the lines F and Hγ were employed, the dispersion being that of the second or third order of a 14,438 Rowland grating. Some time was occupied in adjustment of the apparatus and tests of the clepsydra, and the first photograph showing a prominence was made through the Hγ line of the second order on May 7, the sun being allowed to drift across a narrow tangential slit without employing the driving-clock of the equatorial. Several more photographs were taken through the same line, but, although they all showed the rough outline of the prominence, a lack of contrast made them appear very faint. It was then decided to try H and K, but a difficulty arose as to a means of bringing these faint lines on to the second slit. Induction sparks and other methods did not prove very successful, and it was finally decided to use the K line in the fourth order, find its position in the green of the third order by taking $\frac{4}{3}$ its wave-length, and then bring this point in the green on to the second slit. This method proved entirely successful, and on May 14 the first attempt to photograph a prominence with the apparatus adjusted for the K gave the best result obtained up to that time. On May 18, a number of photographs of a prominence were made through the same line, the driving-clock of the telescope being slowed, so that the sun drifted about one-eighth of an inch in five minutes across a narrow tangential slit. The prominence images in some of these photographs, though, of course, small, show strong contrast and considerable detail; yet, when compared with drawings of the same prominence made just after the exposure through the C line, the finer details of structure are missing in the photographs. If an invisible prominence had been present at this point, it would certainly have been shown, but in this case the forms through C and K were very similar. A search for invisible prominences will shortly be made, and it is even hoped that they may be photographed over sun-spots or on the disc itself, though the difficulty of such work does not justify much confidence in its success.

Kenwood Physical Observatory, Chicago. GEORGE E. HALE.
—*Sidereal Messenger.*

* *Annals of Harvard College Observatory*, Vol. XVIII., No. V., p. 99.

REPRODUCTION OF WRITING AND DESIGNS BY THE CHEMICAL METHODS.*

PELLET PROCESS.—The liquid with which the paper is sensitised is composed of—

Water	1000	grammes.
Arabic gum	250	,,
Perchloride of iron	80	,,
Tartaric acid	40	,,
Chloride of sodium	30	,,

The paper, once sensitised, is employed as follows:—

The paper, exposed to the light after having been placed in the frame, by following the prescriptions described above, is greatly modified. The salt of iron, at a maximum deposited on the sensitive paper, is reduced except in the parts corresponding to the lines forming the screen. When the reduction is complete under the whites of the drawing, the sheet is put into contact with prussiate of potash. Prussian blue is formed on the places where the salt of iron has remained in a maximum state, consequently in the parts corresponding with the strokes, writing, &c., and the draught appears. This is what constitutes the development.

To judge of the moment when the reduction is complete, a square of cloth or paper similar to that being worked, and having some lines in ink or China black, is placed by the side of the design, and on this square are placed two or three bands of sensitive paper, which play the part of tests, and of which one of the extremities overreaches the frame. One can also take tests on the sensitive sheet of paper covering the edges of the design being worked off, or, again, employ a small proof frame.

Whatever may be the mode selected to readily take a specimen after some seconds' or minutes' exposure, according to the intensity of the light, a test-paper is taken and passed through the prussiate bath. If the part under the draught becomes blue the reduction is not complete, the time of exposure is insufficient: the design is again exposed, which during the trial of the test-paper has been preserved from the light. Shortly after, and according to the intensity of light, a second test is tried, and so on until only the lines become blue, and that during thirty to forty seconds—a time equal to that which the interior development of the sheet demands.

The reduction of the salts of iron is then complete at the places corresponding to the whites of the design. If the lines appear badly and incomplete, the ground remaining yellowish, the exposure has been excessive, or the too clear lines have not presented sufficient opposition to the light. When the part of the tracing paper or cloth serving as specimen has no strokes, as is the case when sensitive paper is employed for this purpose, protected by the corners of the drawing, an exposure is made until the paper steeped in the prussiate shows no blue point after thirty or forty seconds.

The time necessary for the complete reduction of the salt of iron, unprotected by the lines, varies with the luminous intensity at the time of exposure. In general it requires:—20 to 25 seconds in the sun; 2 to 5 minutes in the shade; 2 to 15 minutes in the rain; 15 to 30 minutes in the fog.

The manipulations of the development are made in three basins.

1. A wooden or gutta-percha basin containing the solution of prussiate at twenty-five per cent. This solution can be quickly prepared in hot water.

* Concluded from page 539.

A solution saturated with this salt made cold corresponds nearly to this proportion, for that two to four kil. of prussiate are placed in a vessel with two to four litres of water from time to time it is stirred. The floating liquid is poured into the basin according to need, and replaced by other water.

(*Note.*—Only first-class prussiate is to be recommended.)

This bath does not change, and is nowise dangerous. (Prussiate of potash is an old purgative salt, which was given in a dose of thirty grammes.) From time to time by concentration the liquid fills with crystallised glittering spangles. The addition of a little water redissolves them.

2. The zinc basin for *continuous washings* with ordinary water. This zinc basin should always be kept very clean; it is washed occasionally with potash and a couch-grass brush. Generally, the zinc basin is placed between two basins of wood and gutta percha. The water runs in, at fifty centimetres above, by a tap fitted with an india-rubber tube of certain length (about forty centimetres). This arrangement permits the easy manœuvring of the sheet in the basin, and at the same time to throw a spray of water on the entire surface of the sheet.

3. Wooden cuvette and gutta percha, containing the discharge bath, formed of ordinary water mixed with about eight per cent. of chlorhydric acid of commerce, or three per cent. of sulphuric acid in volume. When this last is employed, care must be taken, that the gutta percha may not be attacked, to pour the sulphuric acid, little by little, into two or three litres of water. Then the mixture is placed in the gutta percha basin, which has already received a sufficient quantity of water. This bath should be renewed when the blue precipitate it contains becomes too abundant. Generally, a bath can be used for 150 proofs. When the pose has been found sufficient, after the trials, the sheet is drawn from the frame and passed through the developing bath (prussiate). It is then turned, to make sure that all the parts are thoroughly impregnated with prussiate, and that there is no air-bubble. To drive them away, a wide, soft brush is used, which is placed on both sides of the sheet. When the drawing comes out well, the sheet is drawn off and let drain, examining the design, and without waiting for the pricking up (formation of blue points). The sheet is placed in the zinc basin (very clean), and washed with plenty of water, to take away all excess of prussiate and stop its effect. One must also be careful to wash one's hands under the tap, so as not to introduce any trace of prussiate into the ulterior operations. The washing concluded on both side of the sheet, the latter is passed in the cleansing or bleaching bath. In this bath the lines are deepened, turning deep blue, and the ground also becomes blue. During this operation the minimum salt of iron is dissolved on contact with the diluted acid.

When this solution is complete, which takes place after an immersion of three to fifteen minutes, according to the temperature and nature of the paper, a flat brush is passed over the surface of the sheet, harder than that employed in the prussiate basin. The blue coating entirely disappears, and leaves the white ground of the paper uncovered, on which the lines remain well marked. The sheet is once more passed in the basin, where it is well washed with water, by using a hard brush to rub the blue parts which might still adhere to the paper. The water used for washing the sheet on leaving the prussiate bath should never be kept in the zinc basin.

During the cleansing in the acid bath the water must be let flow into the zinc basin to take away the traces of prussiate, which may have remained either in the corners or on the divisions. The proof, sufficiently washed, is placed on a half-round stick five to six centimetres in diameter, where it drains and dries. Blotting-paper can be used to hasten the drying. The sheet finished has a more or less blue back without any inconvenience; however, a white back can be easily obtained. For that the sensitive side only should be placed in contact with the prussiate. For this purpose, after the pose and on the frame itself, the two large edges of the sheet, the sensitive side of which is placed on the developing bath, are raised. The prussiate sheet is taken off and examined, as stated above. The washing with water is then done, taking this precaution—to prepare in the zinc basin about one to two centimetres of water, the object of which is to dilute the prussiate adhering to the paper, and thus check its effect before complete immersion of the leaf.

In spite of all the precautions taken it happens that some reproductions are stained; some by their contact with the prussiate after the acid bath, others through a tint or stain on the draught, &c. To destroy these spots they use a liquid called "blue solving," with alkaline oxalate bases, which also permits the rectifying of the sketches. To employ this liquid it is sufficient to apply it with a brush, slightly impregnated, on the parts to be obliterated, sponge with blotting-paper, and after a few moments the white ground appears. The "blue solving," like the tints, should be passed over the reproductions only when quite dry.

Blue solving can be used for writing or drawing in white on impressions with white lines on blue ground. Clear lines are obtained, and of great whiteness, which was not the case with the liquids generally used. To take off the blue adhering to the fingers a solution of potash or soda can be used, finishing by washing with water slightly acidulated with oxalic acid, citric, or tartaric to take away the oxide of iron.

The proofs obtained by this procedure are not altered by light or damp. Any tint required can be passed on these proofs. Certain strokes can also be changed. Blue solving, mixed with a red colouring substance (carmine), or blue (indigo), not attacked by the reagent, is passed over the lines to be changed. The blue solving attacks the blue, and the colouring substance remains. Finally, in certain drawing studios, for reproductions, the chief lines are not coloured. On the reproduction they can then be added directly.

A. M. Villow.

PHOTO-TYPOGRAPHY.

Photo-typography consists in reproducing photographically on zinc, copper, or steel, any pen or pencil drawing, any engraving or photographic proof, in strokes or half-tints, so as to be able to transform one of these metal plates into a typographic *cliché*; that is to say, a *cliché* where the stroke, stippling, or tints of the original are in relief, and the whites obtained.

A typographic *cliché* thus obtained reproduces faithfully the original design, and may acquire a greater artistic value than a wood engraving, if the photographic *cliché* and the original design are executed by men accustomed to such work.

The character of the original designs serving for the photo-typographic reproduction varies according to the object to be gained.

The original design, executed on specially inlaid paper, gives, from the photographic and artistic point of view, a better result than any other design made in any way, like a pen drawing—which is too harsh, on account of the hatchings—dubbed drawing, charcoal, crayon, and shading.

On drawing paper a black line is printed, which is cut at right angles by a second white line, goffered on a steel cylinder engraved with lines.

By pencilling over the black and white parts of this paper the draughtsman obtains half-tints, which he renders more or less heavy according as he lays stress upon or merely touches the part. The large blacks are done with the brush and Indian ink.

On the other hand, by passing a scraper on this paper very lightly, in order not to touch the part imprinted downwards by the goffering, the artist obtains light tints. Finally, by pressing the scraper more heavily, both parts are made to disappear, and bright whites are thus obtained.

The artist must make his design one-fourth or one-fifth larger than the required scale. In photographic reproduction it is reduced in the same proportions; in this way, the lines and details of the design having more body, the photo-typographic reproduction preserves the necessary delicacy. Besides, the latitude which is given to the artist for drawing larger than the original obtains for him greater facilities for executing the work. This design is then handed over to the photographer, who makes a negative.

A well-polished zinc plate, two and a half millimetres thick, is covered, as in collodion coating, with a very uniform coating of mineral tar, which is then let dry. Next, the negative is applied on the zinc, and the lot is put into the frame press, and exposed to the sun for one hour, or, in the absence of sunlight, diffused light, from three to six hours, according to the intensity of the light. After a sufficient exposure the plate is taken from the frame, and it is developed with essence of terebinthine.

The tarred parts corresponding with the black or opaque parts of the negative, and which, in consequence, have not been modified by the light, dissolve and disappear from the plate, whilst the tarred parts influenced by the light under the transparent lines of the negative are insoluble, and form the reproduced image of the original design.

As soon as the development has come to a point the action of the dissolvent is stopped, withdrawing the plate, and washing under a jet of water; then the plate is dried with blotting paper. The photographic work is terminated, and the metal plate remitted to the engraver.

The photographic image of the tar forming a reserve which acid cannot attack, the engraving of the plate may be commenced at once. The operations of engraving are not the same for all kinds of reproductions. A model of a close composition should be less hollowed—that is to say, engraved less deeply—than a model with well-separated or isolated lines.

The typographic roller, in passing over an engraving with full-bodied details, cannot penetrate into the close lines of this engraving, whereas, in the large whites, the gelatinous substance of the roller sinks and inks the bottom, which is reproduced on the printing paper.

After the development the plate is gummed with a solution of arabic gum dissolved in water. The gum is left for some seconds in order that it may penetrate well into the pores and render the bare parts of the zinc refractory to the lithographic ink of the roller, and which without that would get black.

The plate is inked, and with a brush the image is covered with tar, in order to consolidate the ink against the action of the acid. The plate is dipped into a basin of water mixed with some drops of azotic acid. The action of the azotic acid on the zinc produces a nitrate of zinc, which is fixed on the ground of the image.

To evolve the white of the image in proportion with the production of this oxide, it is necessary to keep the basin in motion, if not the action of the acid, instead of bearing upon the bottom, would show itself on the side of the line of the image itself, and would thus ruin this last.

The plate is withdrawn to examine the progress of the engraving, and when the whites have become hollow, so that they are easily felt by the nail, one stops, and it is washed and re-inked as before. Once inked, the plate is sprinkled with tar, and placed in the basin.

After some time of biting in, the plate is taken out, and when the hollow is considered sufficient it is washed, dried, and heated. This

heating is effected in order to make the ink run on the divisions of the image brought into relief by the biting in, and thus forms a protective slope for the following bitings.

To reach the hollow of the photographic plate, these same operations are repeated several times. The number of bitings cannot be exactly determined, for they vary according to the space of the lines and the extent of the large whites of the image.

By heating after each biting, the ink in spreading stops up the closest spaces of the image, and thus preserves them against a new attack of the acid. This is indispensable, for the hollow to obtain in these parts can be but very slight; if not, the lines of the image would be too much opened, and thus one would destroy the effect to a certain extent, which, by giving the relief and the model, gives a really artistic seal to the appearance of the engraving.

There is also another method of producing a zincograph *cliché*, copper or steel, without the aid of photography, utilisable only for equal-sized images of the original.

It is by the transfer on to one of these metals of a proof taken on India paper—that is to say, paper without size, specially manufactured, and which dealers cover with a special pulp. On this paper a proof is taken of an engraving on lithographic stone, wood, or other material; this proof is applied by the imprinted side on the metal, and a few pressures are given to the lithographic press. The ink of the India paper is thus transferred to the metal, and, just as in the image obtained by the photographic method, this thick ink forms a reserve which acid does not attack. To make an engraving the plate is treated as for photo-typography.

The engraving terminated, the metal is cut so as to leave only the parts of the zinc with the image, after which it is mounted on wood of height equal to that of the typographic character, less the thickness of the metal, and it is fastened by means of some nails. The advantages given by the procedures of chemical and of photo-chemical engraving are considerable; besides an absolute fidelity in the reproduction of the original work, they give rapidity of execution which no other method can obtain.

In addition there is a difference of sixty to seventy per cent. in price from that demanded for hand engraving.

—*Bulletin Belge.*

BRITISH ASSOCIATION.

In the geographical section, Mr. John Thomson (London) read a paper on *Photography applied to Exploration.* He said: 'My object in this paper is twofold—first, to show the growing importance of photography and its application to science; and, secondly, to urge explorers to avail themselves more fully of the advantages it affords. The camera is an instrument of the highest scientific value, portraying as it does all visible objects with mathematical accuracy, the practical outcome of which may be seen in the reproduction to scale of maps, charts, plans, &c., by a single operation in the camera. The saving of time and labour thus effected is incalculable. Photogrammetry, or survey by photography, is now in use among engineers on the Continent and in America, but up to the present time this new departure has made little headway in this country. To the pioneer whose object it is to map out a new route, picture new scenes, and provide the scientific world with perfectly accurate and trustworthy information, photography is of inestimable value. He has only to refer to the photographs he has taken *en route* to banish doubt, disarm the captious critic, and afford enduring evidence of work faithfully performed. Astronomical observations made abroad may be verified at home, and positions set down for guidance in map-making. Such observations and registering of altitudes above sea-level are matters requiring a separate scientific training, but beyond that there is much important work to be done in connexion with the topography of a region, and such work, I maintain, lies within the scope of photography. Among other services which photography may render to the explorer, that of making observations depending upon proportional measurement is not the least. The author then explained the details of a method of his own, whereby a perfectly reliable basis of measurement could be obtained. He continued:—The more general scientific use of photography may be indicated in taking evidence of the effect of erosion in drainage of mountain chains, the building up of delta by the detritus of rivers, the hydraulic force of streams in undermining and altering formations, in botany, for military purposes, and many other applications commercial and scientific. Travellers, through the mistaken notion that the art can be picked up in the course of an afternoon, too often leave the photographic part of their training to the last moment. This is a fatal error, which I have been combating for years. Personally I have studied and practised the art for over a quarter of a century, and still I have to study to keep pace with its progress. The author reverted to the subject of surveying by photography, suggesting that the surveying of the future will be performed by a captive balloon specially constructed and fitted for the purpose. This balloon may carry the camera, only to be worked from the ground by an electric current. It should be anchored by three cords from the corners of an equilateral triangular space, and its movements over the section of the space to be surveyed watched by means of an artificial horizon until the camera is over the centre of the section. The photograph should then be taken. A series of photographs, say, of a city in sections, taken from a balloon, could be joined together and photographed on one plate to form a complete map of the city. This plate, without touch of graver or pencil, could then be transferred to the printing press. [Numerous photographs taken by the author during his travels in the East were shown.]

Colonel Tanner, of the Indian Survey, said he had been advocating the adaptability of photography to such work as the survey of portions of the Himalayas, which Europeans were not allowed to visit, and which the authorities in India had to map out as accurately as might be from a distance of 100 miles. Photography, in the hands of surveyors, would greatly facilitate the mapping of the Himalayas and would very considerably shorten the work. For ten years he had been endeavouring to make a map of Nepaul, no portion of which State had he been permitted to visit. All they had to go by was a representation of the chief mountain ranges, and they did not know the gaps in the ranges through which the rivers of Nepaul flowed. Photography would also greatly facilitate the survey of the highlands, covered with ice and snow, where his assistants were employed. One of his assistants was taking observations of a range of mountains 20,400 feet high, and he had to devote the whole of his time to recording observations in his note-book. He had not a moment to spare in order to take an outline of the great masses of snow mountains around him. He trusted that Mr. Thomson's observations would reach the Government of India, and that the system he advocated would be introduced in the Indian service.

Mr. J. Coles thought that the question of the application of photography was in its infancy. He had applied photographs towards correcting the maps of the Russian Government of the region of the Caucasus. As to the application of photography to geographical discovery generally, he did not think that any one could obtain so good an idea from a word picture as from a photograph, and it was of the utmost assistance in the making of maps. Photography, in its application to the art of the cartographer, would free us from the great liability of making errors.

The President pointed out that the Jungfrau had been surveyed, and its contour outlined, by means of photography. The photographic process of survey had been tested, and had been found most efficient, particularly where the ordinary surveyor had to deal with places which were inaccessible.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

Photographic Section.

List of Awards.

First Silver Medals.—F. W. Edwards, W. W. Winter, W. J. Byrne.

Second Silver.—Syd. Sawyer, Rev. H. B. Hare.

First Bronze.—H. Tonkins, A. G. Tagleaferro, C. C. Cole, J. P. Gibson, E. Austin.

Second Bronze.—W. D. Welford, Rev. G. E. Hermon.

Photographic Appliance Section.

Award deferred until after trial.

Foreign Notes and News.

Another of the many cases, apparently more frequent in Germany than elsewhere, in which the natural inclination of humanity to indulge in being photographed is turned to account by the professional swindler, is reported in the *Vossische Zeitung.* An individual was recently prosecuted before the magistrate of the thirty-ninth division for proceeding as follows:—He commenced by ringing at the back door and interviewing the cook, whom, with other servants, he persuaded to give him orders, representing that he was travelling for a firm of photographers. He also succeeded on eight different occasions in inducing his victims to deposit from 3 to 7 M. on account. When, at the appointed time, the cooks presented themselves at the business premises indicated, they, of course, found that their deposit had been paid in vain, and that the firm knew nothing about their enterprising would-be representative.

We feel bound to agree with our contemporary, the *Photographische Nachrichten,* that there are few things—not even the much-dreaded amateur—more calculated to injure the profession than goings-on of this description,

and that the magistrates exhibited a rather ill-advised clemency in letting the swindler off with fourteen days on account of his needy circumstances.

The annual outing of the Berlin Photographic Society took place in the Steylitz Park on the 20th. The hour of meeting was 4 p.m., when, as ladies were present, there was, presumably, drinking of coffee.

A new orthochromatic collodion process has, we understand, been recently worked out by Dr. Jones, of Vienna, under the supervision of Professor Eder. It is said to be somewhat similar to the process devised by Dr. Albert, of Munich, but is a great deal simpler and more easily executed. The solutions employed for the emulsions are as follows:—

Solution I.

Ammonium bromide	64 parts.
Distilled water	89 ,,
Absolute alcohol	800 ,,
Thick collodion (four per cent.)	2500 ,,
Glacial acetic acid	55 ,,

The bromide is first dissolved in the water, which is slowly warmed, and the other constituents are then added:—

Solution II.

Crystallised silver nitrate	80 parts.
Distilled water	50 ,,

This solution is effected gradually in small portions, and, when completed, a solution of ammonia (sp. gr. 0·91), added until the brown precipitate formed is redissolved, and then 800 parts of alcohol at 45° C.

Die Photographie points out that the silver nitrate of commerce is generally adulterated with from 50 to 200 per cent. of nitrate of potash. Happily, it is not so in this country.

M. Jaffé, who has for a long time made a speciality of the photographic reproduction of illegible writing and manuscripts, describes a new method of rendering them more visible. It consists in the main of dusting them over with powdered talc, and then removing it by a brush. As the talc adheres less to the ink than the untouched paper, an intensification of the photographic impression is produced.

NATIONAL EISTEDDFOD OF WALES, SWANSEA.

Medal Awards.

The following are the awards made in the Photographic Section of the art exhibition connected with the Eisteddfod.

Class 31. Figure subject.—H. P. Robinson, *Who could have sent it?* gold medal; W. W. Winter, *My Mammy*, gold medal.

Class 32. Landscape.—J. Wickens, *Rising of the Mist*, gold medal.

Classes 33 and 34. Local Subjects.—No awards.

Class 35. Enlargement of Ship in Motion.—S. P. Chapman, silver medal.

Class 36. Waves.—W. P. Marsh, silver medal.

Our Editorial Table.

Handbuch der Photographie, von Professor Dr. H. W. Vogel.

IV. Theil: Photographische Kunstlehre oder Die Künstlerischen Grundsätze der Lichtbildnerei.

This valuable work of Dr. Vogel is devoted to what may be termed the practical art aspect of photography. Naturally the first portion of the book takes cognisance of the construction of the studio and the arrangement of the lighting so as to secure the most artistic effects. We have various examples of lighting heads and figures, and directions, with numerous drawings, showing how such lighting has been obtained. This portion alone will prove of great value to the portrait photographer, who is often troubled as to the management of his lighting.

Attention is next directed to the illumination of the sitter by the electric light, the studio devoted to its illustration being full-page size. By a natural transition this is succeeded by magnesium lighting, and a description of various flash lamps is given. The subject of perspective is one which Dr. Vogel has many years ago shown himself well competent to write upon, and he here treats this subject in a lucid manner. In his chapters on the posing of groups and single figures the learned author has numerous illustrations, which give point to his remarks. Poses of children are given in phototype by Loescher and Petsch. The canons of art as applied to landscapes and architecture are clearly enforced and illustrated by several outline drawings and charming pictures, one of them being a photogravure displaying a fine effect of atmospheric perspective.

The work has 166 illustrations in the text and three full-page illustrations. We can recommend it very highly to all photographers who desire to acquire something more than a mere mechanical knowledge of photography. It is in the German language, and is published by Robert Oppenheim, Berlin.

Die Photographische Retouche in Ihrem ganzen Umfange, von Wilh. Kopse.

Berlin: Verlag von Robert Oppenheim.

A good manual for those who desire to study perspective and anatomy, to which, with the exception of a few pages on the Eye, it is mainly devoted.

Pictorial Astronomy.

By G. F. Chambers, F.R.A.S. (London: Whittaker & Co.)

This forms one of the series in "Whittaker's Library of Popular Science." It is not quite the easy thing it seems to be for one who evidently knows all about astronomy, and who, like Mr. Chambers, makes a hobby of it, to discourse concerning the heavenly bodies in language capable of being comprehended by the non-mathematical reader. Yet our author has done this and more, for he has invested his book with such a charm that one reads it with an avidity and pleasure comparable only to that with which the idlers at the seaside devour the sensational novel of the period.

Commencing with the solar system as a whole, he then treats it *seriatim*, giving first place to the sun, in the chapter devoted to which we get a well-digested mass of information respecting sun-spots, their nature and influence so far as known. After a consideration of the inferior planets (Mercury and Venus), there comes, in due sequence, a chapter devoted to the earth and various phenomena connected therewith. Then follow the moon, the superior planets, eclipses, transits, occultations, comets, meteors, nebulæ, and all that appertains to the subject of pictorial astronomy. This is just the book from which to cull a few ideas as an accompaniment to a lantern display of celestial subjects, many of its chapters being so well adapted as popular "readings." 268 pages, 134 illustrations, price 4*s*.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,887.—"An Adjustable Vignetting Frame for use in Photographic Printing." A. K. Penn and W. W. Beasley.—*Dated August* 18, 1891.

No. 13,950.—"Improvements in Photographic Bags used for Changing Sensitised Plates." J. Sedgwick.—*Dated August* 18, 1891.

No. 13,964.—"The Opaque-negative Photo-printer." H. Foster.—*Dated August* 19, 1891.

No. 14,231.—"Improvements in and Connected with Photographic Apparatus for Surveying and Field-sketching Purposes." H. Weld-Blundell.—*Dated August* 22, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 15,495.—"Photographic Cameras." Lancaster.—Price 11*d*.

1891.

No. 7942.—"Photographic Camera." Beyer.—Price 6*d*.

PATENTS COMPLETED.

Improved Means for Changing the Sensitive Plates inside a Photographic Camera.

No. 7942. William Beyer, 5, Kelly-street, St. Pancras, Middlesex.—*August* 1, 1891.

The invention consists of a pinion which projects outside of the back of a photographic camera terminating in a milled head; the said pinion passes over

the sensitive plates to the front plate, which is held by an arm of the pinion which, on being turned a quarter turn (by the milled head) to the left, releases the plate, and at the same time lets down a second arm, which prevents the next plate from being released. Upon turning the milled head back to first position, the second plate takes the place of the first, and so on until all are used.

Improvements in Photographic Detective Cameras.

No. 15,495. William James Lancaster, Colmore-row, Birmingham.—*August* 1, 1891.

This invention relates, in the first part, to the construction of the camera box; in the second part, to the feeding of the sensitive plates to the camera; in the third part, in feeding the said sensitive plates as required from a pile; in the fourth part, to means for effecting the removal of exposed plates, so as never to have more than one plate in camera box at the same time.

The body of the camera is of the form of an elongated rectangular-shaped box, open at top and back, and with the front enclosed and fitted with an inside lens.

Exposure is cut off by a blind, diaphragm, or other device, brought or coming in front of the lens aperture.

The open top of the camera box is provided with a rectangular-shaped feed well, with a flap bottom or trap-door, upon which the sensitive plates to be fed to the interior of the camera, as hereinafter described, are placed.

The well or feed box is of the shape of the plates, whilst the hinged bottom or trap-door inclines when open upwardly from the rear, so that a plate fed to the camera slides down the said bottom into position, when the same is placed or falls to an angle of about forty-five degrees.

Jointed to the bottom of the camera box, immediately under the opening end of the flap bottom or trap-door, is a lifting arm, preferably made in the form of a frame, which, when in its upright position, comes underneath the said flap bottom or trap-door, and supports the same after the introduction of a plate into the camera, but, immediately the said arm is turned from back to front by a milled head or turn upon its axis, the same allows the said flap bottom or trap-door to descend to a limiting angle of about forty-five degrees; hence the plate slides down the same to the back of the camera, when the placing of the arm or frame again into an erect position lifts the flap bottom or trap-door and also places vertically against the end of the camera the sensitive plate thus fed.

The end of the camera is enclosed by flexible panelling, or a rolling blind working within races, and directed to close the said open back of the camera box, and run to the under side of the same.

To remove an exposed plate, run the blind horizontally under the bottom, when the space vacated by it is left open.

The back may, if necessary, be furnished with a flexible bag, to prevent ingress of light to the plate being removed.

To remove the plates one at a times from a pile, I provide the feed well, or feed box (which is enclosed as may be desired) with a cam-shaped spring catch, having a stud upon one side, against which the opening side of the flap bottom or trap-door, impinges, and takes the said spring catch out of its holding position.

Thus, the turning of the axis of the arm, and the consequent lowering of the flap bottom or trap-door of the feed well, frees the said catch, which springs outwardly, and comes under the bottom plate but one, thus suspending the pile above it, but allowing the bottom plate to slide down the incline thus formed.

The transposition of the parts again to their former positions now takes the spring catch back out of the range of the plates, whose bottom one is now allowed to rest upon the top side of the bottom or trap-door, as aforesaid.

Instead of taking the spring catch or catches out of its or their holding positions by the flap or trap-door, the same may be accomplished by the lifting arm.

Instead of supporting the pile of plates on the removal of the lower one by catches as aforesaid, I may employ a sliding false bottom to the well or plate receptacle.

Operation.

Assuming the plates to be in position within the feed receptacle, turn from left to right the lifting arm, when the flap bottom or trap-door descends to an angle upon its hinge-joint, down which a plate slides to the bottom of the back of the camera. By now reversing the motion of the lifting arm, the flap bottom or trap-door is raised and supported, and the sensitive plate elevated and held in position against the now enclosed back of the camera box. The releasing of the shutter before the lens allows the exposure aperture to be momentarily uncovered, hence an instantaneous picture.

The sensitive plates are preferably carried within light metal frames, whilst the back of the camera may be enclosed by a solid panel, instead of a flexible one.

Photographic Club.—Subject for discussion, Wednesday, September 2, *On Testing Lenses.* September 9, *Printing by Development.* Outing next Saturday, 29th inst., to Hampton Court; train from Waterloo at ten minutes past two.

Society of Amateur Photographers of New York.—An Exhibition of photographs, the work of the members of the Society, will be held at the American Institute Fair, commencing September 30, and coutinuing for eight weeks. The exhibits will be divided into five classes—Portraits, Landscapes, Marines, Instantaneous, Enlargements. Fifteen bronze medals will be awarded for first, superiority; second, excellence; third, merit. Entry blanks and full particulars will be forwarded on application to the Exhibition Committee.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 1.....	North London	Wellington Hall, Islington, N.
,, 1.....	Holmfirth	
,, 1.....	Sutton	Sutton Scientific Society's Rooms.
,, 1.....	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
,, 2.....	Coventry and Midland	The Dispensary, Coventry.
,, 2.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 3.....	Bolton Photographic Society ...	The Baths, Bridgman-street.
,, 3.....	Leeds	Leeds Mechanics' Institute.
,, 3.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 4.....	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 4.....	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

August 25.—Technical meeting.—Mr. W. E. Debenham in the chair.

Mr. Chapman Jones opened the discussion of the evening—*Photographic Printing Processes*—by saying that there were only two direct printing processes in which he took any interest—the carbon and the platinum process. Permanency, he looked upon, as of the first importance; we ought to be ready to give up a little in the matter of colour, although with carbon any colour could be used. Even if a carbon print did change in colour somewhat, it could not be said to fade. With silver printing he had never seen any prints of his own preparation to fade, unless they had been made expressly with that intention. There was, however, no guarantee that a silver print on albumen paper would be permaneut, nor was there with bromide prints, seeing that prints by that process had been found to fade.

Mr. F. Ince had found a difficulty in carbon printing arising from the tissue stickiug to the negative and tearing a piece out of it.

Mr. Chapman Jones inquired whether Mr. Ince had varnished his negatives, and, the answer being in the negative, said that the object of varnish was not to preserve the negative, except in the sense of enabling it to stand printing uninjured.

Mr. Holliday inquired whether any one could tell him if a silver print, fixed without being toned, was less permanent than when toned in the usual way. He considered the colour thus obtained to be much more beautiful and artistic than that of a print toned in the usual way.

Mr. W. England thought that permaneucy was favoured by thorough toning and thorough washing.

Mr. A. Mackie added that thorough fixing was also important. If he wished to make the probability of permauency greater in any print, he would place in two fixing solutions.

Mr. Chapman Jones believed that a print might be thoroughly washed in half an hour by first giving it several changes in water, and then placing it in a solution of iodine until it became of a bluish colour or a black, and then washing again, and drying by heat.

The Chairman said that Mr. W. K. Burton had stated that by a particular mode of toning such a heavy deposit could be produced on a silver print that if it were afterwards immersed in a solution of bichloride of mercury there would be scarcely any effect produced, whereas in an uutoned print the mercury would almost obliterate the image. A print so formed by gold deposit should be much more permanent than those generally made.

Mr. T. Samuel had prints that he had made thirty years ago, and that were not faded. He attributed this to his having exactly followed the directions in the text-books. He also had several prints made by Melhuish twenty-five years ago, and that were still perfectly fresh. These were toned by a process which Mr. Melhuish had published at the time as one giving black tones.

Mr. T. Bolas asked whether Mr. Holliday found that the colour that pleased him at one time did so at another.

Mr. Holliday replied that it did.

Mr. Bolas should have thought it would be the other way, and that the appreciation of colour was a shifting thing.

Mr. Chapman Jones said that an intense colour could be got with an inappreciable amount of silver. If that colour faded, there was nothing appreciable to work upon. He thought that a want of recognition of this fact was the cause of an error in a recent article on the subject in one of the journals.

Mr. Mackie inquired whether any one knew anything about the printing process shown by Mr. Meldola at the Society of Arts recently.

Mr. A. Glasse said that he considered that, the difference of negatives of former days being much denser than at present, a powerful print might be got which could be expected to stand better than one made from a thin negative. He also thought that the thin coating of albumen formerly used might help to account for the greater permanency of prints of a former time compared with those made upon the highly albumenised paper of the present time. A silver priut on albumenised paper was the richest in colour, and most vigorous, and the best that could be given to the public or to the art world.

Mr. England mentioned some prints made in Naples some twenty years since in which he could discover no signs of fading.

The Chairman said that Mr. Chapman Jones had said that we ought to be prepared to give up something for the sake of permanency, and therefore advocated carbon and platinum printing. In carbon printing there was some loss of gradation in the high lights, and in platinum printing there was a loss in the deep shadows. In some platinum prints, shown by Mr. Willis recently, but made long since by a process not in present use, there appeared to be better gradation in the shadows. Whether this was due to the glossy surface he was not prepared to say. Whilst recognising the advantage of permanency he also desired to have a true registration of gradation and, if both advantages could not be secured by one process, he would like to have prints by both. So far, a direct print upon albumen or similar surface seemed to render gradation more perfectly than any other process, and as to colour or condition of surface

whether glossy or matt, that, he thought, was comparatively indifferent. As to colour, however, the public had decided in favour of that of a gold-toned print as most generally agreeable. By a well-toned print he understood one in which a good deposit of gold had taken place without introducing mealiness or weakness. The statement that negatives were formerly much more intense than at present he considered to be mistaken. Probably the tendency of inexperienced workers in the collodion and pyro days was to get too great intensity, whilst with gelatine it was more common for beginners to get weak negatives. The standard of what was recognised as a good negative thirty years ago was about the same as at present. He had noticed, however, that old collodion negatives had become more intense with time. Another mistaken statement often made was, that albumen paper of twenty and thirty years ago had only a slight coat of albumen. A good time for reference would be the Exhibition of 1862. He would ask Mr. England whether the negatives made of the Exhibition were not of the same intensity of those of the present; also whether the albumen paper of that time was not prepared with nearly pure albumen, only enough water being used to dissolve the salt?

Mr. ENGLAND said that he could confirm the propositions of the Chairman as to the equal intensity of what would be considered standard negatives of thirty years ago with those of the present time. The albumen paper, too, of that period was made with as much gloss as practicable.

In reply to a question whether sulphur was contained in albumen, Mr. BOLAS said that it was a moot question. Sulphuretted hydrogen was, however, formed when a sulphate was in contact with organic matter. This happened when fresh spring water, containing sulphate, was sent to sea in casks. When opened, there was a smell of sulphuretted hydrogen, that gave the idea of there being something dangerous.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 20,—Mr. W. H. Prestwich in the chair.

Some of the results from negatives taken at the last outing of the Society were shown, and a comment elicited that in one or two instances the use of backing would have prevented the halation damaging an otherwise excellent negative.

Mr. A. L. HENDERSON showed a lens, by Suter, of the rapid aplanatic type, and of a focal length of six inches. He had, in order to avoid carrying a multiplicity of lenses when travelling, had a set of supplemental lenses, cut from concave spectacle glasses, fitted into holders resembling the ordinary Waterhouse diaphragms. By the use of one or other of these supplemental lenses, the focus of the combination was lengthened to eight or ten inches or more. The actual diaphragm was of the iris form, and was fixed immediately in front of the supplemental lens. The whole modification had been fitted to his order by Swift. He also showed a clamp for the tripod stand, formed of three T-pieces. The cross-bar of one of each was fitted into one of the legs, and the longer central arm of the T-piece was slotted. A bolt passsed through these slots, and was tightened by a nut. The use of the contrivance was, firstly, that the legs were kept firmly together, and an accidental push, though it might drive the stand along the ground, would not overthrow it. Secondly, he had found it useful when photographing in a place too dark to level the stand. He had levelled it in a place where there was light, and then tightened the screw, and carried the whole to where required, and set it down level. Thirdly, when photographing in an interior it was sometimes desirable to raise the whole stand from the ground, and three solid points of support could not always be obtained. In this case it sufficed for two of the legs to rest upon supports, whilst the rest might be supported anywhere along the inner side. The appliance was manufactured by Messrs. Mason, of Glasgow.

The subject of the proposed affiliation of photographic societies was then discussed, and ultimately, upon the motion of Mr. A. Haddon, it was unanimously decided to communicate to the Photographic Society of Great Britain the adhesion of this Association to the scheme proposed.

A short discussion then took place on the development of hand-camera exposures, by which it was understood that the negatives to be developed might be presumed to have received a minimum exposure.

NORTHERN TASMANIAN CAMERA CLUB.

AT the second annual meeting of the above Club recently held, the Secretary read his report, in which he stated that during the year the number of members had increased from twenty-eight to thirty-six. The meetings had been fairly attended, considering so many members reside in the country, those meetings especially being in favour at which lantern work or practical developing formed the principal feature. Two prize competitions have been held during the year, the first in "Indoor Portraiture," the second in "Objects in Motion." The circulating albums have been most successful, members contributing freely and regularly, and the change in the rules permitting the member obtaining the most votes to retain the album has met with universal approval. The exhibitions of lantern slides, made by members from their own negatives, have been most interesting, and were much appreciated. Recently his Excellency the Governor has kindly consented to accept the position of patron to the Club. The returns of income and expenditure were submitted in the Treasurer's statement, and although the expenses had been heavy the report was very satisfactory, as, when some outstanding subscriptions have been collected, a credit balance will remain. The journals subscribed to by the Club had been in good demand, and books, &c., were kindly donated from time to time by the President and other members.

At the conclusion of the reading of the Secretary's and Treasurer's report, office-bearers were elected for the ensuing year, with the following result:—*President:* Mr. R. L. Parker.—*Vice-Presidents:* Mr. P. C. Maxwell and Mr. A. C. Bonner.—*Committee:* Rev. A. H. Champion, Mr. R. Kermode, and Mr. F. W. Stewart.—*Secretary, Treasurer,* and *Librarian:* Mr. F. Styant Browne.

It was decided that the Club exhibit should be prepared for the forthcoming Tasmanian Exhibition, that the date of meeting in future should be the third Wednesday in the month instead of the second as heretofore, and that each member should be entitled to bring two ladies to the lantern evenings. An exhibition of members' slides closed the evening.

The Camera Club have reason to be pleased with their continued prosperity, and taking into consideration the growing taste for the artistic and fascinating pursuit of amateur photography, there is every prospect of the Club growing much larger before the next annual meeting.

Correspondence.

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

WHO FIRST SUGGESTED THE USE OF BROMINE IN PHOTOGRAPHY?

To the EDITOR.

SIR,—It appears clear, from the letter quoted, that Talbot used bromide of silver as early as March 1839, but if we may judge from the fact that Hunt, in his manual, does not refer to the subject, no practical use had been made of the discovery; and it is very remarkable that the letter quoted should have remained unnoticed until now. Hunt says that bromide of silver was used by Bayard in 1840, but in what way is not stated; also that Goddard used bromide and iodine in 1839; and it is well known that Goddard's use of the salt had a most important effect in the Daguerreotype process.

I have in my possession a memorandum in Mr. Goddard's writing, marked "copies of some of the papers placed in the hands of Mr. Malone," and on the same paper is what appears to be a copy of part of a letter to Mr. Malone, in which Goddard says: "In the month of February 1841, you did me the honour (at the request of Mr. Kiernan) of placing in the archives of the Royal Society a sealed packet containing some rough notes of experiments I had made in the improvement of the Daguerreotype process in its application to the taking of likenesses from the life. I had previously published in the *Literary Gazette*, No. 1247, Dec. 12, 1840, my discovery of the extraordinary sensitive property of the vapour of bromine in combination with iodine (I was desirous of furnishing a process that would be effective, simple, and practicable in the hands of artists); the success that attended my first experiments with bromine brought many labourers into the field, and I regret exceedingly my——" (the fragment ends here).

From this it appears that the first publication of the discovery was made in Dec. 1840, but the results must have been stated at an earlier date, which could be ascertained, if necessary, by reference to the papers at the Royal Society.

The fact that Hunt, so late as 1857, does not refer to Talbot's use of bromide of potassium, also that Talbot does not appear to have claimed priority over Goddard, leaves the matter pretty much where it was, and shows that Goddard's discovery was at least independently made.—I am, yours, &c.,

A. BROTHERS, F.R.A.S.

[In reference to the last paragraph in the interesting letter of Mr. Brothers, possibly he is not aware that at the time (1864) an effort was being made to place Goddard above want in his latter days, on the grounds *inter alia* of his being the first discoverer of the application of bromine to photography, Mr. Fox Talbot showed conclusively in THE BRITISH JOURNAL OF PHOTOGRAPHY that he (Mr. Talbot) was in reality the first who discovered this application.—ED.]

PHOTOGRAPHIC IMAGES VISIBLE AT A DISTANCE.

To the EDITOR.

SIR,—In your issue of to-day, under "Foreign Notes," you mention that M. Serrin has proposed a method of making photographic images visible at a distance, in which he proposes to rotate the plane of polarisation of light in a suitable liquid under the action of an electric current from the transmitter. I forward you a copy of the *Electrical Review*, November 7, 1890, in which there is an illustrated article by myself describing a receiver utilising the rotation of plane of polarisation by the action of electric stress on bisulphide of carbon through which a beam of polarised light is passing.

In the transmitter I describe, a fixture is made of that portion of circuit the electrical resistance of which is to vary with the degree of illumination of the several parts of the image, each part being focussed in turn on this point in the circuit by the action of what I term a regulating lens. Although selenium seems to be generally proposed in these matters, I venture to think the researches of Professors Tainter and Bell, as well as those of Mr. Preece, at the time the photophone was before the public, indicate lampblack as more suitable.—I am, yours, &c.,

August 21, 1891. HENRY SUTTON.

LEEDS PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITOR.

SIR,—You are doubtless aware that a photographic exhibition is to be held in the Municipal Art Galleries during the winter.

In addition to the medals offered by the Fine Art Gallery Committee, the Committee of the Leeds Photographic Society have decided to offer the following special medals for competition amongst its own members.

One silver medal to be awarded to the exhibit which the judges may deem most worthy of the distinction.

Six bronze medals to be awarded as follows:—1. Landscape; 2. Figure subjects, including portraits; 3. Architecture (exteriors and interiors); 4. Instantaneous; 5. Lantern slides; 6. Enlargements.

No special form of entry is required for the competition beyond advising me that you are an exhibitor, when all pictures coming within the above classification sent in to the exhibition, by members of the Leeds Photographic Society, will be deemed eligible to compete for the above awards, which will be made quite independently of, and in addition to, any honours gained in the open exhibition.—I am, yours, &c.,

S. A. WARBURTON, *Hon. Secretary.*

9 *Banstead-terrace, Leeds, August* 7, 1891.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—Kindly permit me to remind intending exhibitors that Monday, September 14, is the last day for receiving "packing cases" from the country by our agent, Mr. Bourlet, 17, Nassau-street, Middlesex Hospital, and that Wednesday, September 16, is the only day for receiving pictures and apparatus at the Gallery, 5A, Pall Mall East.

Entry forms and further information may be obtained from me.—I am, yours, &c., H. S. LAWRENCE, *Assistant Secretary.*

August 24, 1891.

Mr. Lawrence adds:—

"The Affiliation Scheme is making way, several Societies—some of the largest amongst them—have signified their wish to become affiliated."

LIMITED PHOTOGRAPHIC COMPANIES.

To the EDITOR.

SIR,—I cannot allow your comprehensive statement, anent the constitution of the Directorates of photographic companies, to pass without suggesting it might have been somewhat qualified. I can inform you that the Directorate of my Company is neither constituted of titled personages, nor army or naval officers, but of gentlemen of known business and technical capacity. I append a list of their names, "not for present publication" . . . . . than whom I would not wish a more capable body, and I can assure you that in attending our meetings they have a far greater interest than fees could engender. They are neither receiving fees, nor have they received fees in any shape or form since our formation. I am sure you will at least, in your next issue, point out that you know at any rate of one exception to what you recognise as a rule.—I am, yours, &c., J. T. SANDELL, *General Manager.*

London, August 21, 1891.

[Surely Mr. Sandell could never for a moment imagine that we class a reputable firm like that of R. W. Thomas & Co., Limited, with those companies to which we referred.—ED.]

Exchange Column.

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

One large-size academy background, on canvas, with roller, and a paper ditto; would exchange for a retouching desk.—Address, PHOTO, 107, Lake-road, Portsmouth.

Wanted, 8½×6½ wide-angle lens (rectilinear), by Dallmeyer, Ross, or Swift; exchange half-plate, square, long-focus camera, with all movements, two double backs.—Address, H. M., 26, Arlesford-road, Stockwell, S.W.

Exchange, Humber tricycle for 10×8 or 12×10 camera and slides, also three Tyler's whole-plate metal slides for vignette background or Thornton-Pickard shutter.—Address, R. H., Blyth, Ilfracombe.

Optimus euryscope, twelve-inch equivalent focus; will exchange for a cabinet portrait lens of not less than twelve-inch equivalent focus, working full aperture *f*-4.—Address, W. J. HARE, Windsor Studio, Sutton, Surrey.

MR. C. BROOKHOUSE, Pool Dole, Fenton, Staffs, has sent specimens of ceramic photographs. They are burnt-in on ordinary dishes, and, of course, are suitable for every-day use.

THE Fry Manufacturing Company have sent us their new price lists of negative plates, lantern plates, celluloid films, and enlargements. These lists, of which there are two, are comprehensive, and are admirably arranged for ready reference.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—September 3, *Darkroom Appliances.* September 5, Outing to Greenwich Hospital; conducted by Mr. A. Haddon. September 10, *Keeping Qualities of Dry Plates.* Visitors cordially invited.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "*THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:

J. T. Barker, Stourbridge.—*View of St. Kenelm's Church.*

W. H. D. Pym, Streatham.—*Three portraits of Henry Tate.*

B. ARTHUR.—Dissolve the dextrine in cold water.

QUADRAGESIMUS.—Apply to the Aluminium Company, Cannon-street, E.C.

H. W. N.—To diffuse the sunlight, stipple the glass with starch paste and whiting.

G. THOMAS.—We cannot say whether the man is in prison or not. We know nothing whatever of him.

FAL.—By dissolving a little Epsom salts in the water employed in developing, the frilling will not take place.

H. P. S.—The haloid salts of silver are the only ones yet known that will receive a latent image capable of being developed.

COLLOTYPE.—We believe those who supply the apparatus also supply directions for use. Write them on the subject. We are unable to say in what the patent consists.

AMATEUR.—There are so many excellent hand cameras and plates now procurable that we are quite at a loss in recommending any. Consult our advertisements, and use your own judgment.

W. CHAPMAN.—Your complaint is groundless. A little consideration would show that it is impossible to make a lantern slide from a 7½×5 negative that will fill a three-inch disc without cutting off part of the subject.

S. W. A. asks where he can obtain some silvered copper plates of large size like those used in the Daguerreotype process?—We fear our correspondent will have to get them made specially. Some of the older photographic warehouses might possibly have a few left in stock, but it is doubtful.

W. H. says: "My work is mainly lantern-slide making, and I wish to know which *you* consider produce the better slides, contacting printing from quarter-plate negatives or reduction from half-plate?"—It is quite a matter of choice. Equally good results can be obtained by both methods.

S. BELL says he has read that prints can be thoroughly washed in two hours, and asks if this be possible without the use of some hypo eliminator?—Yes; but the print must be carefully attended to all the time—alternate washing and draining. Even this time can be reduced by alternate soaking for a few minutes and blotting off as dry as possible.

H. A. COOMBES.—If it is your first essay with the wet collodion process that you are about to make, our advice is, purchase the collodion. Very much depends upon that. If you buy it ready for use of any of the makers of repute, you will have the satisfaction of knowing that any difficulties you may possibly encounter will not arise from that source. However, a formula for collodion is given in the ALMANAC for the current year.

R. MATHER.—1. There is not a work published on chrystoleum painting. It is the old method of colouring the pictures from the back after they have been rendered transparent with oil, wax, or paraffin. The picture is cemented on to the glass, and the paper removed with glass paper, leaving only the albumen carrying the image. It is then heated and rubbed over with paraffin wax, and the excess removed with blotting-paper. The colours are then roughly applied. No artistic knowledge or tuition is necessary. Tragacanth paste is simply a mucilage of the gum in water.

S. MOUNTAIN writes: "A friend of mine recently showed me what I consider a novelty. It was some pieces of albumenised paper that were quite white, on which, when put into hyposulphite solution, a fairly good picture was developed. The paper did not appear to be sensitive, as everything was done in open daylight. He would not tell me the process, which he claims is a new discovery of his own. Can you throw any light on the matter?"—Yes; the method is an old and well-known one. When the prints—ordinary prints—are taken out of the frames, wash out the silver and fix as usual without toning. Then immerse in a solution of bichloride of mercury until the image disappears. Wash thoroughly, and dry. The image will be reproduced by treating it with a weak solution of hyposulphite of soda.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1635. Vol. XXXVIII.—SEPTEMBER 4, 1891.

THYLATED SPIRITS: NEW REGULATIONS BY THE INLAND REVENUE.

the first of the present month some new regulations affecting preparation and sale of methylated spirits come into operan, which will have the greatest interest for those to whom employment of alcohol in photographic processes is a necesy. Among these are to be classed manufacturers of collodion, uloid, and gelatine emulsion, while, besides, there are few otographers, either professional or amateur, who do not, some time or another, make use of spirit for a variety of poses connected with the practical side of the art. The ulations are of such an important nature that we placed ourves in communication with the authorities at Somerset House, m whom we have obtained such information as is necessary let our readers know exactly how photography stands in re'd to the innovation.

The department issues an instruction that "the present cks of ordinary methylated spirits for sale by retail should be posed of before the first of January, 1892," and this appears indicate that photographers may yet secure a supply of the kind by obtaining it from wherever a stock of it was held erior to the 1st instant. That order bears date July 20, 91, and was issued to retailers many days, if not weeks, ago. e natural result must undoubtedly be that low stocks of the icle have been brought up to the maximum quantity allowed ifty gallons, we believe—so that those of our readers who ire to do so should take advantage of the obvious opportunity parently presented for obtaining a supply.

The other regulations, which are addressed to methylators, ne into force on September 1, and we cannot do better than ke a few extracts from them, so that photographers will be e to see how they will be affected by them. The first one s it down that—

> An authorised methylator must, in the presence of the proper er of Inland Revenue, mix with and dissolve in all methylated its to be supplied to a retailer of methylated spirits for sale by a quantity not less than three-eighths of one per centum by volume mineral naphtha of a specific gravity of not less than ·800. The neral naphtha must before the mixing thereof be approved by the ard."

The mineral naphtha, it will be observed from this, is in lition to the usual ten per cent. of wood naphtha, and is not, we believe it has been inferred by some, in substitution reof.

After reciting that "essential oil or other flavouring matter st not, without the express sanction of the Commissioners of Inland Revenue, be added to or mixed with methylated spirits," the order proceeds:—

> "A retailer of methylated spirits must not sell or have upon his premises for sale methylated spirits containing any essential oil or other flavouring matter, or in which mineral naphtha has not been dissolved.
>
> "In any case where methylated spirit for sale by retail is supposed from its odour to contain essential oil or other flavouring matter, or where the spirit, by remaining clear when diluted with water, shows the absence of mineral naphtha, a sample should be forwarded to the laboratory, under the usual regulations.
>
> "A person who has been authorised to receive methylated spirits for use in any art or manufacture carried on by him, whether he holds or does not hold a licence as a retailer of methylated spirits, must obtain all methylated spirits from an authorised methylator only, and in the manner directed by sub-section 4 of section of 124 of Spirits Act, 1880."

The result of the admixture of mineral naphtha with methylated spirits, as the above order draws attention to, is that when it is diluted with water it becomes turbid. Hitherto, if methylated spirit when diluted with water became turbid, it was taken as a proof that it contained a resin in solution, that, in fact, it was what is known as "finish." Methylated finish contains three ounces of one of the soluble resins to each gallon. In future, therefore, the addition of water must not be taken as evidence that the spirit contains a resin.

The new regulations have possibly been brought about by its coming to the knowledge of the Excise authorities that the spirit was being somewhat largely used as a potable one. However, the small addition of mineral naphtha may not largely affect photography, as its use is now principally confined to varnish-making, with which it will not interfere. Few people now precipitate their emulsions with spirit. If any do, the new addition will certainly not be beneficial. Neither will it be, we suppose, where it is used in the developer for the wet collodion process. As yet we have not had the opportunity of examining a commercial sample of spirit methylated under the new *régime*. It will, however, be found that, with a mixture of the ordinary spirit with a small proportion of benzol, the addition of water causes a milky appearance and a separation of the benzol, which floats on the top. We assume that the Excise authorities will insist upon the use of a much cruder article than ordinary benzol.

We understand that the Inland Revenue Department, in order not to interfere with the industrial uses of the old kind of methylated spirit, is willing to allow it to be employed as heretofore on condition that the manufacturer or user provides two

independent bonds, each equal in amount to the probable value of the quantity consumed. Thus the regulation need not, after all, cause the least alarm to those who have so far remained undisturbed by the department. But, presumably, the regulation also applies to those who only want to use a small quantity of spirit now and then, and the number of these is so great that something like a hardship will be inflicted which will undoubtedly in due course call for removal.

ENLARGEMENTS *VERSUS* DIRECT PICTURES.

At a meeting of one of the metropolitan societies, recently held, the discussion was on the above old theme. Possibly no subject has been more often discussed than this; still it comes up once more, apparently as fresh as ever, and probably will again in time to come, for it must be borne in mind that each year photography is advancing in every direction. Old methods die out as they are supplanted by others. For example, collodion transfers for cheap enlargements are now almost, if not quite, superseded by bromide paper. Moreover, new optical appliances are being continually introduced, as well as more rapid plates, that may facilitate the production of large direct pictures; therefore, old as the theme may seem, it is ever interesting.

It seems pretty generally admitted that there is a certain something in a good large direct photograph, whether landscape or portrait, which gives it a charm that does not exist in an enlargement made from a small negative by whatever method it may be made. Let us select, by way of example, a landscape taken direct on, say, a twenty by sixteen inch plate, and an enlargement to the same size of the same subject from a five by four negative, that is, an enlargement of four diameters only. Which would prove the better result, assuming, of course, the same amount of skill being displayed in each instance? There would, in the case of the direct picture, be a certain degree of crispness and gradation in the deepest shadows that would be wanting in the enlargement. Whether the lack of crispness is a disadvantage or not may be a matter of opinion with some few people just now. Of the gradation, however, there can be no question. Few landscape pictures larger than fifteen by twelve are made direct on account of the weight and bulk of the requisite apparatus, coupled with the fact that there is but little demand for pictures beyond that size.

With portraiture the conditions are different. In this case the subject comes to the apparatus, instead of the apparatus having to be taken to the subject. We have ever condemned life-size portraits taken direct in the camera. They may be sharp, crisp, and vigorous, but there must always be a certain amount of unpleasant distortion, owing to the closeness of the lens to the sitter. If, however, the portrait be taken as a three-quarter length, on a plate of the same relative proportions in comparison with the focus of the lens as in the case of, say, a cabinet picture, then we shall have a portrait that, in the opinions of most people, will be considered far better than an enlargement. But large portraits are rarely taken under these conditions, as they would, for a twenty-four-inch plate, necessitate a lens of nearly double the focal length of any portrait, or "rapid," lenses catalogued by our leading opticians. The large direct pictures by Mr. Barry, of Hull, shown at the meeting referred to, were judged to be as perfect as anything that could be desired, for they possessed that peculiar something—difficult to describe—that gives the charm to large direct pictures.

Large apparatus is, however, somewhat costly, hence m portraitists find it more convenient, not to say more e nomical—when the size exceeds twelve or fifteen inches- take small negatives and enlarge them afterwards. W life size is desired, this is, without doubt, the best procedur

There are enlargements and enlargements, as well as ferent methods of producing them. One of the quest raised at the meeting was whether bromide paper, on wh the largest proportion of enlargements are now made, gave same amount of gradation as some other processes in wh an enlarged negative was made through the medium o transparency, and then printed from in carbon, platinum silver? This is an important phase of the subject when qua of result is the chief desideratum. Each system has adv tages which the other does not possess, while, on the o hand, each has certain disadvantages the other does entail.

So far as simplicity alone is concerned, bromide paper the advantage. In all cases when the amplification is n from the original in a single operation, as with bromide p or the collodion transfer process, or when the solar camer employed, the utmost sharpness the negative is capabl yielding is secured; but to obtain the best results the nega must be specially adapted to the process. This, as all pro sional enlargers are aware, the large majority of negat they have to deal with are not so. With bromide paper a t negative, full of detail, will yield excellent results; while wh a vigorous one, with strong contrasts, there will be heavi and a lack of gradation both in the lights and in the shad It may be mentioned, however, that a skilful operator m considerably ameliorate these defects, though he is unabl overcome them entirely.

When the other system is followed the character of negative is but of minor importance, inasmuch as there wide scope for modifying the result. If the original negat for instance, is thin and feeble, an increase of contrast ca obtained in making the transparency, and also, if necessary the development of the enlarged negative. Conversely, if negative happens to be of the hard, black and white kind, t the contrasts can be softened in the production of the tr parency, and still further in making the enlarged negat Furthermore, the latter can be dodged in the printing, if fo necessary. Hence, from a very weak original a vigorous largement can be obtained, and from a hard one, even of "soot and whitewash" type, an harmonious result can secured. When the amplification is made direct from original, no such opportunity is afforded for modification. W inferior negatives, by this system of working, as we have o pointed out before, it is possible—indeed, it is done daily- produce enlargements that are far superior to the origi from which they are made.

It has been said that with the successive operations a cer amount of detail is lost. That may be the case to a trif extent; yet, as results prove, it is not noticeable. Even i were, the advantages gained with the majority of negatives more than sufficient to compensate for any slight shortcom in that direction.

THE "TEXTURE" OF GELATINE PLATES.

With so many methods, published and unpublished, in vo for the preparation of gelatine films, it does not, at first sig appear easy to suggest any means of remedying the defe complained of by Dr. Huggins in his address to the Brit

sociation; but perhaps we are not wrong in surmising that, the hunt after extreme sensitiveness, plate-makers, amateur well as professional, have got into a groove, from which, wever, it will not prove difficult to depart if the necessity is pressed upon them. It does not, for a moment, follow that e whole system of plate-making need be revolutionised; the ns now on the market answer admirably the purposes for ich they are mainly intended, and if for special objects, such that referred to by Dr. Huggins, a plate of a particular kind desirable, it should not be a difficult matter to supply the nt without interfering with the standard makes now in use. To obtain the necessary fineness of grain with a slow, or mparatively slow, plate is a matter of the greatest ease, and therefore, may be worth while to consider how far the ques-n of sensitiveness may be set on one side in the production the finer film. A merely cursory glance at Dr. Huggins's marks might lead to the impression that sensitiveness, or, at ast, *extreme* sensitiveness, is a secondary consideration in tronomical photography, since he says, speaking of the gela-ne plate, it "can be exposed again to the same object on cceeding nights, so as to make up by several instalments, as e weather may permit, the total time of exposure that may deemed necessary." But we must bear in mind that it is the use of films of the highest sensitiveness that astrono-cal photographers are indebted for the discovery of innumer-le new stars, whose feeble luminosity had hitherto failed to press either the eye or the photographic plate; and that ch objects necessitate a certain degree of initial sensibility fore their impression can be secured at all. Besides this, olonged and successive exposures necessitate a perfection in e mechanical arrangements for driving the apparatus that is yond the power of human ingenuity to secure, and it is only close and unremitting personal attention on the part of the erator that the objects can be "followed" with any accuracy ring a very long exposure. For these two reasons, if for no hers, then, sensitiveness is of the very highest importance for e work in view.

In comparing the results obtained at the present day with ose that accrued from the same method of treatment, say, a zen years ago, we must always take into consideration the eat difference there is in the gelatines employed now and en. At the period referred to, the choice was, indeed, limited, d the sample almost universally employed and recommended as "Nelson's No. 1," a beautifully pure but extremely soft nd that was certainly scarcely suited to the process of pro-nged emulsification then chiefly employed. With the harder nds that the demands of the photographer brought into the arket, it is by no means unlikely that a return to that method f working might be made with advantage, for, whatever may ave been the physical defects prevalent in the days of Bennett's rocess, coarseness of grain in the film was rarely, if ever, eard of. Sensitiveness to almost any extent was obtained, ut, unfortunately, it was apt to be accompanied by defects hich would at the present day be sufficient to condemn the ost rapid plate. The prolonged emulsification method was, deed, a struggle between sensitiveness and decomposition or g.

But it was eminently suited to the production of a fine eposit of silver bromide. The large quantity of gelatine resent at every stage, from the first mixing to the finish of the ooking, combined with the low temperature at which the ixture was kept, was all in favour of fineness of deposit, and, , from decomposition of the gelatine and the formation of products having a reducing action on the silver salts, fog supervened, still the great viscidity of the emulsion prevented, in a very large degree, the agglomeration of the particles that takes place under other circumstances. Whether modern and harder gelatines would successfully resist the decomposition resulting from long stewing or cooking is a question that wants trying, though probably better results would accrue from other modifications of procedure.

The late Colonel Stuart Wortley was one of the earliest workers who showed that similar results, as regards sensitiveness, could be got by increasing the temperature of the cooking operation, and reducing its length. It is well known that heat, even if it reaches the boiling point of water, has a less destructive action upon gelatine than a much lower temperature greatly prolonged, while heat itself is a powerful factor in the production of sensitiveness. Colonel Wortley's plan was to cook, if we remember rightly, for a quarter of an hour at a temperature of 180° Fahr., and he claimed to obtain as high a sensitiveness by that means as was produced by a week's stewing at 90° or 100°, and that combined with a finer deposit than usually resulted from boiling in the presence of only a small proportion of the gelatine.

But there is another point of considerable importance to be taken into consideration in connexion with fineness of deposit, namely, the relative proportions of the salts employed in sensitising. In mixing plain solutions of silver nitrate and of a soluble bromide, the mixture remains persistently milky so long as there is any marked excess of either salt; but when the proportions approach neutrality, that is, when neither silver nor soluble bromide is in appreciable excess, a vigorous shake, or more especially the application of heat, will cause the whole of the precipitate to separate and leave the supernatant liquid perfectly clear. In most of the "precipitation" methods of emulsification introduced in succession to Bennett's process, advantage was taken of the use of a large excess of bromide in order to prevent total precipitation of the silver bromide in a granular form. But, when the cooking process commences, the excess of bromide has a precisely opposite effect, for, as pointed out by Dr. Eder and the late Dr. Van Monckhoven, it hastens the transformation of the bromide from the fine and ruby-coloured condition by transmitted light, in which it is first found, to the green and granular stage that indicates sensitiveness. The change is proportionately rapid, of course, as the quantity of gelatine present is large or small, and boiling in the presence of a large excess of bromide and a minimum of gelatine will produce the green sensitive modification in a very few minutes.

A similar effect, though much less in degree, is arrived at in Bennett's or any other method in which a large proportion of gelatine is used, but in this case neither the green colour nor absolute granularity results. The colour of the emulsion by transmitted light passes from ruby to pale yellow, or, perhaps, after very prolonged action, to greyish, and the film loses much of its transparency, and assumes an appearance of greater opacity and "body." If we mistake not, Mr. Bennett himself was the first to make this observation, for he pointed out to us, upwards of a dozen years ago, that the nearer the actual balance of the salts was approached the thinner was the emulsion, though actually the same quantity of silver might be present. His formula, it may be remembered, contained a large excess of soluble bromide.

When the boiling process came into vogue, coarseness of deposit, of course, grew rapidly, and all the conditions *can* be

made to work in that direction, although it is by no means necessary that it should be so. For instance, the small quantity of gelatine in solution at the time of the formation of the bromide necessarily points to greater care in mixing, and here it may be said that probably the excessive care taken to secure thorough and complete incorporation of the ingredients tended rather in the direction of coarseness than in that intended. Various means were adopted of mechanically agitating the solution at the moment of mixing, the very plan adopted by chemists to secure the precipitation of the silver salt in volumetric analysis. Then, again, the large excess of soluble bromide usually employed to prevent fog during cooking exercised, as we have already shown, precisely the same effect, so that it is scarcely to be wondered at that, while there was very great diversity in the results obtained by this method, the majority were of the opaque and semigranular class. Indeed, a blue or green tinge, and a dead matt surface, with considerable opacity by transmitted light, came to be recognised as the tests of a sensitive emulsion.

It seems doubtful whether the old process of emulsification for a week will ever return to favour, or we should perhaps be more correct in saying that it is pretty certain it will not. But there is no reason why a proportionately decreased period of cooking at a moderately raised temperature, and in the presence of the full quantity of gelatine, should not be adopted in the production of fine grained plates. In fact, this method, we are aware, is actually used by many of the professional plate-makers; but, in the attempt to secure abnormal sensitiveness, elements are introduced which, while not producing visible granularity, give a "texture" to the film that becomes painfully visible upon a very moderate amplification.

There is no reason either why the boiling process should not be applied for the same purpose; in fact, in one respect, which we shall speak of presently, that method seems more than any other calculated to produce rapidity and fineness of deposit combined. If the silver nitrate and the bromide be dissolved in separate portions of the thin gelatine solution, and then mixed by gently stirring one into the other, both being at as high a temperature as can conveniently be managed, the result will be a fine ruby emulsion of the most extreme transparency; and, if the quantity of soluble bromide present during the subsequent careful cooking be not excessive, the fineness of deposit will not disappear during the operation. If, however, other means be not adopted to prevent it, there will be a slight risk of fog supervening, and to avoid this many operators add a very minute trace of mineral acid, though others object to this as causing insensitiveness. But there is another and better method which, perhaps from its simplicity, has secured little, if any, attention, namely, the use of one or other of the soluble nitrates added to the emulsion, in addition to that it already contains from the double decomposition of the silver and bromide used in sensitising. These salts, while practically inert, otherwise act as very powerful fog preventers, and a few grains added to the silver gelatine solution before mixing will keep an emulsion perfectly clear where it would otherwise fog.

There is, however, one all-powerful method of preventing the coarse formation of the silver bromide under the most severe test of cooking that has never, to our knowledge, been utilised unless it be in some of the unpublished formulæ of commercial firms. It seems likely, also, to conduce to the most extreme sensitiveness obtainable by any means whatever if only its fog-inducing tendencies could be held in check. Several years ago we experimented in this direction with partially successful result but had to abandon the work from pressure of other busines If an emulsion containing but a grain or two of gelatine to th ounce be boiled in the presence of excess of silver, it will b found almost impossible to destroy its ruby colour and the fi state of division of its bromide; but the action of the silver c the gelatine has to be reckoned with. Probably with the ai of free acid, and more particularly of a soluble nitrate, th desired end may be obtained; at any rate, we offer the su gestion for what it is worth.

We have purposely made no reference to "ammonia" pr cesses, for as far as our experience goes, though they gi almost any degree of rapidity, it is impossible to obtain wit any of those a really fine film. For the purposes of such filn as Dr. Huggins and other astronomers require, we believe or or other of the methods indicated will be used.

An evil star seems to have attended all that had anything to do wi the two Automatic Companies. First, we have the patentee an prime mover in the affair before the Bankruptcy Court. Then, th petitions for winding up both the Companies, and now the affairs the National Debenture and Assets Corporation, which floated the amongst others, are in the hands of the "Official Receiver." Of th ill-advised and unfortunate shareholders enough has already bee said.

There is every probability that during the coming winter mont the electric light will be employed photographically on a more exte sive scale than has hitherto been the case. There is scarcely a distri of London, or any of the large provincial towns, where electricity f lighting purposes may not be as readily obtained as gas. Alread many photographers, whom it would not pay to instal an engine an dynamo themselves, are, we hear, having the current laid on f studio use, so as to be to an extent independent of the weather, an also be enabled to take portraits either by day or night.

Apropos of this subject "An Operator" writes: "I hear that man of the leading photographers are about to adopt electric lighting f night portraiture—taking people on their way to balls, conversazione &c. What, then, will be the hours of operators and assistants? Surel they are long enough already, now that the negatives are often n developed until the day's sittings are over, as appears to be the ca in some of the cheap houses." There is no question that, take generally, the hours of photographic *employés* are longer than th used to be, and when electric lighting is adopted they, no doubt, w be still longer. But, where this is the case, we imagine an arrang ment will be come to by which the *employé* will receive a *qu pro quo*, as he certainly ought to do.

At a recent meeting of a metropolitan Society it was considered th the beard usually appeared much coarser in an enlargement than did in a large direct picture. The reason for this is not far to see more especially if the small negative were taken on an extra rap plate. If we consider the fineness of a hair, and how much th fineness must be rendered in a portrait of, say, a one-inch head, it w be seen that, unless the particles of silver composing the image a fine enough to form the hairs in correct proportion, it is very cle that, in an enlargement to life size, the beard will appear more li string than hair. The names of railway stations, in letters of sever feet in length, are often formed with large flint stones. But th could not be formed, with the same stones, only a few inches length. They would have to be much smaller to do that. So wi the particles of reduced silver. In a direct picture the particles ne be only sufficiently small to render the beard the same size as

Nature, and not, as in the other case, from nine to twelve times finer.

The meeting of the British Association for 1891 is now a thing of the past. It may be interesting to know that amongst the money grants for scientific purposes are two in which photography is concerned. There is a grant of fifteen pounds for photographs of meteorological phenomena, and one of twenty pounds for photographs of geological interest. The grants are not large, though they are larger than some that were made. Although no papers specially relating to photography were read, reference to its value to science in general was made in several.

In one of the papers our patent laws, as contrasted with those of America, was somewhat severely dealt with. Mr. Edmunds, in a paper entitled *The Taxation of Inventors*, pointed out, what we did some weeks back, that the American patentee gets for 7*l.* 10*s.* more than the English does for 154*l.* The former receives three years' longer protection for his money, with a certain amount of assurance that his patent is valid, as a search is made to see that the invention has not been anticipated before the patent is granted. This is not the case here. Sir F. Bramwell severely condemned the way in which the specifications are issued to the public—bad printing and bad photo-lithography. There is good ground for this, as any one may see by comparing the specifications now issued with those of a dozen years ago, notwithstanding that a higher price appears to be charged for them.

The Ordnance Survey Department was also complained of for the inaccuracy of some of the maps issued, and the time taken to complete them. It was stated that the map to the six-inch scale, the only one yet completed, took sixty years to execute. One of the gentlemen who took part in the discussion complained of the inaccuracy in the names of places. Another said there was scarcely an Ordnance map that was not imperfect before it was issued. It is difficult to conceive how this can be altogether avoided, seeing the rapid development of new neighbourhoods.

REDUCING THE WEIGHT OF AN OUTDOOR KIT.

Any plan that will reduce the weight of outdoor apparatus, without at all interfering with its stability or effectiveness, is certainly worth attention. Cameras at the present time have been reduced in both weight and bulk to such a degree, that any further reduction on the same lines is almost out of the question. That an ideal camera may be made on other and different lines is not at all impossible; at present, however, we have either roller slides for films, or double backs for plates. Now, my idea is to do away with double slides altogether, and, in place of them, substitute light-tight carriers, each containing a plate made of thin metal, so that the whole bulk would not be more than two or three times that of the plate itself, and a bag containing a dozen would take up no more space than two or three ordinary double dark slides—one dark slide, or a modification of the camera itself, being all that is necessary.

The method of doing so I would propose is this: Each plate should be contained in a separate holder, made of thin metal, with a shutter covered with black velvet, so that each plate could be handled in full daylight without danger, the shutter of this case being provided with catches that, when placed in the dark slide or back of camera prepared for it, would engage with other catches on the shutter of the dark slide, and be drawn up with it and returned to its place in the same manner. The back could then be opened, the plate removed, and another put in its place. The velvet lining of the shutter, brushing gently against the plate, would free it from any accidental dust, as well as keep it safe from adventitious light. The only necessary alteration to the single dark slide would be to enlarge the opening of the shutter, to permit of both shutters being drawn out, as the back of the dark slide would really have nothing to do in keeping out light, but merely act as pressure to keep the carrier in its place. Each side might be provided with a short curtain, folding up fan-wise, and thus do away with the trouble of a focussing cloth, these curtains shutting up inside when the back was closed. As far as I can see, the mechanical difficulties are scarcely worth mentioning, and the convenience, as well as saving of bulk and weight, enormous.

Since writing this, I have constructed a model on this plan, which works quite as effectually as I expected it would do.

Edward Dunmore.

AMERICAN NOTES AND NEWS.

It seems to be admitted on all hands that the American Convention, just terminated, has not been a success. This is to be regretted, because of the long distances having to be travelled by most of its members to attend its meetings. In this "tight little island" of ours, photographers are apt to look glum at the bare idea of having to travel twenty, forty, or sixty miles to attend one of our Conventions—we mean photographers having only a modicum of enthusiasm, for there are some to whom four hundred miles have not proved a preventive—but in America our brethren make light of such distances, and we have known them travel more than a thousand miles on a similar errand, hence the great importance of providing such technical treats as will warrant this expenditure of time and money. Can it be that those who have not attended the Buffalo meeting have trusted to the photographic press to supply them with reliable information of what transpired and the publication of the papers read? Anyhow, it is, we think, a wise conclusion at which they arrived at the last meeting, that two years instead of a year shall be allowed to elapse before the next Convention, which is to be held in Chicago in 1893.

The *Beacon* informs us that, although great things were expected at Buffalo, the expectation was not realised, only one hundred members having been present the first day (the American Convention lasts only three days), sixty-nine only being the additional number at the important business of electing officers for the next year. Who knows but that the transatlantic conventionalists may take a "tip" in the reconstruction and management of their great meeting from that on our side, which is, in a sense, an outcome of the American one?

In the course of a paper read at the American Photographic Conference, Mr. C. R. Pancoast, when contrasting the old wet collodion days—when "the meetings of societies were full of interest, since the membership was composed of persevering and enthusiastic workers, who, by recounting the results of their experiments and exhibiting samples of their work, made the meetings instructive as well as interesting, since each spoke from his own practical experience"—with the present times, he says: "Too many take up photography, not from a love of the art *per se*, but simply because it is a fashionable fad, a matter to be treated lightly, a mere amusement to while away an idle hour, and not, as it should be, a study of one of the most beautiful arts known to mankind." Of course, he speaks of things as they exist in America. It is to be hoped that Mr. Pancoast does not read the transactions of many of our younger societies in this country, else will his field of observation be broadened to an unpleasant extent, forcing him to conclude that the antitheses to the society meetings of the former times prevails elsewhere than in the United States.

One of the papers presented at the Buffalo Convention was by a writer who had dropped into poetry for the occasion, taking Longfellow's *Hiawatha* for his model. It occupies many columns in some of our contemporaries. In order that our readers may to some extent participate in the pleasure doubtless experienced by those present, we submit a brief extract. The effusion bore the elegant, if unintelligible title, "Shucks."

"As has been remarked already,
We have pulled on up the pathway
Of improvement quite a little,
And have really got some standing.
We hold National Conventions,
And the press associations
Herald all our mighty doings
Through the cities of the country,
Even to remotest hamlets;
And reporters catch our button
To 'detain us just a moment,'
As they do important persons;

And we press cigars upon them,
And intoxicating liquor,
So their vision may be clearer
When they comment on our speeches—
Just the same as do the members
In the lower house of Congress."

We are slightly at a loss to understand the following, which appears in an excellent report on the Progress of Photography, presented by Dr. Elliott to the Convention:—

"In the matter of lenses, by far the most important step has been taken by Carl Zeiss in the adaptation of the Jena glass to photographic lenses, and the construction of a lens in which the chemical and visual rays come to one and the same focus. Yet another improvement is the use of lenses so corrected that they may be used at very short focus and wide angle without the distortion hitherto encountered in lenses of this character. There is no doubt that this Jena glass, which has done such wonders in the field of microscopy, is destined to teach us some new things in the world of photography."

Why we are at a loss is to be found in the fact that all photographic lenses of any pretension whatever have for many years had their chemical and visual foci coincident, and that this, therefore, was not left for Zeiss to achieve. Furthermore, all rectilinear lenses, both of long and short foci, were really rectilinear *many* years before Zeiss's name was known in photography.

Passing by a bookstall one day, we saw and secured a number of the *Century Magazine* of a not long previous issue. It contained an article by E. L. Wilson, of New York, descriptive of his tour (of a few years since) in Syria. The numerous illustrations were wood-engravings from photographs by the author. These gave rise to several reflections which we shall summarise. Does not a well-executed engraving on wood, after all, form a better pictorial illustration than a phototype? Phototypes, heliogravures, process blocks, *et hoc genus omne* are, we all know, invaluable as means of showing the whole thing, and nothing but the thing, contained in the negative, including stains, spots, dark corners and all. The skilful engraver, while adhering strictly to his principal theme, and reproducing *it* with an accuracy that is marvellous—for we have been beside, and have watched with interest, the operations of one of the most skilled New York magazine engravers—does not perpetuate the small excrescences and defects which may sometimes be found on even the most valuable negatives. In this respect a wood-engraving, conscientiously prepared and well printed, may be made to take a far higher rank than a photograph printed in facsimile. Another reflection arising from the perusal of the magazine named is this—Is it not a pity that illustrations of foreign scenes, in in which all are interested, should be allowed only to repose in the pages of serials necessarily devoted to many other topics not of the same paramount interest, instead of being, as they might be, removed from them when the immediate interest had subsided, and embodied in a volume in which nothing else should find place? The Orient teems with scenes of intense attractiveness, but few photographers can afford the time and means of visiting it; and some books on the East, in our possession, are illustrated by hand drawings, the accuracy of which are sadly open to dispute, judging from photographs of certain scenes we have since examined. Hence the value of reproductions from photographs.

THE BRUSSELS CONGRESS.

We learn that the International Congress of Photography, held in the Belgian capital last week, passed off with great success. The meetings were held in the Hôtel de Ville, a building of magnificent exterior and proportions, and were prefaced on the first day by a dinner to the delegates, given by M. Hector Colard, editor of the *Bulletin*. Throughout the week a number of successful excursions were made, including visits to Antwerp, where the party indulged in a pleasant trip on the Scheldt, the ruins of Villers-la-Ville, and other places. A most successful group of the members was taken by M. Alexander.

Captain Abney and Mr. Warnerke represented the Photographic Society of Great Britain, Sir H. Trueman Wood, who was nominated, being unable to attend owing to his absence in Chicago. The activity of the Congress may be judged from the fact that, besides the numerous non-official hospitalities of which the members were the recipients, two business meetings were held each day respectively from nine till eleven, and from two to five. At the meeting on August 24, Messrs. H. Colard, Janssen, Liesegang, Pricam, and Warnerke were appointed a Committee to consider the suggested international federation of photographic societies. Facilities for the examination of sensitive plates by the various custom-house authorities were discussed. *Inter alia*, it appeared that, although such facilities abound in France, they are not much availed of. In refererence to the suggested official recognition of photographs as works of art, the Congress expressed the hope that photographic works should be placed under the same laws governing other works of art. After a long discussion, the resolution that "the photographer is proprietor of the negative, but must not make use of it without the assent of the sitter," was passed, thus confirming a similar resolution passed by the Paris assembly in 1889.

At the meeting held on the 25th, the following diameters of lenses were, after considerable discussion, adopted, the dimensions being expressed in millimetres:—20, 25, 30, 40, 50, 60, 70, 80, 100, 125. This series supplies a few intermediary sizes upon that drawn up by the Paris Congress. On the 26th the Congress dealt largely with matters affecting the characteristics of lenses, and decided to adopt the definition and method of measurement as to ascertaining the principal focal length arrived at in 1889. As to the other questions relating to largest working apertures, field of view, area of illumination, &c., these were remitted to a large Committee for consideration. The names of these gentlemen are Commandant Moëssard, De la Baume Pluvinel, General Sebert, A. Bugnet; Fabre and Janssen (France); Kowalski (Russia); Abney and Warnerke (Great Britain); Stanicovitch (Servia). As to the unit of light and the unit of sensitiveness, the 1889 proposals were confirmed; but the Congress, after having unanimously voted that there was need of a means of ascertaining relative sensitiveness, decided that no definite agreement could then be arrived at, and nominated a Commission to take the matter in hand and make the necessary experiments, and Captain Abney was chosen a member of it. As opticians were asking for special sizes for the fronts of stereoscopic cameras, the Congress decided that there was no addition to make to the normal series adopted in 1889, but that it was sufficient to point out that the No. 4 might carry two lenses, mounted at distances between 65 and 90 millimetres, if an ordinary camera were used for obtaining stereoscopic pictures, and recommended the employment of two No. 1 fronts, each carrying a lens, if a stereoscopic camera be used. The sizes of stereoscopic pictures adapted were 66 mm., 4 mm. clear between the images. The maximum thickness of plates, of which the length is under 18 centimetres, was fixed at 2 mm.; 3 mm. for those of which the length is above 18 centimetres and below 36; and, finally, 4 mm. for plates of larger sizes.

Perhaps one of the most important actions of the Congress was the constitution at the meeting on the 28th of a Universal Photographic Union. Seventeen members of the Congress are founders, each subscribing three hundred francs, and agreeing to an annual subscription of twenty francs. A provisional Committee was formed—M. Maes, of Antwerp, being chosen President; MM. Goderus (Ghent) and Pector (Paris), Secretaries; and MM. Colard (Brussels), Janssen (Paris), Pricam (Geneva), Liesegang (Düsseldorf), and Warnerke (London), members. The Union will meet next year at Brussels, and will be a permanent body, and among other things will charge itself with the organization of succeeding Congresses. That of next year will take place in Switzerland.

At the final meeting the dimensions of plates and the expression of weights and measures were considered. In these respects some slight alterations were made on the 1889 resolutions, on the lines laid down in the recent report of the Great Britain Society's Standard Committee.

Socially speaking, we understand the Congress was an unqualified success. The publication of Messrs. Abney and Warnerke's report, which will undoubtedly be highly interesting, if we may judge from the few details gleaned, which we have given above, must determine, or at any rate indicate, the practical benefits to photography that are likely to ensue from it.

THE CLAIMS OF PHOTOGRAPHY TO RECOGNITION AS ART.

[A Communication to the Camera Club, and printed in their Journal.]

PHOTOGRAPHY is not a fine art, and never can be; *vide* Mr. Pennell. Therefore, every photograph should be alike. Are they? Are Davison's photographs like Maskell's, or Emerson's like Gale's? Is not there individuality in each of these men's work? I grant that, to one not accustomed to the higher forms of photography, it is hard to tell what is the difference between them. But every sheep has its own face; and, to those who can see with knowledge, every photograph by a master of his camera has individuality, and, therefore, art; and the very fact of there being individuality proves that photography is not a mechanical science. Therefore, I do not look upon the camera as a machine, but as a tool which, in the hands of one of an artistic mind, combined with knowledge, will, and does, give artistic results. Surely every one knows that the lens will see what it is made to see, *i.e.*, the point of the picture, and will blur what is only accessory. True, it will not leave our objects, as an artist can, who either will not, or cannot, draw them. Neither will it look round corners, or combine two or three views into one, but will only give the view or subject before it; and it is for the photographer to so choose his view, or arrange his subject, that it shall be both true and yet artistic, which Mr. Pennell seems to imply do not go together. That there is truth in photography every one will admit who has been at a lantern evening at the Camera Club.

Truth to nature is what all great artists of all times have aimed at, and, though their work is so different, yet all have the true ring of nature in them. Who, looking at a Velasquez, does not see that it is the presentment of life. Do not Titian's figures seem to breathe? and, looking at modern art, is not the whole aim of it to be like nature? So should the art of the photographer be. The art of representing nature as she is, is art. *We* do not wish to leave out. Leaving out is not art; any one can do that. And leaving out is not truth to nature, neither is seeing three views at once. Nature arranges her effects far finer than human mind can ever do, and it is art to be able to understand them and interpret them for others to see and understand. And what matter how it is done—whether by photography or paint? If nature is there, and rendered true, the result is true art. Of course, Mr. Pennell's lecture and letter are only his own opinion on the subject, and there are at least two sides to every question, if not more. To me it seems that photography deserves to be considered a fine art, for it possesses the two qualifications which constitute art—it shows individuality, and it is under the control of the mind. But to compare it with painting, where a man paints what he chooses, and how he chooses, is absurd. Photography is well able to stand by itself; it owes nothing to any other art, but is entirely dependent, as they are, on nature, and it is folly to say that, because photography will not do what painting can, it is, therefore, not art. To put the matter plainly, it matters not whether you use a brush or camera; both are under control of the mind, and both are, therefore, to be considered the work of the man. If the work is bad, who is to blame—the camera, the brush, or the man?

With regard to detail in photographs compared with paintings, it must be remembered that colour is a great suggestor of detail, and, if the picture were rendered into black and white, there would be no more detail in one than the other, and possibly the photograph might have more than the painting; but detail beyond a certain point is not true art, for nature so blends her tones and detail together, that unless you look very close you cannot see everything; and if it is so in nature it is false to reproduce in art what you cannot see at *once* in nature.

Instantaneous effects, like Mr. Muybridge's horses, are not art, they are curious, but are simply chance shots at nature as she is never seen. I remember being at his first lecture before the Royal Academy at Burlington House, where, before he showed us the horses in movement, he analysed each action as taken by him. Each figure was laughable until the machine was set going, and then they went along true, but no one could see the actions that had been shown before.

There is a great future before photography, but photographers must learn to use their lens more for expressing their idea of nature. When they know the capabilities of the lens (and there is more in the lens than focus), they will find they are able to obtain on the plate an effect that will give both feeling and truth, instead of the hard all-over-sharpness that has brought the art of photography into disgrace with all true lovers of nature. A good photograph will always have a value, and photography will eventually be considered an art by the multitude, even as it is now considered so by us.

A. BURCHETT.

PHOTOGRAPHY AND FICTION.

"LAND AT LAST"—"MOONDYNE."

IN the course of a life some trifling incident, seemingly of no account at the moment, proves of such power that it changes the whole current of action, and thus the most unexpected results have been ofttimes produced from the most insignificant of causes. In Edmund Yates' novel, *Land at Last*, such an incident occurs, where a lady, scanning a photographic album in quite a disinterested cursory way, comes upon a photograph in its pages, the finding of which turns the whole current of her life.

The girl had been found lying in the street, dying from want and exposure, by a young artist who was passing that way. He proved a good Samaritan, and saw that she was attended to till she recovered. He falls in love with her, and wants to marry her. For all his goodness to her, he presses it so, she is not averse to become his wife; but she cautions him not to do this thing in haste—that she had not led a pure life, that she had loved before, and he might regret the step. No, he would not look into the past, he only wished to make her happy now; and so they were married.

Margaret, in her married life, strives to do her best; but she still keeps thinking, thinking all the time of that first lover, who holds her heart, and, no matter how hard she tries, her life proves a round of dull monotony of duty, without a spark of love. She becomes very ill, and Ludlow, her husband, lovingly tends her. Ludlow is looked upon in art circles as a rising man. When Margaret is convalescent he takes her out one day for a drive, and, having to call on Lord Caterham, a patron of his, on business, he takes his wife along with him.

"You will excuse me bringing my wife with me me," he said to his Lordship. "She has been laid up—it's her first day out, and, as you wanted to see me, I thought that I would bring her along with me."

His Lordship received Mrs. Ludlow very kindly, and, during the time that he and her husband were doing business, he gave her a photographic album to amuse herself with. She turned over the leaves of the album without interest, scarcely looking at them, till in a moment her eyes became fixed. Her face was deadly, her lips trembled, and with difficulty she gasped, "Who is this?"

"That?" said Lord Caterham, bending over the book; "oh, that is the portrait of my brother, Lionel Brakespere. He——" But Caterham stopped short in his explanation, for Mrs. Ludlow had swooned.

It was the face of her lover, who was known to her as Brookfield.

Every one thought that the faint was produced by over-fatigue so soon after her recent illness; but that was not so. She had made a discovery, and it came upon her so suddenly that she had lost consciousness. In a moment she had found the home, the parentage, and the people of her first lover, and here—a thing she had never dreamed of before. Under an assumed name he had wooed her, and his real position he had never told her. She had really tried to shut out the past; she had tried to perform the duties of a wife to Ludlow, for he had been so good to her.

This latter incident of the photograph upset the resolutions of all her married life, she fled her home. She traces her former lover. In the midst of this tumult of madness and passion, he spurns her from him; she wonders forth broken-hearted and dies.

J. B. O'RELLEY'S "MOONDYNE."

IN police records photography holds a prominent position, and, according to the number of times a man is convicted, so does this form of witness accumulate against him. J. B. O'Relley, in his story entitled *Moondyne*, uses the photograph in tracing an escaped convict after many years, but whose heroic conduct saves him, when the blow is about to fall through the tell-tale picture.

A Mr. Wyville from Australia came to England on a visit, and, being a great authority on the penal system and convict management, the Government officials at home greeted him with pleasure, as they desired the value of his experience and advice on many things in connexion with our home prisons. In his condemnation of many of what he considered weak points in our prison work and arrangements, Mr. Wyville was unfortunate enough to engender the hatred of the Governor and the chaplain of one of the prisons whose special system he had condemned. Though high in power, a mystery hung about Mr. Wyville's life. To find out what that might be, and if possible to have his enemy in his power, that Haggett, the chaplain, resolves to go to Australia to find out all about Mr. Wyville's previous career, and, when there, he seemed to have met with some success, for on his return his bearing was that of a man who could crush his enemy if he chose, but it did not go further than offensive manners then.

Wyville arranges to go out to Australia again as Comptroller-General in a convict ship. Haggett was on the same ship as spiritual teacher and adviser and Wyville's avowed enemy, but in mid-ocean things changed.

Two convicts set the vessel on fire. In the universal panic and consternation the daring of Wyville in commanding order, in suppressing the fire, and saving the ship, so appealed to Haggett's better nature that hate was turned to admiration, and he craved forgiveness from Wyville for all the wrong he had done him, even in his thoughts.

That night, when Mr. Wyville entered his cabin, his eyes fell upon a letter fixed endwise on his table to attract his attention. It was addressed to him. He opened it and took out a photograph.

The portrait of a convict in chains. There was no other enclosure.

On the back was written—"This is the only photograph of the man known as Moondyne. It was taken in Western Australia just before his latest escape from Fremantle Prison. All other photographs of this prisoner have unaccountably disappeared from the prison books."

Mr. Wyville gazed a long time at the strange present. Then he laid it on the table, locked his door, and walked meditatively to and fro in his narrow room. At times he would stop and take the picture from the table, look at it with deep attention, while his lips moved as if he were addressing it.

At last he took the portrait, tore it to pieces, and, opening the window of his room, threw the pieces into the sea. MARK OUTE.

ON THE ACTION OF 66° SULPHURIC ACID ON HYDROQUINONE AND THE VALUE OF THE RESULTING SULPHO-ACID AS A DEVELOPER FOR GELATINO-BROMIDE PLATES.

[Communicated to the American Chemical Society.]

SINCE the introduction of the dry plate in photography many substances have been proposed as developers, but the only practical survivors of the substances thus proposed are pyrogallic acid, ferrous oxalate, hydroquinone, and, more recently, eikonogen, or the sodium salt of amido-β-naphthol-mono-sulpho-acid. Having at one time had occasion to employ hydroquinone as a developer, I was struck with the beautiful qualities of the plates developed by its means; but, although hydroquinone is *per se* a most excellent developer, it has, nevertheless, several drawbacks, among which are its limited solubility in water; and it was this very question of solubility which started me upon the present investigation. It seemed that, if hydroquinone could be converted into a mono-sulpho-acid, its solubility would be very materially increased, and, if this could be accomplished without in any way affecting its reducing qualities for the haloid salts of silver, a very material improvement would be obtained.

Finding only very meagre information in the literature upon this subject, the following experiments were made :—

EXPERIMENT 1.

Twenty grammes of 66° sulphuric acid were mixed with ten grammes of hydroquinone, and then heated under constant stirring upon the steam bath, until the hydroquinone was all dissolved. The stirring was kept up for a few minutes longer, when suddenly the whole contents of the beaker solidified to a cake of small straw-coloured needles.

The cake was broken up and dissolved in cold water, in which it is very soluble, then converted into its lime salt by neutralising the acid solution with calcium carbonate. The precipitate of calcium sulphate was filtered off, and the filtrate of the lime salt placed upon the steam bath for concentration. After a short exposure to the air the solution began to darken, showing that oxidation was taking place. Concentration by this means had therefore to be abandoned. The solution was then placed under the air-pump over sulphuric acid, hoping that by this means it might be concentrated without spoiling; but even in this case oxidation kept slowly taking place. It was therefore decided to treat the mixture with an excess of sodium sulphite, and then concentrate *in vacuo* over sulphuric acid. On adding the sodium sulphite, calcium sulphate was precipitated, carrying considerable of the colouring matter with it. The precipitate was filtered off, and the filtrate containing the sulpho-acid of hydroquinone was placed under the bell-jar of the air-pump over sulphuric acid to concentrate, but owing to an accident the contents of the beaker were spilled, and therefore the experiment had to be repeated.

EXPERIMENT 2.

Ten grammes of hydroquinone were treated as before, with twenty grammes 66° sulphuric acid. After the reaction the mixture was dissolved in water, heated upon the water bath, and neutralised with barium carbonate.

The barium sulphate was filtered off, and the filtrate containing the barium salt of the sulpho-acid was concentrated *in vacuo* over sulphuric acid. The barium salt thus obtained crystallised much more readily than the calcium salt, and the solution of the same in water does not appear to be as readily oxidisable as the former when exposed to the air. It crystallises from its aqueous solution in white, warty concretions of star-grouped crystals (needles).

A sample of the above barium salt, obtained by rapidly boiling down a portion of its aqueous solution to dryness, and then further drying over sulphuric acid, gave the following results :—

WATER OF CYSTALLISATION.

0·2810 gramme substance lost 0·0081 gramme H_2O.

Equivalent to water 2·88 per cent., or 1 molecule water of crystallisation.

Ba ESTIMATION.

0·2810 gramme substance gave 0·116 gramme $BaSO_4$.

Equivalent to Ba	24·26 per cent.
Equivalent to Ba in anhydrous salt	24·98 ,,

On now attempting to calculate the molecular weight of the barium salt from the amount of barium sulphate formed, we get the following:—

0·2729 anhydrous salt gave 0·116 gramme $BaSO_4$.

$$0{\cdot}116 : 233\ (BaSO_4) :: 0{\cdot}2729 : x;\ x = 548{\cdot}1.$$

The least molecular weight of the salt, carrying one atom of barium, is, therefore, 548·1.

One atom of barium might belong, however, to a substance containing either one or two sulpho groups; but the theoretical molecular weight of barium hydroquinone disulphonate is 406, whereas the theory for barium hydroquinone mono-sulphonate is 515 (calculated from the formulæ—

$$\left(p.\ C_6H_3\left\langle\begin{matrix}OH\\ \overline{OH}\end{matrix}SO_3\right)_2 Ba\right),$$

and consequently the former is excluded. Therefore the substance analysed is, beyond much doubt, the barium salt of a hydroquinone mono-sulpho-acid.

On calculating the molecular weight from the salt containing water of crystallisation, we get—

$$0{\cdot}116 : 233 :: 0{\cdot}281 : x;\ x = 564.$$

The theoretical molecular weight of the hydrated salt, or rather salt containing water of crystallisation, is 533.

The theoretical amount of barium called for in the anhydrous salt is 26·6 per cent.

The theoretical amount of barium in the hydrated salt is 25·7 per cent.

The amount of water of crystallisation found is 2·88 per cent.; therefore—

$$2{\cdot}88 \div 18 :: 0{\cdot}16 \text{ molecule } H_2O.$$

That is to say, that 100 parts of barium salt contain 0·16 molecular H_2O of crystallisation; therefore 548 parts of barium salt will contain—

$$100 : 0{\cdot}16 = 548 : 4;\ 4 = 0{\cdot}87 \text{ molecular } H_2O.$$

or, in round numbers, 1 molecular H_2O. We have therefore found—

Barium	24·26 per cent.
Water of crystallisation	2·88 ,,
Molecular weight	564·

Whereas theory calls for—

Barium	25·7 per cent.
Water	3·40 ,,
Molecular weight	533·

The formula of the barium salt is, therefore, without much doubt,—

$$\left.\begin{matrix}p.\ C_6H_3\left\langle\begin{matrix}OH\\ \overline{OH}\end{matrix}SO_3\right.\\ p.\ C_6H_3\left\langle\begin{matrix}OH\\ \overline{OH}\end{matrix}SO_3\right.\end{matrix}\right\rangle Ba + H_2O.$$

The barium salt is readily soluble in cold water and dilute alcohol, and insoluble in strong alcohol. It crystallises from dilute alcohol in white six-sided prisms. On adding ferric chloride to its aqueous solution, a momentary deep blue colouration is obtained, which almost immediately changes into a dirty yellow colour.

POTASSIUM SALT.

This salt was obtained from the barium salt by decomposing the latter with the theoretical amount of potassium carbonate. On rapidly concentrating the aqueous solution of the same, out of contact with the air as much as possible, it is obtained in the shape of little yellowish-white needles. Better results, however, are obtained by adding three or four volumes of alcohol to the concentrated aqueous solution, and then allowing the mixture to evaporate under the bell jar of an air-pump. It is readily soluble in water.

FREE ACID.

$$p.\ C_6H_3 - \left(HSO_3\right) \quad \begin{cases} OH. \\ OH. \end{cases}$$

The free acid may be obtained from the barium salt by accurately decomposing the latter with dilute sulphuric acid, filtering off the $BaSO_4$, shaking up the filtrate with ether, and then distilling off the latter and allowing to crystallise. A simpler method, and one that works very well, is to place the cake resulting from the action of H_2SO_4 upon the hydroquinone, upon porous tiles, till the greater part of the excess of sulphuric acid has been absorbed. Then press the mass between filter paper until

nearly every trace of H_2SO_4 has been removed. The mass thus obtained is dissolved in as little alcohol as possible, and set aside to crystallise under the air-pump. The free acid is thus obtained in long, well-defined, brownish, transparent, rhombic prisms (some of the crystals were over one c.m. long), containing alcohol of crystallisation. When exposed over sulphuric acid it effloresces, giving off a part, or all, of its alcohol of crystallisation.

0·1155 gramme substance over H_2SO_4 lost 0·0087 gramme alcohol = 753 per cent. On now heating to 120° C., the said free acid lost 0·004 gramme more of alcohol. It will, therefore, be seen that the larger part of the alcohol of crystallisation is lost over H_2SO_4.

The total amount of alcohol lost is, therefore, 0·0087 + 0·004 = 0·0127 gramme = 10·9 per cent.

This equals 0·43 molecule, or, in round numbers, one-half molecule alcohol of crystallisation.

Theory for $C_6H_3(HSO_3)(OH)_2$. One-half C_2H_6O calls for alcohol 10·7 per cent.

It begins to fuse at 98° C., and is completely fused at 104° C. (uncorrected). Dissolves readily in water and alcohol.

Reducing Action upon the Haloid Salts of Silver.

It was thought that the best way to test this question would be to submit some exposed gelatine dry plates to the action of the hydroquinone monosulpho-acid. For this purpose a preliminary test was made, using an Eatman lantern-slide plate and a solution of the barium salt of the hydroquinone sulpho-acid, made slightly alkaline with sodium carbonate. A positive of very fair quality was thus obtained, the tone of colour being reddish brown; it developed up very slowly, however, but it is expected that better results will be obtained when using a developer of definite composition.

In conclusion, I would state that I hope soon to complete experiments upon this subject, and will then submit such further results as I may have obtained.

J. H. Stebbins, jun.

PHOTOGRAPHIC CHEMISTRY.

Apart from the popularity of photography as an inexpensive amusement, enabling the amateur to obtain, with comparatively simple appliances, permanent records of places visited, or representations, more or less faithful, of the features of those whose individuality it is wished to bear in remembrance, the subject is becoming of daily increasing importance on account of the numerous applications which photographic processes have found, both in art and in science. For this reason it is desirable that the claims of photography, to be considered a distinct branch of applied science or technology, should be urged upon all those who are in any way interested in the advancement of technical education. Some progress has already been made in this direction in certain schools and colleges in this country, but when our efforts are compared with the keen appreciation of the subject which is borne witness to by the splendidly equipped photo-chemical laboratories of the technical high schools of Berlin and Vienna, it will be admitted that in this, as in other departments of chemical technology, we have allowed ourselves to sink into a secondary position. It is certainly remarkable that the land of Fox Talbot and Herschel—the country which has given to the photographic world all the most important processes discovered since the foundation of the art by Niepce and Daguerre*—should nowhere possess a school of photo-chemistry, where the subject can be taught from a scientific platform, or where original investigators can find the requisite appliances and the skilled assistance necessary for the prosecution of research.

Setting out from the admission that photography must, sooner or later, become incorporated in all schemes of systematic instruction in applied science, I propose in the present course of lectures to show how this subject may be dealt with from a chemical point of view. From this it must not be inferred that photography is to be regarded purely as a branch of chemical technology, for it has also its physical side, and the highly trained photographer should be well grounded in the theory and construction of lenses, spectrum analysis, and, in short, in the general principles of optics. Assuming this knowledge to have been acquired, we may proceed to ask how the subject is to be taught, and the consideration of this question is of considerable importance—it is, in fact, of far greater importance than may appear at first sight, for photography is most admirably adapted to bring out into prominence the principles of technical instruction in a subject which is very largely of a chemical nature. The consideration of this question may help to dispel some of the haze with which the much-abused term "technical training" has been surrounded, and it will certainly lead to a clear conception of the object and scope of these lectures.

* This is no vain boast. Taking the discoveries in order, we have the silver print and chromatised gelatine emanating from Fox Talbot, the cyanotype due to Sir John Herschel, the collodion process introduced by Scott Archer and Fry, collodion dry plates by Russell, printing with pigmented gelatine worked out by Swan, gelatino-bromide emulsion introduced by Maddox, and the platinotype process of Willis, to say nothing of the photo-mechanical printing processes, such as Woodburytype, to which English investigators have contributed so largely.

There are many who identify technical instruction with the teaching of some handicraft, a notion which has no doubt arisen from the identification of technical skill with manual dexterity in some mechanical industry. By the adoption, either tacity or openly, of this narrow definition, the chemical industries have suffered to a very large extent in this country, because their progress is more dependent on a knowledge of scientific principles, and much less dependent on manual dexterity, than any of the other subjects dealt with in schemes of technical instruction. Now, in order to give technical instruction in a subject like photography, which is so intimately connected with chemistry, we may adopt one of two courses. The student may become a practical photographer in the first place, and may then be led on to the science of his practice by an appeal to the purely chemical principles brought into operation. This may be called the analytical method. The other method is to give the student a training in general chemistry first, and then to specialise his knowledge in the direction of photography. This may be regarded as a synthetical method.

In other departments of technology, and especially in those where the underlying principles are of a mechanical nature, the analytical method may be, and has been, adopted with success. It is possible to lead an intelligent mechanic from his every-day occupations to a knowledge of the higher principles of mechanical science by making use of his experience of phenomena which are constantly coming under his notice. From this it is sometimes argued, by those who are in the habit of regarding technical instruction from its purely analytical side, that technical chemistry can be taught by the same method. Some teachers may possibly succeed in this process, but my own experience, both as a technologist and a teacher, has led me to the conclusion that, for chemical subjects, the analytical method is both too cumbersome and circuitous to be of any real practical use. No person engaged in chemical industry in any capacity—whether workman, foreman, manager, or proprietor—can be taught the principles of chemical science out of his own industry, unless he has some considerable knowledge of general principles to start with. No person who is not grounded in such broad principles can properly appreciate the explanation of the phenomena with which his daily experience brings him into contact, and, if his previous training is insufficient to enable him to understand the nature of the changes which occur in the course of his operations, he cannot derive any advantage from technical instruction. These remarks will, I hope, serve to emphasise a distinction which exists between technical chemistry and other technical subjects, and I have thought it desirable to avail myself of the present opportunity of calling particular attention to this point, because it is one which is generally ignored in all discussions on technical education.

The reason for this difference in the mode of treatment of chemical subjects is not difficult to find. The chemical technologist—the man who is engaged in the manufacture of useful products out of certain raw materials—is, so far as the purely scientific principles are concerned, already at a very advanced stage, although he may not realise this to be the case. The chemistry of manufacturing operations, even when these are of an apparently simple kind, is of a very high order of complexity. There are many branches of chemical industry in which the nature of the chemical changes undergone by the materials is very imperfectly understood; there is no branch of chemical industry of which the pure science can be said to be thoroughly known. For these reasons I believe that I am justified in stating that the chemical technologist is working at a high level, so far as the science of his subject is concerned, and this explains why he cannot be dealt with by the analytical method.

The general considerations which have been offered apply to the special subject of photography with full force. A person may become an adept as an operator without knowing anything of physics or chemistry; there are thousands of photographers all over the country who can manipulate a camera and develop and print pictures with admirable dexterity who are in this position. If we adopt the narrow definition of technical instruction, we should appoint such experts in our colleges, and through them impart the art of taking pictures to thousands of others. But would our position as a photographing nation be improved by this process? I venture to think not. We might be carrying out the ideas of certain technical educators by adopting this method, but I do not imagine that in the long run the subject itself would be much advanced; our position in the scale of industry would not be materially raised by the wholesale manufacture of skilful operators. And so with all other branches of applied chemistry; it is technologists, whose knowledge is based on a broad foundation, that are wanted for the improvement of our industries. These are the men that are raised in the technical high schools of the Continent, and whose training the Continental industries have had the wisdom to avail themselves of.

To become a photographic technologist, as distinguished from a photographer, it is desirable, therefore, that the student should have received instruction in the general elementary principles of physics and inorganic and organic chemistry. When thus prepared, he may begin to specialise his studies, and the real technical training will be commenced. The application of chemistry to photography will naturally divide itself into two branches; the chemistry of the materials used in the art, and the theory of the chemical changes occurring in photographic processes. This last part of the subject I have already attempted to deal with, to some extent, elsewhere.* With respect to the chemistry of photographic

* *The Chemistry of Photography.* (Macmillan. 1889.)

materials, time will not admit of any attempt to draw up a complete code of instruction. Nor is this necessary on the present occasion, for the requirements will be met by the simple statement that this branch of the subject should be an extension of the ordinary chemical training, with special reference to the preparation, properties, and reactions of the compounds which the student is most likely to have to deal with in photography.

In so far as the study of the chemistry of photographic materials is ordinary text-book knowledge, it is not proposed, therefore, to take up your time by unnecessary recapitulation; but certain special reactions, having a direct bearing on photographic processes, may be worth dwelling upon. Since the compounds of silver are by far the most important of photographic chemicals, it will be advisable to commence with these. After a study of the ordinary qualitative reactions of this metal, the student should be well practised in the quantitative estimation, both gravimetrically and volumetrically, so that the value of commercial silver nitrate may be ascertained with precision. The reducing action of fused sodium carbonate, of zinc and acid, and of alkaline solutions of glucoses on the silver haloids, can be made the basis of practical exercises in the recovery of silver from residues. It is desirable also to point out, and to illustrate by experiment, that silver is displaced from the solution of its salts by the more electro-positive elements—hydrogen, copper, mercury, iron, zinc, lead, and so forth. It is important also to demonstrate that silver is more electro-positive than gold and platinum, and displaces these metals from solutions of their salts.

In illustrating such points in the chemical history of silver as those referred to, and, in fact, in all practical work leading from ordinary chemistry to photographic chemistry, it will be found advantageous to adopt the general principle of performing the experiments, whenever practicable, both in glass vessels and on films. This method is admirably adapted to lead the student from the general science to its special application to his subject. For example, having shown that the salts of silver are reduced by such reducing agents as alkaline pyrogallol, ferrous sulphate, &c., in test-tubes, and having allowed the experimenter to convince himself that the precipitate in these cases is really metallic silver, the production of a film of the metal may be shown by taking a sheet of paper coated with silver nitrate, and, when dry, painting stripes of ferrous sulphate solution on the coated surface. On washing out the excess of nitrate from the unreduced portions, it will then be realised that the dark stripes consist of finely divided silver on a paper surface. With these silver films many instructive demonstrations can be given. Thus, the fact that silver displaces gold and platinum from solutions of the salts of these metals may be shown by passing the paper through a bath of platinic or auric chloride, when the silver stripe undergoes a change of colour, indicating the replacement of that metal by gold or platinum. A comparison of the strip thus treated with a portion of the original strip—by treating both with nitric acid—clearly proves that the platinised stripe has lost its solubility in that acid. The application of this principle to toning and intensification will naturally follow, when photographic processes are being dealt with.

While demonstrating the reducibility of silver salts by such reagents as ferrous salts, &c., it must be strongly urged that reduction of the silver salt is accompanied by a corresponding oxidation of the reducing agent. This fact will be made apparent by the chemical equations; but it is important that the student should verify it experimentally. Many ways of doing this will suggest themselves, but it will be sufficient if I give one appropriate example. Every student may be assumed to be familiar with the different behaviour of ferrous and ferric salts towards potassium ferrocyanide. Now, on adding a solution of ferrous sulphate to a solution of silver nitrate, we get a precipitate of silver, indicating the reduction of the silver salt. That a simultaneous oxidation of the ferrous salt takes place is proved by filtering off the silver and adding ferrocyanide to the solution, when Prussian blue is at once formed. An apology is really necessary for detaining you with such a well-known illustration, but the broad principle, that chemical reduction is accompanied by a simultaneous oxidation, is so important in photographic chemisty, that the student cannot be too strongly impressed with its generality.

The precipitation of finely divided silver may be made use of to illustrate some of the more obscure phenomena with which the photographic chemist is frequently confronted. It is desirable to point out that outside the domain of text-book science there is a mass of information concerning the properties of silver which may become of direct importance in connexion with photographic processes, and the consideration of which will certainly help to broaden the student's notions of his subject. It may be well at this stage to broach the idea that photographic chemistry, like all other branches of applied chemistry, does not begin and end with a series of reactions which can be written down in the form of equations. This mode of treating the subject may be academic, but it is not technical. It is believed by many experimenters that silver is capable of existing in several different conditions of physical aggregation according to the manner in which it is precipitated from its solutions. Thus, the deposit obtained by adding ferrous sulphate to a solution of silver nitrate is grey; the product obtained by reducing silver solutions with organic ferrous salts is darker in colour.* It is possible that the difference of colour in these cases may be due, as suggested, to the differences of molecular aggregation. The rate of reduction may have something to do with it, and the well-known coloured forms of precipitated gold, studied by Faraday, may be referred to in this connexion.

But, on the other hand, there is another possibility which must be borne in mind and well emphasised in dealing with photographic chemistry. I allude to the tendency which silver and its compounds possess, in common with many other metals, of bringing down and retaining traces of foreign substances, in whose presence the metal or its compounds may be precipitated. This kind of combination is not sufficiently recognised by orthodox chemistry, because it does not take place in definite proportions, but there are many branches of applied chemistry where this so-called molecular combination plays a very important part. The practical outcome of these considerations is that the student of photographic chemistry cannot be too early prepared for the occurrence of indefinite combination, and he must not be allowed to suppose that, because a distinct formula cannot be ascribed to such compounds, they are outside the pale of chemical science. I have thought it necessary to utter this caution, because in the present state of knowledge we must not commit ourselves to dogmatic assertions about allotropic modifications of silver. It may be that the different colours of reduced silver are due to the retention of "traces" of some foreign substance. The fact that minute traces of impurity produce remarkably great changes in the physical properties of metals is now familiar through the experiments of Roberts-Austen, and we must be prepared for a similar modification in such a physical property as that of colour by the influence of associated "impunity."

In connexion with this part of the subject the recent experiments of Carey Lea* demand some notice. By reducing certain organic salts of silver, viz., the citrate and tartrate, with the corresponding ferrous salts, this experimenter professes to have obtained three allotropic modifications of silver. After carefully considering the conditions of formation, and after repeating some of the experiments, I must say that there appears to me to be no sufficient evidence that these coloured forms consist of the pure metal. On the contrary, all the evidence goes to show that some impurity is present;† the published analyses of the products in no case show a greater percentage than 98·75 per cent. of metal. If an alloy of gold, containing only 0·2 per cent. of lead, differs so completely from pure gold as to be brittle instead of malleable and ductile; if the colours of many metals can be completely modified by being alloyed with small quantities of other metals, such, *e.g.*, as the deep purple alloy of aluminium of gold, it is not unreasonable to suppose that the colour and other properties of precipitated silver would be modified by combination with one per cent. or more of some impurity which may consist of an organic iron salt. At any rate, it seems premature to speak of these products as allotropic forms of silver.

The whole subject of the reduction of silver salts by various inorganic and organic reducing agents is well worthy of engaging the attention of the photographic chemist. Did time permit, I could point out many lines of investigation which might be followed up with comparative simplicity. If the student can be brought to realise that we have yet a great deal to learn about the nature and composition of these coloured products—if the spirit of inquiry can be stirred within him till he is prompted to take up the investigation of some of these compounds for himself—he is far more likely to contribute towards the advancement of photography than by taking any number of pictures. And I will add that, if he has the true spirit of technology in his composition, he will derive quite as much pleasure from this kind of work as from manipulating the camera.

R. Meldola, F.R.S.

(To be continued.)

* Pyrogallol will reduce silver nitrate in neutral or slightly acid solutions. It is not necessary to add alkali to show this reduction; the solution may be distinctly acid with acetic acid.

PHOTOGRAPHY AND ART.

It is difficult to discover what can possibly be the practical outcome of the Emerson-Goodall manifesto, even if it be granted that their propositions are the facts they state them to be. Whether the artist convert the photographer to his way of thinking, or *vice versâ*, the work of both will remain just the same. It cannot seriously be entertained that the difference between photography and art lies in the ability of artists to convey a better idea of "binocularity," for, if that were so, their work would be vastly inferior to pictures seen in the stereoscope, yet few artists would be found to accord more artistic feeling to the one than to the other—from the art point of view they would probably favour the single picture. Then, again, do artists give us a truer visual impression than is conveyed by a photograph? No two artists would draw a building or a landscape precisely alike, nor would the same artist produce the same result if he sketched it twice. Such being admitted, how can it be that binocular vision makes the difference between art and no art? One would think that

* *Amer. Jour. Sci.* (3), vol. xxxvii. p. 476, and vol. xxxviii. pp. 47 and 129. Also *Phil. Mag.*, vol. xxxi. pp. 238, 320, and 497.

† Thus in repeating these experiments Prange (*Rec. Tran. Chim.*, ix. 121) found that the dark substance precipitated from the solution of the so-called "soluble silver" always contained traces of iron as an impurity.

artists, according to Dr. Emerson, drew so correctly, that two of their pictures of the same view might coalesce in a stereoscope. "Exactitude," he says, "is the virtue of photography, . . . which renders it absurd as an art medium;" so we infer that art must never be exact. In another place he says "the results are in no way true to the visual impression, but the truest that can be got by the camera." So we are asked to accept the idea that truth and exactitude have little relation to each other. In another place he tells us, "The lengthening the image by tipping the swing-back is merely distorting the monocular perspective." Well, suppose it is; is that any worse sin than the artist making his distance larger than monocular perspective would give it? and would the error be as "visually" measurable as would the artistic distance?

The Doctor tells Mr. Boord that he "gets muddled over foreground and distance." We cannot say; but surely Dr. Emerson gets "muddled" over *planes*. He tells us that "one position must be selected as the real position. We therefore take the generally accepted—*i.e.*, a plane at right angles with the ground plane. When you look at the plane at a distance, you see foreground as well as distance. When you look at the immediate foreground, you alter the plane, and it is just the same as if the body were suspended at an inclination, and all the same phenomena will follow, but with different objects?" Does this language convey a definite idea? Not to us, certainly. "The plane at a distance" and the plane which we alter when we look at the foreground, what planes are they? As well as being at right angles to the ground plane, are they at right angles to the principal or central line of sight? or shall we say to the two lines of sight, to speak of our vision binocular? Both distance and foreground lie in an infinity of planes, and so the word "plane" can hardly be used in that sense, and must, we think, refer to the plane on which the picture is delineated. Now we have something definite, and we can compare the photograph with the artist's sketch-block, for they are planes of delineation both of them. Let it be supposed that the artist is provided with a piece of 12×10 glass having a black or opaque margin of nearly half an inch in width, and he holds it before his eyes at a distance of twelve inches; he will include about as much subject as will a photographic picture taken with a twelve-inch focus lens on a 12×10 plate after it is trimmed, and, if he draws correctly, what he thus sees on a quarto royal sketching block, whether he uses one or two eyes, there will be no "visual" difference in the contours of the subject between the sketch and a photograph. And, furthermore, one may make a bet of ten to one that the artist will, almost intuitively, elect to use one eye when looking through the glass. Now, is this piece of glass a representative of the plane that is to be altered when viewing the distance and foreground, or *vice versâ*?

Let us suppose a picture where the artist would be probably most tempted to depart from exactitude for the sake of artistic truth, or, as many would prefer to call it, artistic licence, say, a foreground of rocks and herbage, and at the sides trees, to form an opening, through which the rest of the picture is seen; in the middle distance a lake, beyond which are mountains of a rugged and precipitous character, and at their feet some buildings, say, a town or village, among trees. Now, these buildings, perhaps, are essential to the picture; they give a character to the scene, and can on no account be omitted. The artist, in depicting them, either consciously or unconsciously—most likely the latter—will make them much larger than the photographer could; for, if he did not do so, they would probably have no effect in the picture. Having enlarged trees and buildings to, say, twice their linear dimensions, it becomes necessary to equally enlarge the mountains, or they will seem too small, on account of the trees and buildings being the natural measure of the mountain's altitude.

To revert to our plane of representation. If the artist holds the piece of glass at *two* feet from his eye, the distance will occupy *comparatively* twice the linear space it did at one foot; but it does not give what the artist wants, because, though he gets his heights, he has lost one-half his distance in width, which would most likely destroy the character of the scene. If this were all that was wanted, photography could accomplish it very simply by taking the foreground with a double lens, and the distance with the back lens of the same, and then making a combination print. There are many views which would lend themselves very happily to this or similar treatment; but to speak of that is outside our present purpose.

The reverse case may be illustrated by something we once read in a book on art, by whom we now forget. Two artists went to sketch Stonehenge. The one chose a position where he could command the whole of the stones, and made a pretty picture of them, but it did not impress the spectator with the grandeur of the monuments. The other approached much nearer, and made the nearer stones fill the height of his picture, while the further ones diminished in perspective. The distance, in this case, was made to look small, which increased the apparent size of the stones, and, by giving them a background of storm-cloud, their importance was proportionately increased. Both pictures were true in their way, but it might be said that one was truth, and the other truth emphasised.

Now, in these two cases we find nothing that can be explained by the artist working with two eyes while the camera works with one only, and we cannot see that an artist would work any the less artistically if he were deprived of one eye. We sympathise much with what Dr. Emerson would *now* say about the limitations of photography and the superiority of an artist's rendering of any given scene, but we think he has been very unfortunate in his attempts to trace a scientific basis for the difference. There is nothing essentially artistic in the *manual* delineation of nature's work any more than there is in photography. There are many good and facile draughtsmen who are not artists, even though they have two eyes. The art lies not in the method but in the man. We see no reason why a man may not be a photographic artist, and, though Dr. Emerson says that photography is "absurd as an art medium," though it is "unsurpassed for all purposes of scientific drawing" (a statement that might be challenged), we believe that he has, not so very long ago, taught somewhat differently; and why is he not as likely to have been as correct, or as wrong, then as since his celebrated denunciation? This change of front should at least be a caution to those who are apt to place too much confidence in the utterances of others.

I have felt for many years that there is just a tinge of jealousy among artists towards photography which they cannot wholly suppress. It is, of course, natural, though the true artist has more reason to be thankful for its advent than he is likely to admit. On the other hand, there is much to regret in its indiscriminate employment where a draughtsman's work would be better; that, however, is not the fault of photography, but of those who have the determination of what kind of illustration shall be used. The cry out about "that vulgar gloss," or that "beastly photographic colour," as being inartistic, is simply "rot" (excuse the inelegant expression, but it *is* forcible). That there is anything essentially artistic in "matt surfaces" or "engraving blacks" is not true. They can no more put "art" into a photograph than the putting glass in the front of an oil painting can take it out. All these matters are the accidents of art, and of themselves no part of it. We naturally associate matt surfaces and black inks with artistic prints because they are printed in black ink upon paper more or less white. There have been times when brown, dark red, and other colours have been employed in printing engravings under the idea that there was something more artistic in colour than in black. For many years all our choicest engravings have been printed in black ink because it yields a greater range of tones than coloured inks, but that cannot be said of the colour of platinotypes and bromide prints, which always, or nearly always, seem to require a finishing of black to make them satisfactory; very noticeably so in the case of enlargements.

No bromide print or platinotype—indeed, we may say, no developed print—will get as much out of a negative as will printing out. In the lighting of a developable surface no change of colour takes place as a check upon further action, such as takes place in printing out, where the darkening of the shades is prevented from going too deep by the intervention of its own darkness, and thus giving time for the detail to be brought out in the lights. The photographer who adopts platinotype or bromide under the idea that he is securing more artistic results, is deliberately throwing away a means of art by sacrificing the transparency of his shadows. Let us not be misunderstood; we are not writing against platinotype and bromide printing, which have great claims on the photographer's attention. They are more permanent than ordinary silver printing, and bromides can be produced under circumstances when printing out cannot; they possess a different colour, and a still greater range of it can be secured by chloride printing by development. When, therefore, the photographer elects to use these methods, let him be honest to himself, and not say he does it because he thinks them more artistic, for they are not, though he may probably use these processes because others have told him that they are considered more artistic.

W. D. Richmond.

(To be continued.)

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

The Glasgow International Photographic Exhibition was duly opened for private view on Tuesday, previous to the conversazione, which was held the same evening at eight o'clock. The suite of rooms in the galleries of

the Institute of the Fine Arts is where the exhibition is located. These galleries having been specially built and arranged for the exhibition of pictures, and a better place for the purpose could not have been found. The Walker Galleries, in which the Liverpool Exhibition was held, are certainly finer and more extensive, but, we think, not so well arranged for a photographic exhibition; for what the rooms at the Art Institute lack in extent they gain in compactness.

When the Glasgow and West of Scotland Amateur Photographic Association thought of an international exhibition, it was well that they had the pluck to venture engaging this magnificently arranged suite of galleries for their show, for, although at first sight the filling of such an immense space looked next to an impossibility, it has been ventured, and has proved highly successful. It has proved that by taking time by the forelock, and, with an energetic executive, steadily working and keeping the matter constantly before the public most interested in the matter, they have received abundance of exhibits from all quarters; in fact, more pictures than can be accommodated in the space at their command. It seems such a very little time ago since this Society held their yearly exhibitions in a single room in these same Art Galleries, and it must be very gratifying for the members to think that from that small beginning has sprung this unrivalled collection of pictures and apparatus as shown by the Society to-day. There can be no lack of energy and enterprise to obtain such results.

In taking a cursory glance round the rooms, going from class to class to gain an impression of the general work and effect, and taking it all round, the standard is much above the average, judging from similar exhibitions, being almost free from patches of ordinary and badly finished work that one drops upon here and there in the usual photographic exhibition.

There has been considerable care and attention paid to the hanging of the pictures, and the finished results must be very gratifying to the gentlemen who undertook this arduous and, in many cases, thankless labour.

It was no easy task, for on the previous Friday the rooms were in a perfect chaos of exhibits, while boxes of pictures came still crowding in; but by the Monday morning all was reduced to order, and the exhibits ready for the Judges' work.

The draping of the pictures shows great artistic taste, and lends a pleasing effect to the whole, the neutral tints of the draperies showing great discrimination of choice, the total lack of loud colouring being very restful to the eye.

In all classes a good show is made by representative and known workers. In the first and second classes, which embrace professional portraits, first, for whole-plate and over, and second, for under whole-plate, pictures are sent in by Winter, Chancellor, Ayton, jun., Byrne, Tunney & Co., Warnerke, Vanderweyde, &c.; whilst the third class, enlargements by professionals, is represented by such names as Annan & Sons, Terrier, Clark, Lafayette, Alexander Bros., &c.

In Class 4, other than portrait, we have Antonio Ruffo, Prince de la Scaletto, Annan & Sons, Adamson & Son, Platt, Story, Stuart, &c.

The next is No. 5 Class, Lantern slides by professionals, amongst which are Wilson, West, Green, Adamson, Mitchell, &c.

Then comes the portrait competition of the amateurs, Class 6, whole-plate and over; and Class 7, under whole-plate, with Clarke, McKenyon, Jenkins, and Oliver, with other exhibitors; and the Enlargements class, amateur, Class 8, is represented by Brown, Clark, Davis, Inglis, Mackay, Oliver, Smith, Watson, &c.

The amateur slide exhibits follow with well-known names, such as Pringle, Carpenter, Howie, Elder, Evans, Graham, &c.

The foregoing gives some idea of the class of exhibitors, Classes 11 and 12, Landscapes, being represented by some fifty exhibitors, and for small sizes of landscape a like number. Marine and cloud, &c., Classes 13 and 14, show some thirty competitors; and from Classes 15 to 22, embracing outdoor groups, interiors, still life, instantaneous work, hand camera, &c., there will be about a hundred in all exhibiting in these classes.

The Genre pictures have forty competitors, and the Scientific class is represented by seven. Fifteen ladies compete in their special class; and the Champion class is very large and full of good things, as might be expected.

The photo-mechanical and kindred processes is a special feature of this exhibition. Apparatus is also well represented, and taking it as a whole the exhibition leaves nothing to be desired. In our next we will go into more detail.

On the Monday evening the Judges were entertained at dinner at the Bath Hotel to meet some invited guests and the representatives of the Press. A very congenial couple of hours was spent, which would have been prolonged much further, but for the work still to be undertaken by the Judges.

The Chairman (Mr. John Morrison, jun.) proposed the health of the Judges, at the same time tendering them the thanks of the Society for their extreme courtesy and kindness in responding to the desire to have them to act as judges, feeling sure that their names, so well known and respected in the photographic world, would help them considerably to the successful end attained, for the confidence of the exhibitors was with them, and the Society certainly lay under a deep debt of gratitude to them, which, in the name of the Society, he wished to acknowledge.

Mr. V. Blanchard, who responded, considered such duties pleasures, and, as one who had undertaken many like duties, he had only to say that he had never seen a finer exhibition than the one that they were now judging.

Mr. W. Young said that he had been a judge at a few photographic exhibitions now, but that this was certainly the biggest job of the kind he had ever handled.

The Chairman next proposed the toast of the Press, which was acknowledged by Mr. George Mason, as representative of The British Journal of Photography, and Mr. Welford, representing *Photography*.

After the healths of the Secretary (Mr. W. Goodwin) and the President (Mr. John Morrison, jun.) had been duly proposed and responded to, the meeting broke up in consequence of the work yet to be done by the Judges.

The Judges were Messrs. Valentine Blanchard, Adam Diston, Richard Keene, Francis Powell, and William Young. Special judges in the Photo-mechanical Section—Messrs. Robert Blackie and W. B. Blackie. The list of awards is as follows:—

Class 1. Portraits (Professionals).—H. Vanderweyde (No. 61), gold medal for special excellence; W. M. Warnerke, silver medal; W. W. Winter, bronze medal; G. Gruel, extra bronze medal.

Class 2.—H. Baker, silver medal; W. J. Byrne, bronze medal.

Class 3. Enlargements.—H. Vanderweyde, silver medal; T. & R. Annan & Sons, bronze medal.

Class 4.—Alexander Bros., silver medal; T. & R. Annan & Sons, bronze medal.

Class 5. Lantern Slides.—G. W. Wilson & Co., silver medal; West & Son, bronze medal.

Class 6. Portraits (Amateur).—Prince Ruffo, silver medal; C. B. Moore, bronze medal.

Class 7.—No silver medal given; W. G. Jenkins, bronze medal.

Class 8. Enlargements.—No silver medal; W. H. Kitchen, bronze medal.

Class 9.—R. H. Elder, silver medal; W. S. Anderson, bronze medal.

Class 10. Lantern Slides.—J. E. Austin, silver medal; A. Watson, bronze medal; A. Pringle, bronze medal.

Class 11. Landscape (Open to Professional and Amateur).—D. R. Ward, gold medal; H. P. Robinson, silver medal; A. H. Hinton, for artistic excellence, silver medal.

Class 12.—J. A. C. Ruthven, bronze medal; J. G. Pratt, bronze medal; Mrs. Janie N. Hignett, bronze medal.

Class 13. Marine and Cloud.—Clement Millard, bronze medal. One award.

Class 14. Animals.—J. Catto, silver medal; C. Reid, bronze medal.

Class 15. Outdoor Groups.—Karl Greyer, silver medal; F. Bremner, bronze medal.

Class 16. Architecture.—C. V. Shadbolt, bronze medal.

Class 17. Interiors.—C. Court Cole, silver medal; W. J. Byrne, bronze medal.

Class 18. Still Life, Flowers, &c.—No awards.

Class 19. Flash Light.—John Stuart, silver medal.

Class 20. Instantaneous.—W. S. Anderson, silver medal; H. Symonds, bronze medal.

Class 21. Hand Camera.—J. W. Wade, silver medal; A. Watson, bronze medal.

Class 22.—W. S. Anderson, bronze medal; R. H. Elder.

Class 23. Stereoscopic Transparencies.—W. S. Anderson, silver medal; F. McKenzie, bronze medal.

Class 24. Genre.—H. P. Robinson, silver medal; J. Ferras, bronze medal.

Class 25. Scientific.—R. Kidston, silver medal; W. L. Howie, bronze medal.

Champion Class.—W. Crooke, for series of portraits, gold medal; L. Sawyer, for complete exhibit, gold medal.

Ladies' Competition.—Mrs. Blanche G. Bennetto, silver medal; Mrs. Janie N. Hignett, bronze medal.

Special Awards.—R. W. Robinson, silver medal for series of artists at home; Countess Loredana da Porto, silver medal for complete exhibits.

Apparatus.—W. Middlemiss, bronze medal for lantern-slide-making

apparatus; George Mason & Co., bronze medal for general excellence of exhibit; James More & Co., bronze medal for hand-stereo camera; J. Lizars, bronze medal for developing lamp; W. Watson & Sons, London, bronze medal for excellent workmanship in cameras; extra award highest to Boussod, Valadon, & Co., for six subjects reproduced in colour.

PHOTO-MECHANICAL PRINTING.—CLASS 1. PHOTOGRAVURE.—Boussod, Valadon, & Co., silver medal; Richard Poralusseu, bronze medal; T. & R. Annan & Sons, extra bronze medal.

CLASS 2. PHOTOTYPE.—In black and white, no award; in colour, Photographic Engraving Company of New York, bronze medal.

CLASS 3. COLLOTYPE.—S. B. Bolas & Co., bronze medal.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

ON Tuesday, August 25, the fifty-ninth annual exhibition of the above Society was opened at Falmouth. The weather was anything but fine. The Right Hon. Leonard Courtney, M.P., the President, occupied the chair. All the various classes were well represented, and were referred to by the President in detail, especially the fine arts, mechanics, photographic department, &c. Lectures and concerts were given in the afternoons and evenings. A lantern entertainment was given on Thursday evening by Mr. W. Brooks, of Reigate, the subject being *The Tower of London*, followed by a selection of pictures of the State apartments of Windsor Castle, some local and monochromous pictures, and winding up with a selection of statuary. Every one seemed perfectly satisfied with the exhibition. Mr. J. F. Peasgood gave the lecture, and many expressed their regret that it could not be repeated during the exhibition; but, as all the time was filled up with other subjects, it was out of the question.

PHOTOGRAPHIC DEPARTMENT.

JUDGES' REPORT.

The Judges have pleasure in making the following report to the Society:—

Whilst the number of general exhibits is not quite equal to last year, there is no falling-off in the excellence of the work shown. In the professional section landscapes are again, as last year, few in number. Portraiture, however, is exceedingly well represented, especially by our old exhibitors, whose names are well known by this time. By far the greater number of pictures are printed in platinum. The amateur section is well represented in the several classes, and in many cases shows a distinct advance upon former attainment. There are also several exhibits of importance in the photographic appliance and lantern section.

Professional Section.—For interior work Mr. F. W. Edwards, of Peckham, takes first silver medal for his view of nave of Westminster Abbey, which shows high technical excellence. Mr. and Mrs. Anckorn have two *genre* pictures, which are gems in their way. Mr. Gulliver Speight sends two skating scenes. Mr. Lyd Sawyer, of Newcastle, is again well represented; but he had evidently overlooked the fact that one or more had been previously shown here. For his humorous picture, *Two's Company*, he has been awarded a second silver medal. Messrs. Green, Cross, & Bevan send some curious examples of photographic printing on silk, and also some transparencies on celluloid and glass, the latter being very poor. Mr. J. Milman Brown shows some landscape, chiefly in the Isle of Wight. Mr. Clarence James has a frame of tudies of dog and child, which are very clever in arrangement and tell their own tales. Mr. W. Rooke sends an enlargement, which, not being large, if taken direct would have been better. Mr. Henry Reeves is represented by three frames of interior work, which are soft and delicate. Mr. Bradshaw sends two portraits of the same child. Mr. W. D. Welford has been awarded a second bronze medal for transparencies. Mr. R. W. Robinson, of Redhill, hows good work in several classes; and his late pupil, Mr. S. N. Bhedwar, sends portraits of a luxurious type. Mr. J. P. Gibson, of Wrexham, takes the award, viz., first bronze medal, in landscapes with his small picture, *When the Day burns low.* Mr. S. J. Barrett, of Manchester, has a case of half-a-dozen portraits printed in silver. Landscapes are also treated by Mr. Hendray and Mr. Joseph Smith, which show careful work. In portraiture the Judges had some difficulty in making their award between Mr. W. W. Winter, of Derby, and Mr. W. J. Byrne, of Richmond, as each seem to have attained the highest points of excellence, the one in his well-known sepia tones (platinum), and the other in silver printing. They therefore, in justice, have been obliged to award a first silver medal to each. These two exhibitors have also various other works well worthy of inspection. Mr. Westley J. Fry this year enters in the professional section for enlargements, instead of, as last year, in the amateur division.

Amateur Section.—Mr. H. Tonkin, of Penzance, carries off first bronze medal for an enlargement of Mousehole Pier and boats, which is a highly creditable work. Rev. H. B. Hare is awarded a second silver medal for his meritorious picture, *The Taker Taken.* Mr. Ernest Beck, of Sheffield, sends a series of landscapes and river scenes in platinum, which are decidedly artistic. Mr. A. K. Gillespie exhibits a small series. *The Stepping Stones* of Mr. T. B. Sutton, of Liverpool, is a picture of careful treatment. For Genre work Mr. A. G. Tagliaferro takes first bronze medal, and his six pictures form a highly interesting collection. A view of the interior of Christ Church, Oxford, secures a first bronze medal for Mr. C. Court-Cole. Mr. A. R. Dresser is represented by several enlargements. Mr. E. Austin receives first bronze medal for his picture denominated *Chaff*—a work of instantaneous character. Mr. G. Soltan Symons sends specimens of divers methods of printing from the same negative. For *The Tomb*, 978, the Rev. G. E. Hermon receives a second bronze medal. Mr. H. Dudley Arnott exhibits a frame of interesting subjects. Six quarter-plate prints are shown by Mr. Victor J. Hatfield, printed in silver. Four transparencies are shown by a beginner, Miss Rachel Barclay, and some similar work by Mr. J. Richards, of Newlyn, Penzance. Dr. Campbell shows some instantaneous studies, but, owing to their not being framed, they are disqualified. It would not be right to omit mention of the splendid series of enlargements from the negatives of Mr. Sheving, of botanical subjects, which, though growing in the neighbourhood of Falmouth, are of a tropical character, and the series cannot fail to be of great value to the student. They show great skill on the part of Mr. Sheving.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,278.—"Improvements in or relating to Shutters for Photographic Cameras." L. M. KORDS.—*Dated August* 24, 1891.

No. 14,336.—"Improvements in Photographic Apparatus." C. W. CLARKE.—*Dated August* 25, 1891.

No. 14,536.—"Improvements relating to Photographic Cameras and to Apparatus for use in connexion therewith." B. J. EDWARDS.—*Dated August* 28, 1891.

No. 14,556.—"Improvements in Shutter Apparatus for Regulating the Admission of Light for Photographic Purposes." L. BERTEAU and H. ROUSSEL.—*Dated August* 28, 1891.

No. 14,648.—"Improvements in Photographic Cameras." A. RAYMENT and G. LYONS.—*Dated August* 29, 1891.

SPECIFICATIONS PUBLISHED.

1890.

No. 15,783.—"Photographic Cameras." MUCKLOW.—Price 6*d.*

1891.

No. 664.—"Photograph Machines." (Communicated by the Fisher Specialty Manufacturing Company.) THOMPSON.—Price 1*s.* 1*d.*

No. 8628.—"Photographic Printing Frames." HONEY.—Price 6*d.*

PATENTS COMPLETED.

IMPROVEMENTS IN OR APPERTAINING TO MACHINES FOR AUTOMATICALLY TAKING, DEVELOPING, FIXING, AND DELIVERING PHOTOGRAPHS.

(A communication from abroad by the Fisher Specialty Manufacturing Company, a corporation organized under the laws of the State of Minnesota, of 32, Washington-avenue South, in the City of Minneapolis, United States of America.)

No. 664. WILLIAM PHILLIPS THOMPSON, F.C.S., M.I.M.E., 6, Lord-street, Liverpool, and 6, Bank-street, Manchester, Lancashire, and 323, High Holborn, Middlesex.—*August* 8, 1891.

THE nature of this invention is to provide an automatic mechanism for the taking of pictures which, when set in motion, will automatically carry out all steps in the process of taking a picture, developing and fixing it, and then delivering the completed picture, the mechanism being preferably controlled by a device that permits it to be put in operation only upon the introduction of a suitable coin.

The nature of the invention will be ascertained from the following claims:—1. An automatic picture-taking machine comprising in combination a plate-holder, a camera, a plate-carrier, tanks for holding the developing, fixing, and washing materials, means for operating the plate-holder, camera, and plate-carrier, and means for releasing from the tank the materials for developing, fixing, and washing the pictures. 2. An automatic picture-taking machine comprising a series of clockworks arranged to operate in succession, a plate-holder and camera operated by the first clockwork, plate-carriers and tanks for holding the developing, fixing, and washing materials operated successively by the other clockworks, substantially as described. 3. An automatic picture-taking machine comprising in combination a plate-holder, a camera, means for conducting plates from said plate-holder to said camera and exposing them therein, a flash light, means for holding the developing, fixing, and washing materials, and means for moving the plates from said camera after exposure therein and carrying them into position to receive the material from said tanks, substantially as described. 4. In an automatic picture-taking machine the combination, with the operating mechanism, of the winding shaft provided with the gear wheel, the rack bar engaging said gear wheel, the shaft connected with said rack bar, and provided with the arms, the locking dog, the coin holder, and the arm secured upon the shaft, and provided with the lug and the stud, substantially as described. 5. In a machine of the class described, the combination, with the operating mechanism, of the winding shaft provided with the gear wheel, the rack bar engaging with said gear wheel, and provided with a series of ratchet teeth, a pawl arranged to engage said ratchet teeth as the rack bar is moved in one

direction, and to be raised therefrom as it is moved in the other direction, and a locking device adapted to release said rack bar upon the introduction of a suitable coin. 6. In a machine of the class described, the combination, with the camera and the picture developing and fixing devices, of the independent clockworks, arranged to operate successively, and thereby to operate said camera and said fixing and developing devices, a winding mechanism common to all of said clockworks, and a coin-controlled locking device, connected with said winding mechanism, substantially as described. 7. In a machine of the class described, the combination, with the clockwork, of the winding mechanism, the locking dog, the coin holder, having an open centre, and arranged beneath a suitable coin shute, the winding shaft and the arm upon said shaft provided with the lug and the projection, substantially as described. 8. In a machine of the class described, the combination, with a suitable camera, of the plate reservoir, the series of sectional plate-holders arranged therein, and means for feeding said plate-holders along in said reservoir, substantially as described. 9. In a machine of the class described, the combination, with a camera and means for exposing a plate therein, of a flashlight and means for operating said flashlight simultaneously with the exposure of said plate in the camera, and automatic mechanism controlling the camera and flashlight operating devices, substantially as described. 10. The combination, with the camera, of a series of successively operating plate-carriers, for the purpose set forth. 11. The combination, with the camera, and the series of trays, of the series of successively operating plate-carriers. 12. The combination, with the camera, and the series of trays and the shelves, and of the series of successively operating plate-carriers, substantially as described. 13. The plate-carrier comprising, in combination, the vertical and laterally movable frame, the shafts mounted thereon, and provided with springs, and with the plate-holding arms, and means for separating said arms, substantially as described. 14. The combination, with the plate-carrier, of the tray mounted upon suitable pivots and means for rocking said tray. 15. The combination, with the plate-carrier, of the pivoted tray provided with a raised centre and means for rocking said tray. 16. The combination, with the plate-carrier, of the pivoted tray provided with a raised centre and having an opening in its bottom, the spring-controlled plate closing said opening, and means for rocking said tray. 17. The combination, with the plate-carrier, of the shaft and the plate ejector, substantially as described. 18. The combination, with the plate-carrier, of the shelf, the plate ejector, and the slide for closing the opening in the plate ejector, and the slide for closing the opening in the walls of the casing. 19. In a machine of the class described, the combination, with the series of clockworks, of the coin-controlling device connected with the first clockwork, the coin shute, and a slide arranged to close said shute whilst the first clockwork is in operation.

Improvements in Photographic Printing Frames.

No. 8628. William Griffith Honey, 15, Orange-grove, Bath, Gloucestershire.—*August* 8, 1891.

My present invention relates to photographic printing frames, and has for its object a simple, safe, and expeditious means of releasing a part of the cover or back in order to inspect the print from time to time during the progress of printing, to attain which I divide the back into two hinged portions or flaps, which are secured to a cross bar hinged to one side of said printing frame.

The two said hinged portions or flaps are kept in close positions by means of a spring, which has one portion coiled around a cross rod secured at each end to a screw or bolt, which latter is fastened to said hinged cross bar. The ends of said coiled springs are arranged to extend over each flap respectively, so that, should a flap be pulled backwards for the purpose of inspecting the progress of the print, it will automatically return to closed position when released.

The hinged centre bar, which carries both said flaps, is arranged with one end to fit into a groove or recess formed on one side of frame, and is secured in closed position by means of a pivoted bar or catch.

I preferably arrange on one side, and at the back of my said improved printing frame, an index or indices formed by means of undercut vertical or other grooves, wherein fit spring pointers arranged so that when they are pressed with the thumb and finger they are easily moved, and when released they remain in fixed positions; for instance, where it is required to note the number of prints wanted, and the number of prints printed, I fix to the side of one slot an index of figures with the words wanted or required, and to the side of another slot an index of figures with the words printed, and I manipulate the pointers as hereinbefore described.

Improvements in Photographic Cameras.

No. 15,783. John Davies Mucklow, 260, Camden-road, Middlesex.—*August* 8, 1891.

My improved camera is made by moulding the different parts of various suitable substances, such as indiarubber compounds, which form hard and compact materials, woodite, and other suitable substances.

The different parts may be moulded either with or without the necessary brass work or other metal fittings, so that when removed from the mould the different parts will be fitted with its necessary metal work, and ready for putting together to form a complete camera.

The dark slide and all other accessories are likewise moulded.

The claim is:—The construction of the frames and other parts connected with or forming part of photographic cameras, dark slides, and accessories, of ebonite, woodite, xylonite, paper pulp, celluloid, or other suitable plastic material, metallic plates being embedded therein or not as may be required, by the means, for the purpose, and in the manner described.

Photographic Club.—Subject for discussion, Wednesday, September 9, *Printing by Development*. September 16, *Intensifying and Reducing*. Saturday outing to Greenwich; *rendezvous* at west gate of Royal Naval College at half-past two.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 8.....	Derby	Society's Rooms, Derwent-bldings.
,, 8.....	Manchester Amateur	Manchester Athenæum.
,, 8.....	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 9.....	Photographic Club	Anderton's Hotel, Fleet-street,E.C.
,, 10.....	Birkenhead	Association Rooms, Price-street.
,, 10.....	Manchester Photo. Society	36, George-street, Manchester.
,, 10.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 27,—Mr. A. Haddon in the chair.

Further results from negatives taken at the West Drayton outing of the Association were shown. Some stereograms by Mr. G. W. Atkins attracted notice by their delicacy and clearness, and it was elicited, in answer to inquiry, that the negatives had been taken on backed plates. A hope was entertained that the use of backing would become more and more general at future outings.

Mr. A. L. Henderson showed negatives, the image on which had been locally reduced, and even removed, by exposure, whilst moist, to the vapour proceeding from a solution of cyanide of potassium.

Mr. S. Teape had made the experiment suggested at the last meeting by his failure to fix certain collodio-bromide films. He found that the unfixed deposit, which looked like unaltered bromide, was entirely soluble in nitric acid.

Proving, said Mr. Haddon, that it was not bromide, but silver reduced by the developer.

Mr. Atkins said that remarks had been made at a previous meeting as to ebonite dishes softening out of shape in hot climates. He showed one which boiling water had failed to materially alter in form.

Mr. W. E. Debenham suggested that there would be varieties in ebonite according to the heat and amount of sulphur used in the manufacture.

Mr. T. E. Freshwater had had some ebonite dishes become quite useless. Those of the Silvertown manufacture had stood very much better than another make which he mentioned.

Mr. Teape then opened the discussion of the evening on *Blisters in Albumen Prints*. He believed that the true cause of blisters was the existence of a soluble layer of albumen next the paper. If the albumen were completely coagulated, blisters would not occur. Strengthening the silver bath and longer floating he had found to prevent their occurrence. A suggestion had been put forth that blisters were caused by the liberation of carbonic acid; but, if such a cause were present, he thought thorough coagulation would prevent the liberation from taking the form of blisters. A very effectual method he had found to be the keeping of both toning and fixing baths alkaline, and to immerse the prints in boiling water between toning and fixing. He had also tried the use of boiling water before toning, but, although effectual in preventing blisters, the toning was hindered, the prints, in fact, requiring twice as long to tone. He had also tried boiling water immediately after fixing. The objection to this plan was that it made the prints very red. Yet another method which, on the whole, he preferred was to put the prints from the hypo into a salt bath.

Mr. F. A. Bridge had not found that the salt made any difference, but prints given to blister blistered all the same.

Mr. Freshwater had found salt to fail with certain papers.

Mr. Debenham inquired whether, when using boiling water before toning, Mr. Teape had still been able to tone to the same extent, although more slowly.

Mr. Teape replied that he had.

Mr. Debenham continued, that in that case he should think that the prints had greater probability of permanency than those produced in the ordinary way. Mr. W. K. Burton had found the prints from which the free nitrate had been removed by long washing took on so much gold without becoming overtoned in colour, that the image appeared to be mainly one of gold.

Mr. Henderson did not think Mr. Teape's explanation of the effect of hot water in preventing blisters was satisfactory. He further remarked that, as to thorough washing before toning, a print not washed at all would be more brilliant than one that was washed.

Mr. Debenham considered that, although an unwashed print would tone more readily than one that had been washed, the colour in the former case appeared not to result from a liberal deposit of gold, and the resulting print he thought neither so good in itself, nor to have so much probability of permanence, as one that had been well washed before toning.

The discussion then turned upon toning and other things connected with printing, and it was decided to devote another evening to these matters.

A vote of thanks to Mr. Teape concluded the meeting.

HACKNEY PHOTOGRAPHIC SOCIETY.

Thursday, the 27th.—Mr. C. F. Hodges in the chair.

Work was shown by Messrs. Gosling, Barton, Roder, &c., and only criticised.

Mr. Harverson asked which was the best silver paper to use for procuring good prints.

The Chairman said he had found nearly all good; but, if there was a preference, he would say Edwards'.

Mr. Reynolds had got good prints with Schölzig's.

Durand's was mentioned as being a good paper.

The Secretary presented the Society with a guide-book to the North of Ireland.

The Chairman then called on Mr. J. O. Grant for his paper and demonstration on *Bromide Enlarging*.

Mr. Grant then proceeded to say that, as far as the paper went, he would be very brief, for he thought demonstration was more interesting. With the aid of a powerful oil light, he proceeded to expose a negative of some cattle on Ilford rapid bromide paper, giving an exposure of twelve minutes. Blocking the landscape out, he, by double exposure, printed in some clouds. The resulting picture was exceedingly good, and received due appreciation by the members. He did not use a clearing bath, but merely washed the print with cotton wool.

The Chairman announced that the excursion to Dorking would be held on the following Saturday.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

August 27,—Mr. W. Jerome Harrison, F.G.S., in the chair.

Favourable reports were read of the Leicester, and Arley, and Fillongley excursions.

Letters were read from the judge of the Leicester excursion competition (Mr. Geo. Bankart), and the judge of the Arley and Fillongley excursion competition (Mr. Harold Baker), announcing their awards as follows:—Leicester, prize, Mr. W. Rooke; Arley and Fillongley, prize, Mr. A. J. Leeson.

The business of the evening was the exhibition of the negatives sent in for the developing competition. Forty-eight sets of three plates each had been exposed by a Birmingham professional photographer, each set consisting of one plate each over and under exposed, and the other receiving about the right exposure. Forty-four sets were applied for, the prize being awarded by the judge—Mr. Harold Baker—to Mr. J. T. Mousley for a very even set.

Mr. Thomason said that he should have preferred to have had the plates exposed say on some open landscape than as they had evidently been exposed in a photographic studio.

Mr. Middleton thought it impossible to expose forty-eight plates out of doors in a constant light. He also mentioned the case of a lens not covering so large a plate as it was advertised to cover.

The Chairman mentioned the fact that the Kew Observatory now undertook to test lenses and grant certificates on payment of a small fee.

Mr. J. H. Pickard was, on the 21st of August, the recipient of a testimonial from the members of the Council in the form of a lock-up stationary cabinet and secretaire, on his retirement from the secretarial duties.

The President, Mr. J. B. Stone, who has just returned from a visit to Japan, &c., in making the presentation, remarked that it was not given with the idea of making any award, but as a bond of friendship.

Mr. Pickard thanked the Council for their unexpected gift, and briefly traced the progress of the Society from its inauguration, in 1885, to its present position.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

August 27.—Ordinary meeting.—Mr. Paul Lange (President) in the Chair.

In the absence of Mr. William Tomkinson, Mr. John Wells reported on the excursion to Knowsley Hall on the 6th inst.

Messrs. Adams & Co. (London) had sent one of their "Lightning Tripods" for exhibition, which attracted much interest.

In the unavoidable absence of Mr. F. Anyon, who was to have read a paper and practically demonstrated the making of *Home Sensitised Paper*, Mr. J. H. Welch, at very short notice, gave a most interesting demonstration on the working of the Blackfriars Photographic and Sensitising Company's new celerotype paper. Mr. Welch developed a number of exposed prints, some of which had been prepared by the Hon. Secretary, and showed the variety of tones obtained by stopping the development at certain stages. The bath used was that recommended by the Company.

The proceedings concluded with the exhibition, by the aid of the Association's limelight lantern, of about 200 lantern slides (the prize slides of the Liverpool International Photographic Exhibition), and which now forms a handsome addition to the collection of valuable slides the property of the Association. Mr. Thomas S. Mayne ably described the slides in his usual graphic style, and the lantern was skilfully manipulated by Mr. P. H. Phillips.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

August 28.—It was agreed by the Committee that an effort be made to prepare sets of lantern slides illustrating the various industries in Brechin. The Secretary was instructed to write to the various manufacturers in the town and the manager of the East Mill Company, Limited, asking permission for the members to photograph their machinery for this purpose. Should this endeavour be successful, it is intended to take up paper-making, distillery work, &c.

Correspondence.

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

ARTIFICAL LIGHT FOR REDUCTION.

To the Editor.

Sir,—I wish to ask, through the medium of your widely circulated Journal, for some advice as to the following:—

I have about ninety negatives which I am very desirous of turning into antern slides. I have no time to work by daylight, and therefore cannot reduce them in the ordinary way. I am very wishful to do the work myself, rather than to send it to a professional. By what light or apparatus can I reduce them at night? I have a magic lantern, and one or two cameras, and a good dark room, but I do not know how to proceed. Would you kindly append a note to this, in the issue in which it appears, for the benefit of myself, and such as I who are in the same plight, and who have to work under the same difficulty.—I am, yours, &c.,

46, *Chesilton-road, S.W.* T. H. Holding.

[If the negatives are of the same size as the lantern slides, the simplest and best method of making the latter is by superposition in a printing frame. The exposure to a gas flame may vary from five to thirty seconds, according to circumstances. Should the negatives be half or whole-plate size, or of any dimensions larger than the lantern plate, then must another system be adopted. The negative must be lighted from behind by a powerful radiant, whether oil, gas, or lime, and a condenser must be interposed between the light and the negative. The copying is then effected by an ordinary camera. The optical arrangement in the case described is merely that of the lantern. Another way is to back the negative with a plate of ground glass, and project the light on to this from a lamp. But the centre will be much more strongly depicted than the margins, unless a large lens of the condensing order be placed behind the ground glass to bend the oblique and marginal rays of the lamp in the direction of the camera lens. A ground glass alone will not answer as an even background for a negative; without some such precaution as that mentioned, it is impossible to obtain equality of illumination.—Ed.]

PHOTOGRAPHY AT THE NAVAL EXHIBITION.

To the Editor.

Sir,—I have looked from week to week to see some comment on the matter of the taking of photographs in the Naval Exhibition, where one is met on every side with large notices to the effect that photographing is forbidden. Taking it for granted that there must be some good and proper reason for this prohibition, one naturally would expect to find the power to be let to some photographer or other, from whose prints, &c. of the Exhibition scenes might be obtained; but, up to the present, I have not come across anything of the sort. Again, what could be the harm in *properly* using a hand camera in the grounds? The scenes daily to be seen there seem to be specially suited for such work, and lantern slides of such scenes would be of great use and interest for optical lantern entertainments, which are now so deservedly popular. Therefore, sir, I should be glad to hear your opinion on this matter, and shall value highly your reply, for, knowing you yourself to be a worker of the hand camera, have you not sometimes felt strongly inclined to make some exposures during the various torpedo operations, which, with the crowds all around the lake, would indeed make fine subjects for lantern slides?

I remember, during the French Exhibition, the matter was arranged by payment, and many an excursionist thither has brought away real and lasting mementoes of that unique exposition; why could not something similar be obtained at the exhibition now at Chelsea?—I am, yours, &c.,

A. H. B.

London, August 28th, 1891.

OPTICAL PECULIARITIES OF ANCIENT STAINED GLASS.

To the Editor.

Sir,—In a notice of a paper by Mr. F. F. Tuckett, *On Some Optical Peculiarities of Ancient Stained Glass*, in the *Athenæum* of July 11, 1891, page 69, the following occurs, which may be interesting to some of your readers:

"But it is a singular fact, which seems only lately to have been noticed, that ancient glass transmits only a white light through its coloured medium. . . . Dr. Sebastian Evans . . . . confirmed Mr. Tuckett's statement by the fact that he had, on behalf of the firm of Messrs. Chance, devoted several months to studying and drawing the famous thirteenth-century windows of Chartres Cathedral, and that the one infallible mode of distinguishing between the ancient glass and the more modern insertions was to allow the sunlight to stream through the windows upon a sheet of paper fastened on a board, when any resultant spots of colour corresponded with the more recent additions."

I am, yours, &c., J. C. S.

Oakfield, Beckenham, September 1, 1891.

MR. MASKELL'S CAMERA CLUB PAPER.

To the Editor.

Sir,—Last week's number of The British Journal of Photography brings a communication to the Camera Club by Mr. A. Maskell, which contains the following: "We are told that the photographer uses an unintelligent machine." Well, are the brush and palette intelligent?

May I ask Mr. Maskell the same question in regard to music? The organ-grinder uses his instrument, and the musician uses his piano; but the latter is considered an artist, and the organ-grinder an organ-grinder. If the organ-grinder uses an unintelligent machine, is the piano an intelligent one?—I am, yours, &c., B.

Exchange Column.

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

A Weir sewing machine, in case, equal to new, perfect working order; will exchange for studio accessories. Also whole-plate burnisher, with gear; want studio chair, or half-plate rolling press.—Address, SYDNEY J. GANNON, Chelmsford.

Wanted a 10×8 or 12×10 camera and slides, tripod, and instantaneous shutter and lens; will exchange for a safety bicycle, cushion tyres, balls throughout, all complete (cost, last May, 13*l.*, new).—Address, JOHN WESTHEAD, 2, South View, Lane Top, Atherton.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPH REGISTERED:—

W. C. Gordon, Nairn.—*Portrait of Robert Anderson, Lochdhu.*

F. E. BECKER & Co.—Received.

OPERATOR.—You will find the subject referred to in another column.

A. B. (Switzerland).—The details of the process have not yet been published. Our readers will be the first to be apprised of it.

E. J. BROWNE (Liverpool).—A half-tone rubber-stamp process was devised by Mr. Duncan C. Dallas some years ago, and a notice of it appears in a former volume of our JOURNAL.

W. H. H.—You are perfectly safe in buying from any of the makers named, but it is against our practice to "give an opinion as to the relative merits" of manufacturers' productions.

A. BLOES.—You will not be able to obtain the thinnest tinfoil anything like the size you mention. We have never seen it in sheets four feet by three, and do not think it is procurable that size.

W. TUCKER wishes to know where blood albumen is to be obtained. It may be procured from most drysalters and dealers in bookbinders' requirements. Messrs. Skilbeck Bros., Upper Thames-street, supply it, but whether in small quantities or not we cannot say.

OAKLEIGH.—Notwithstanding that you say no hypo was present in the solution it is very clear that it must have been in small quantity. No such an appearance could be obtained from any other cause. A few splashes on the bottom of the dish would amply account for the trouble.

J. P.—The bad definition at top and bottom of the negative arises from the camera having been tilted while the lens was being worked with its full aperture. Let it be borne in mind that, in proportion as the camera is tilted from its level position, so must the diaphragm be reduced.

ADVENTURER inquires "whether there is any way to make a second negative from an original negative without having to take the photograph again, and, if there is not, would such a process be of any commercial value?"—In reply: The simplest way is to make a transparency from the negative, and use it in the reproduction (by contact) of another photograph, which will be a negative similar to the original.

W. SHARLAND.—If the negative is stained with damp silver paper through rain getting into the frame, the stains are irremediable. The other day we carelessly left a negative printing for several hours in the rain, and when examined the paper was firmly attached to it. However, by soaking in water for some hours, the paper was removed, then the negative was well washed, and it is now none the worse for the transaction. But it was thoroughly washed in the first instance, or the case would have been different. It was not varnished.

H. P. K. writes: "I wish to obtain a quantity of photo-mechanical prints from whole-plate negatives (landscape) suitable for mounting as opalines. What process do you consider cheapest and best, as most nearly representing silver prints?"—In reply: We do not think our correspondent could do better than employ the collotype process, which will exactly meet his requirements.

F. SQUIRES (Erith).—1. You will find an article in our ALMANAC for 1888 which will place before you in a clear and simple form all the information necessary to enable you to make enlargements from your quarter-plate negatives. 2. Hardwick's *Photographic Chemistry*, ninth edition (Churchill), will, perhaps, suit your purpose. 3. The preparation of ferric oxalate, although not difficult, is perhaps beyond the capacity of one who has no chemical skill; better purchase the quantity you require. The Platinotype Company, we believe, supply it.

STONE & WILKINSON ask: 'Would you kindly inform us what to use to precipitate the used developer, pyro and ammonia, Ilford formula? We have tried salt, but with no success. Thanking you in anticipation."—It is evident that our correspondents suppose a used pyro and ammonia developer to contain silver salt in solution, but this is not the case, as a glance at the *rationale* of dry-plate development will show, and hence all attempts at "precipitation" are wasted. Directions for recovering silver from old fixing baths have appeared in this column times out of number.

S. A. J. asks "what lenses are used in making the very great enlargements often seen in shop windows in the Strand. They must be very large, and of unusually long focus to cover so well, must they not?"—The degree of enlargement does not depend upon the lens. Any lens that will take the original negative will enlarge the same to any size. Thus, a quarter-plate lens will enlarge a quarter-plate negative to several feet. But, as a matter of practice, professional enlargers usually employ lenses capable of taking a larger negative than the one to be enlarged. Thus, for enlarging from a whole plate, a ten-by-eight lens is generally used. By this means better marginal definition is secured without so much stopping down as would be necessary with the smaller lens.

C. W. (Liverpool) says: "By some means or other some sweet oil from the rolling press has got on a very valuable water-colour drawing I have to copy. Not only is the grease on the surface of the picture, but it has gone right through the paper. Can anything be done with the picture to remove the oil, or could a print-restorer take it out without injury? The picture is said to be worth fifty pounds or more. Pray help me if you can."—The injury is not so great as our correspondent thinks. The grease may be taken out by the following method:—Obtain some pure benzol and some clean white blotting-paper. Moisten the soiled parts back and front with the benzol, and, after allowing it to soak for a few seconds, blot off. Keep on repeating the operations till the picture is clean.

R. C. G. writes: "I photographed H.R.H. Princess Louise on Thursday last, whilst she was passing with a procession at Kendal. Am I at liberty now to put on memorandum, &c., 'Photographer *of* H.R.H.?' I have the negative in my possession. It is not a very good one; but, still, you can tell every one of the occupants in the carriage."—It would not be good taste, to say the least, to make capital out of a photograph taken without the lady's knowledge. The case would be quite different if she had given you a sitting. People entertain a very natural objection to be photographed surreptitiously. Besides, all photographers who chose to point their cameras at members of the Royal Family when passing through the public thoroughfares would have the same right to dub themselves as proposed, and have quite as good a claim to the title you wish to assume.

REVIEWS, &C.—In our next.

LIVERPOOL CAMERA CLUB.—At next meeting, on the 9th inst., Mr. H. Handley will demonstrate *The Platinotype Printing Process*. The Secretary will be pleased to receive the names of any members desirous of showing sets of lantern slides during the winter months.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—September 5, Outing, Greenwich Hospital. Members meet at the west gate, Royal Naval College, at thirty minutes past two p.m. September 10, *Keeping Qualities of Plates*. September 17, *Demonstration of the Lantern Microscope*, by Mr. T. E. Freshwater.

HACKNEY PHOTOGRAPHIC SOCIETY.—September 10, *A Holiday in Isle of Man and Ireland*, by W. Fenton Jones. September 13, Excursion to Whipps' Cross; meet at Whipps' Cross at forty-five minutes past two. September 24, Members' Lantern Night. September 26, Excursion to Wanstead Park; meet at Leytonstone Station at forty-five minutes past two p.m.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1637. Vol. XXXVIII.—SEPTEMBER 18, 1891.

LINE SUBJECTS ON GELATINE PLATES.—I.

ALMOST the only department in photography in which the wet-collodion process still maintains its old supremacy is the reproduction of line subjects, chiefly in connexion with the numerous photo-mechanical printing processes now in vogue. For this particular purpose it is indubitable that collodion possesses very distinct advantages over gelatine plates, and, except in very special cases where speed is an object, it would be foolish to attempt to disestablish existing wet-plate arrangements in order to make room for the more modern process, when the only result could be increase of trouble for no better result.

While, however, the professional photographer, whose business lies wholly or mainly in the direction referred to, may find it to his advantage to adhere to wet collodion, it would be decidedly straining a point on the part of the amateur photographer, or professional for that matter, who may want to copy an occasional line subject, to maintain a wet-plate equipment for the sole purpose of such very exceptional calls upon his time. Yet the idea prevails that gelatine plates are totally unsuited to the work, and consequently many such jobs are refused by the professional, or left undone by the amateur, simply because each supposes himself unable to cope with them. Collodion in the form of emulsion may, of course, be employed, but unfortunately this is almost as strange to the average laboratory as is wet collodion.

As a matter of fact, reproductions of the class we have now under consideration can be as perfectly made by means of gelatine plates—and we refer now to any good plate of commercial origin, and not to specially prepared films—as by wet collodion, but the care and trouble involved in the operation will be slightly greater, though not sufficiently so to deter any one, amateur or professional, from undertaking the work at very short notice. We do not go so far as to say that *all* commercial plates are suitable for the work of reproducing black and white subjects in line, for many of them are, unfortunately, barely capable of fulfilling the requirements of ordinary studio or field work in half-tone; but any fairly "robust" film, such as may be worked without anxiety, and fulfil the all-round requirements of the studio, will be found perfectly adapted to the work in question.

There are a few fallacies in connexion with line reproduction that it may be worth while clearing away. In the first place, it is generally supposed that, for this purpose, a negative of abnormal density is an absolute necessity, and that this extraordinary density must be accompanied by perfect clearness and transparency of the dark lines of the engraving, or whatever the original may be This is far from being the truth, for, provided the lines be absolutely clear—and this is a *sine quâ non*—the density is a matter of comparatively little importance, except in the case of certain printing methods, notably that upon bitumen, in which a very long exposure is needful. For printing upon ordinary albumenised paper, for platinotype, or especially for developed gelatino-bromide prints, a negative of moderate density—provided, as has been said, the lines are absolutely clear—will give a better result than one of greater strength, and its production will be, in many respects, far easier.

The difficulty, then, is to secure the necessary clearness of the lines of the negative, and not, as is usually supposed, to arrive at a sufficiently deep deposit. If the former condition be attained, the latter becomes comparatively easy. Now, it is pretty generally believed that a gelatine plate is necessarily inferior to a collodion film in these two respects, namely, the giving of density as well as clearness; and though, in general practice, this character may seem to be borne out, it is a fallacy to suppose that it is the fault of the gelatino-bromide, as such, that this is the case. Rather, it may be said to be due to an under-estimate of the good qualities of the gelatine film and to a neglect of certain mechanical precautions, rather than to any chemical inferiority of the younger process.

In the first place, all who have done much at this class of work know how highly important it is to shut out all extraneous light, both from the camera and the developing room. In the latter respect there is, perhaps, at the present day, less cause for complaint or suspicion than formerly, since the necessity for a "safe" developing light has been so thoroughly drummed into the modern photographer; but perhaps the camera itself cannot be placed so far above suspicion. We do not mean to imply that cameras are used whose angles, and joints, and slides present crevices, through which white light is able to get to the interior. We do not require the conditions to have reached that stage; but it is more than probable that in innumerable unsuspected cases white light, reflected from the inside of the camera and even of the lens, has been the means of condemning gelatine plates for purposes of reproduction, and even in cases where the importance of the most perfect protection from light is not so great.

Even granting that the camera itself and its belongings are absolutely light-tight, it should always be borne in mind that the lens itself forms a window through which white light enters, and that, though theoretically every portion of that light is conveyed in straight lines to the sensitive surface to take its own part in forming the image, such is far from being the truth practically. However perfect the lens may be, some portion of the light it transmits is diffused or reflected from the sides of the camera, and so reaches the plate otherwise than in refracted straight lines; and, in proportion to the working aperture of the lens or its rapidity, so does the proportion of diffused light increase. Now, if in the days of the comparatively slow wet plate it was considered necessary to exercise unwonted care in

preventing internal reflection and diffusion in the camera when copying was the work in hand, how much more so should it be the case when gelatine films are in question. Yet how many, amateurs especially, would set to work to copy an engraving with, say, a sliding-body camera that has not been "blacked" for a dozen years and with the full aperture of a rapid rectilinear lens? What wonder if under such conditions the dark lines of the engraving receive nearly as much exposure from diffused and reflected light as the portions impressed by the lens? And what other result could be expected than a thin, feeble image, useless for any purpose?

COAL-TAR COLOURS IN PHOTOGRAPHY.

THERE was recently sent to us for inspection a freshly printed photograph which had "faded," and our opinion was asked as to the cause of this fading, seeing that, as we were informed, every precaution had been taken to obviate the possibility of such defect. A close examination showed that the fading, for such, in truth, was in this case a correct designation, had occurred, not in the silver image, but in the white margin of a vignetted picture. It had been exposed for two or three weeks only to an exceedingly dull light on a shelf at the end of a room, and had been partly protected by a brown-paper mask with a central aperture, which lay upon it. The part receiving the light was a sickly white, the rest a very pale pink colour. We presume that, in portrait work at any rate, the bulk of the albumenised paper sold is tinted. In our opinion, a very pale pink or "flesh tint" is as decidedly advantageous to effect as a full pink is the reverse; but the folly of employing such a paper as we describe—pale pink that fades in a dull light in a week or two—is, or should be, patent to all. At a time when silver printing cannot hold its own, but yet is a necessity in commercial popular photography, every effort should be made to prevent further loss of reputation. It is, no doubt, the fault of the albumen paper manufacturers, yet we cannot but think that, if proper representations were made to them, they would employ less fugitive colouring matters. It was at one time the fashion to decry all coal-tar colours as fugitive. In the early days of their manufacture this was true, but at the present time it is possible to procure these colours in all leading tints as fast as those produced in the older modes. We have seen instances of the colour fading in the trimmings of a lady's bonnet in the course of an ordinary call, the lady sitting in the sun. Evidently the dyes used in her costume were fugitive; but fast colours could have been employed for similar fabrics, and so can they in albumenised paper, if the makers will take the trouble to discover them, and—pay for them. The paper we speak of was no tyro's work; it was out of a batch from one of the most extensive makers known. For this purpose it is very probable that magenta is used; call it fuchsine roseine, azaleine, rubine, or whatever appellation is fashionable, for all represent the same dye stuff; but it is fugitive in the light, and should not be chosen for the purpose of tinting albumenised paper. Again, a considerable amount of tinting photographs has been done by the use of coal-tar dyes. There is little to be said in their favour as regards the effect produced; but, seeing that it is not difficult to tint a face or a landscape at the rate of one per minute, it might be well to use colours known to be fast, though some of our readers might say the sooner they faded the better.

Another very important use these colours subserve is the giving a suitable tint to carbon prints. Here, we believe, every care is taken by the manufacturers of tissue to employ no fugitive colours, and it is rare to see a carbon print of the ordinary kind that has given way to the action of light. But of another kind of carbon print—the original chromotype—the same cannot be said. It is simply necessary to expose one of these to sunlight for a comparatively short time to have ocular proof of the fact. It is unfortunate that such should be the case, for the aim of a business-like photographer should always be to eradicate rather than encourage the old belief that photographs "always fade." The same word is used whether it be the whites of a print gone yellow or brown, or the darker portions become lighter; they are to the public always "faded."

In regard to the colours chosen, experiment will have to play some part; it will not suffice to take a dye known to produce fast shades, and, putting it to other uses, and in a different manner, expect its reputation to carry it through safely. For example, alizarine is used in Turkey-red dyeing, and that colour is the fastest known; but it is not a necessary consequence that any alizarine colour, however used, should be as fast as Turkey red. That colour itself, for example, would not be so fast if a certain oil called Turkey-red oil were not used in the process. Fortunately, bichromate of potassium has no action upon alizarine dyes, though free chromic acid has; but that is not a likely accompaniment of the bichromate bath of the carbon process.

The moral of our remarks consists in a recommendation to use care in the selection of any coal-tar colour for use in photographic processes, which embrace many more than those we have indicated; and, above all, we would, in conclusion, recommend that a fast colour be employed in giving that commonly employed tint upon albumenised paper which, when very faint, as we have said, improves a photograph, but which at present proves to be of a most fugitive character.

THE GENESIS OF ALBUMENISED PAPER.

REFERENCE has frequently been made in these columns to the durability of many of the prints of old that were made on what was once known as albumenised paper. It is an incontestable fact that some photographs produced thirty and many more years ago are still far brighter, and show less signs of fading, than many modern ones but a few years, even months, old. We shall here indicate what that paper was, and wherein it differed from the albumenised paper of modern date.

When direct positive printing was first adopted, it was found necessary to add something of a glutinous nature to the salting solution in order to prevent the image from sinking too deeply into the paper, and thus destroying its brilliancy. For this purpose various materials were used, such as Iceland moss, serum of milk, a very dilute solution of gelatine, or one of albumen. Eventually the use of the latter grew, because it was found to retain the image better on the surface than any of the other substances, thereby giving greater transparency in the shadows of the picture. Paper prepared with albumen then became known as "albumenised paper."

Referring to the volume of the *Journal of the Photographic Society* for 1853, we find the following formula for albumen paper given by Mr. Maxwell Lyte:—Albumen, 6 ounces; water, 6 ounces; chloride of barium, $7\frac{1}{4}$ drachms. This would be equivalent to eighteen grains of chloride of sodium to the ounce—the paper to be sensitised on a silver bath of 120 of nitrate to the ounce of water. In the same volume the late Mr. Spencer gives equal parts of albumen and water with eight grains of chloride

of sodium to the ounce, and sensitising on a solution of nitrate of silver of from ninety to one hundred grains to the ounce. In 1854 Mr. Hennah, the excellence and durability of whose prints our older readers will well remember, recommends albumen diluted with three times its bulk of water, with twenty grains of hydrochlorate of ammonia and half a grain of iodide of potassium to each ounce, the paper to be sensitised by floating on a seventy-grain bath for two or three minutes. Delamotte, in his treatise (1856), gives equal parts of albumen and water, with ten grains of chloride of sodium to each ounce. This paper was to be floated for four or five minutes on a sixty-grain bath. Hardwich (third edition, same year) gives precisely the same proportions, both for albumenising and sensitising.

In Long's treatise on photography (1859), we have six eggs given to twelve ounces of water, with 270 grains of chloride of barium, and a sixty-grain silver bath. In the same year, Mr. Melhuish, when using commercial paper, said he floated it on a seventy-five-grain bath, and when the paper was nearly dry he refloated it on the same solution, and then suspended it from the opposite corner to that it was previously hung. In 1860 Mr. J. C. Leake, who was noted for the excellence of his prints, used albumen, 15 ounces; water, 5 ounces; and chloride of ammonium, 300 grains, and sensitised on an eighty-grain bath. Hardwich (sixth edition, 1861, just thirty years ago) gives albumen, 15 ounces; water, 5 ounces; and chloride of ammonium, 200 grains, with a sensitising bath of 60 grains to the ounce. He mentions that, if pure albumen be used, the amount of chloride may be reduced.

Undiluted albumen about this time was being employed by some professional albumenisers. But the paper differed widely from that of the present day, as may be seen by reference to prints of that date still to be found in most family albums. It was prepared with fresh egg albumen, hence its gloss was far less than that of the "single" now supplied.

No doubt the introduction of the *carte-de-visite* had much to do with the demand for glossy papers, and from about 1862 manufacturers vied with each other in their production. It was known that by keeping the albumen till it became sour it produced more glaze, as well as being easier to manipulate, and full advantage of this property was taken by the albumenisers. Many then rolled the paper under heavy pressure before floating it, and again after the paper was dry, this sometimes being done between silver plates. Great care was also taken to dry the paper as quickly as possible after floating, so as to avoid the albumen sinking into its substance. By this procedure the paper of about 1866 was, so far as gloss is concerned, very different from that of, say, 1862. Not only did it differ in appearance, but a large proportion of the commercial papers contained considerably less chloride, so as to enable weaker sensitising baths to be employed. As the amount of albumen was increased, so was the salting diminished. It may be mentioned that in 1863 Mr. Wood, of Edinburgh, described a method of coagulating the albumen by the aid of steam. This enabled a second coating to be applied if desired.

During the last twelve or fourteen years the amount of gloss has still further been increased. Now, instead of the albumen being kept until it has become sour only, it is generally kept until it is quite putrid. It is said that its viscosity is further increased by the addition of dry blood albumen. One thing is certain—namely, that the highly albumenised paper of the present day differs widely, both in gloss and the proportion of chloride it contains, as well as the bath it is sensitised upon, from that of thirty or even five-and-twenty years ago. So it does in price.

In a catalogue now before us, dated 1854, the then albumenised paper is quoted at two-and-sixpence per dozen sheets—eleven inches by nine—equal to twenty shillings per quire full size. In our ALMANAC for 1861 the late Mr. Jabez Hughes, then of Oxford-street, advertised albumenised paper at twelve-and-sixpence per quire. This is about the price now charged for highly glazed ready-sensitised paper. Of course the papers just referred to were not sensitised.

In conclusion, it may fairly be said that photographers have educated the public in the matter of highly glazed photographs. Now an attempt is being made by many to educate it back to the original matt surface.

"SHOW SUNDAY" is an institution among artists which, although of comparatively recent introduction, seems to have taken firm root among them. The term may possibly be one which, to those who do not follow artistic matters closely, is not perfectly intelligible. Let us explain it. Some few weeks before the opening of the Royal Academy, many artists of eminence, as well as others on lower rungs of the ladder, invite "Society" people and pressmen to an informal private view of their pictures. These invitations are eagerly sought after. Large crowds do the round of the studios in the course of the day, the custom being recognised as a "function" which must not be missed by those who aspire to be *en règle*. Thus the principal pictures of the year are talked about and discussed long before they are hung, and lengthy descriptions and sometimes criticisms of them appear in the newspapers, presumably to the advantage of the artists, if not of the public. Shortly speaking, therefore, Show Sunday is an excuse for the "puff preliminary," which is so marked a feature of artistic and literary life nowadays.

So far photographic exhibitors have not advanced to this extent, but there is no knowing what the future has in store for them. It is quite within the bounds of possibility that before very long the photographic press will be invited to pass in review pictures that are *intended* to be sent to Pall Mall or some other exhibition. Whether these invitations will be accepted, and put to similar uses as those above referred to, is a matter upon which we offer no conjecture. As regards the non-photographic press, however, "show-day" among photographic exhibitors seems to have made a good start, since we read in the columns of a provincial morning paper a long and eulogistic description of a number of pictures that are destined for exhibition at Pall Mall "by one of the foremost artists of his profession." It is, we believe, on record that more than one highly lauded "Show-Sunday" picture has failed to find a place on the walls of Burlington House; but we hope that no such untoward fate at Pall Mall awaits any of the photographs of which our contemporary, no doubt quite justifiably, speaks so favourably. The risk pointed out, however, seems to us to indicate that it would be unwise on the part of photographers to imitate the artists too closely in all their curious doings.

THERE was an old-fashioned ring about the discussion which, according to the report given elsewhere, arose out of the subject for the evening at the last meeting of the London and Provincial Photographic Association. From the keeping qualities of plates to their methods of preparation is a natural and inevitable step—indeed, it is hard to see how the first subject could be talked of without giving rise to the other. As we partly anticipated in our Continental Notes last week, the subject elicited some curious experiences. Perhaps the most valuable matter it gave rise to was a long discussion, chiefly sustained by Mr. A. L. Henderson and Mr. J. Barker, as to the merits and demerits of the ammonia process of emulsification, which, in turn, was the means of inducing the first-named gentleman to promise, at an early date, to publish before the members of the Association a new formula and process, which we are sure will be productive of a great deal of interest and information for a very large number of members who

have joined the Association since the "old gelatine" days, when gelatine-emulsion making was a constant topic of discussion at its meetings. "Old gelatine days," in photographic phraseology, may now, we suppose, pass current as well as "old collodion" days, since we are within measurable distance of the twenty-first birthday of the gelatine process at the hands of Dr. Maddox.

MANY of our readers are familiar with the pictures that have been published by Messrs. Barrand, in which portraits of members of learned societies, taken separately, have been grouped together with an appropriate background, and then reproduced. This firm, we are given to understand, are now engaged in producing a picture to commemorate the recent Jubilee "Canterbury Week." Over three hundred portraits were taken which are to be included in the picture.

THE coupon-system of attracting business appears to be quite the rage just now. At one time it was principally confined to the tea grocers, but lately it has extended to very many other trades, even to half-price omnibus fares. A large trade is done in photography on the coupon system. A person is supplied with three coupons, each of which entitles the holder to a dozen *cartes* for three-and-sixpence. When these are disposed of, the one to whom they were supplied is entitled to a dozen *cartes* for nothing, so that a dozen *cartes* of four different persons are supplied for ten shillings. The latest thing in this kind of business that has come under our notice is an announcement at an establishment where the business in tobacco and photography is combined. It is to the effect that purchasers of tobacco, &c., to the amount of twopence and upwards will be supplied with a coupon, and, when a collection of these represents purchases to the amount of a pound, their owner will be entitled to two cabinet portraits of himself on payment of a shilling. What is photography coming to next?

IT is hard to tell to what extent the general public has, as regards portrait photography, abandoned albumen silver prints for pictures in platinum, developed bromide, and the other processes that are now more or less employed. Although it would be absurd to pretend that the first-named process has the hold which it enjoyed some ten or a dozen years ago, there can be no doubt from the facts referring to its consumption, which frequently come under our notice, that it still enjoys an amount of favour so considerable as to justify, not only the unabated activity of those engaged in its commercial preparation, but also the uprising of new competitors for a share of patronage. Generally our observations tend to show that, while among amateurs albumen has little or no popularity, the great body of professional photographers still use it extensively, especially in country districts

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CONCEDING so much, therefore, we cannot but conclude that the consumption of this much-abused paper is still very large, and that, in the natural course of things, it must be years before the process becomes obsolete. To the eye of the unsophisticated sitter, there is an attraction about a good silver print which might puzzle him to define, and would just as surely defy the efforts of critical experts and others to destroy or supplant. We have heard it said that photographers would be only too happy to adopt platinum or bromide printing if they could persuade their sitters to change their tastes; but, if the custom of one of the former class with whom we are acquainted is a guide to the feelings of the many, they are not much concerned one way or the other. This gentleman, in sending out his proofs, always submits them in silver and platinum, and thus allows the sitter to exercise his (or her) own choice in the matter.

ON THINGS IN GENERAL.

THE "Correspondence" column has been specially interesting of late; but I am disappointed that no one has replied to the letter of "J. C. S.," published in the issue of the 4th inst. He quotes from a notice in the *Athenæum*, stating that "ancient glass transmits only a white light through its coloured medium." Thus Mr. Tuckett; Dr. Sebastian Evans is said to confirm the truth of this remarkable discovery, having stated that "one infallible mode of distinguishing between the ancient glass and the more modern insertions was to allow the sunlight to stream through the windows upon a sheet of paper fastened with a board, when any resultant spot of colour corresponded with the more recent additions." This is all very extraordinary. In other words, it states that, if the sunlight stream through the coloured glass direct upon the eye, it produces an effect of colour, but that, if it be reflected from (presumably) white paper, the colour effect is lost! This reads very like nonsense. Was the scientific expert of the august journal in question sleeping when "copy" came in? What an excellent illustration of the discussion at the London and Provincial Photographic Association upon dark-room lights it would have made. Rather confusing; but that would, perhaps, have been a merit rather than a defect. There is only one way of testing coloured media for the purpose, and that is to expose a plate in the most brightly illuminated part of the room, and for a fairly protracted time develop, and see if a deposit is produced. Every practical man knows it is quite possible to develop, by the aid of naked gaslight, or even by daylight, provided the plate receives very little of it, and for a short time only. A plate left in the dish may be developed with perfect safety by a light which would rapidly fog it if the negative be held up for scrutiny every now and then for a second or two. A safe light is one that does not fog under working conditions. Any light may be made to fog under suitable conditions.

Some one has evidently been complaining that the price of platinum paper has not been generally reduced, seeing that the price of the metal has fallen. The question is, "Has the metal fallen below the price it had attained when the makers found it necessary to raise their charges?" We all know how the price of a quartern loaf jumps up when flour is, or promises to be, higher, and how slow it is in coming down when normal quotations reign. Surely we are not able to accuse photographic manufacturers of such equivocal conduct.

On the twenty-first ult. "F. W." raises a very important point. He finds that some photographs treated with encaustic paste some sixteen years ago have not faded, but that prints he now produces do fade. The argument is certainly not complete if, in the same parcel, he had some non-encausticised that had faded; and here would be more ground to work upon. Still, as I said, he raises an important point. It is held by some that atmospheric influence alone causes the destruction of properly executed prints, and it is reasonable to suppose that the protection afforded by the resin of the paste to the print might ensure its permanency. Are there no other readers of the JOURNAL who could contribute information of value on this point? I should like to ask one firm in particular, who, I believe, a great many years ago treated all their *cartes* with encaustic paste, what information they could contribute? I refer to Messrs. Robinson & Thompson, of Liverpool.

Regarding the use of flat baths for fixing negatives in, as discussed at the London and Provincial Photographic Association, there is no doubt that they offer facilities for staining, unless they are kept in motion and a sufficiency of liquid be employed. The best upright baths that I have seen are the stoneware troughs with solid grooved sides; they can be purchased half-plate size, to hold a dozen and a half, and, I believe, larger sizes, to hold a dozen. They are rather unwieldy, and they hold a much larger amount of solution than at first sight might be thought.

I may give my own experience of ebonite dishes, which also were referred to at a meeting of that Society. I have some (12 × 10) that are useless for developing purposes, owing to the bottom having become convex; while others of the same size, that have been in my possession and use for a much longer time, are as good as on the day I purchased them.

There is a vast amount of real, practical discussion at the meetings of the London and Provincial Photographic Association, and no one could attend and fail to receive valuable information from time to time; but, as I have already noticed, the "same old story" is occasionally brought forward. Take, for example, the conversation on the blistering of albumenised paper. It has been preached upon, and written upon, *ad nauseam* in every photographic journal in existence, and for a long time there has been no new notion brought forward. Why not let it have a quiet funeral, and be entirely forgotten, until

some new light can be thrown upon it? A method for preventing, under all circumstances, has been several times given in these pages. Let those who have blisters adopt it, until, as I say, some new discovery is made regarding its prevention or cure. FREE LANCE.

AMERICAN NOTES AND NEWS.

A HIGHLY humorous engraving appeared in English art establishments two or three years ago. It was entitled "Witness my Last Act and Deed," and represented a playful kitten, during the temporary absence of the lawyer, upsetting a bottle of ink and rolling it over the elaborate will or testament just finished, and still spread out on the desk. We remember applying for permission to reproduce this on a lantern slide scale, offering to pay the full retail purchase price of the coveted print. This permission was not granted. In a recent issue of the *American Journal of Photography* we find this same engraving reproduced by photography as its frontispiece, and we are glad to become possessed of it at such a cheap price. But what about the copyright? And how does the law apply as against the possessors of what is undoubtedly a piracy in this country? We know very well that the copying of prints and engravings by photography or any other process is an offence within the statute, and that so also is the selling of a copy; we further know that the importation into the United Kingdom of copies or imitations made abroad of any picture in which there is copyright is prohibited; but what we want to know is—granted that the customs officers blunder in allowing prints to be admitted—have we not a perfect *legal* right to take advantage of such laxity, and retain, nay, frame, if desired, the mischievous kitten with its ink-besmudged testamentary parchment? From the point of *ethics* another view presents itself, but we confine our queries to the legal aspect of the case. Those competent to judge affirm that cigars on which no duty has been paid smoke quite as pleasantly as if it had been, the axiom being, that once admitted into this country they are free. And so, we suppose, with piracies.

AMERICAN journalism is noted for the bland and refreshing manner in which it deals with topics which on this side of the Atlantic are as a rule handled with rather more reserve, if not delicacy. It seems that at the late Buffalo Convention a well-known face was missed, and this is the manner in which the *St. Louis and Canadian Photographer* elects to refer to the fact. "Last year," it says, "the editor of the *Photographic Times* was detained at home on account of an increase in his family. This year the editor of the *Bulletin*, Dr. Elliott, was for the same cause prevented from attending the Convention. Who next? We would suggest to our Executive Committee not to appoint the time of convening the Convention on such important dates. Consult the old farmer's almanac, gentlemen." Can it be that the excitement of the happy event was responsible for Dr. Elliott's optical slip with which we twitted him a fortnight ago? But, Mrs. Fitzgibbon Clark, what special virtue attaches to the old farmer's almanac?

THE *Photographic Herald* (N.Y.) for August gives some "pointers" (*i.e.*, hints) in bromide printing that seem to have a smack of novelty, which, it is to be hoped, do not detract from their practical value. As regards development, we are informed, among other things, that when the iron solution is yellow, red, or brown, it is useless for developing purposes. Now, good *Herald*, do you mean to say that a solution of ferrous sulphate ought to be colourless? If so, we should like to know how often you obtain it so? Then, bromides in development are said to spoil the tone. We always thought that, used intelligently, they simply retarded development, and never heard that they influenced the tone one way or the other. "Although fixing takes place rapidly," continues our mentor, "do not remove till its (the hypo's) function is accomplished." Nobody, we should hope, would dream of doing such a thing. After this, the advice to keep separate trays for developing and fixing is too choice a *bonne bouche* to be spoiled by any comment of ours. By the way, our old friend and contributor, Mr. H. S. Starnes, will be amused to know that he is called "Professor" across the water. But, then, everybody who is anybody has a handle to his name there—and so have a great many people who are nobodies.

MR. P. C. DUCHOCHOIS, of New York, has done that which a man, according to the quotation, sometimes wishes his enemy would do—that is, he has written a book; but Mr. Duchochois is a gentleman whose long acquaintance with photography, as well as his sound and extensive information in regard to its practical applications, places him above any feeling of fear as to the sort of welcome which his work will receive. Readers of the JOURNAL for a quarter of a century or more past will hardly need telling of his qualifications to treat his subject ably and clearly. The title of the work is *The Photographic Image: a Theoretical and Practical Treatise of Development in the Gelatine, Collodion, Ferrotype, and Other Processes.* The book, we understand, will be published in New York and London.

IN an article on "Practical Development" in the *Photographic Times*, Mr. W. S. Waterbury, notwithstanding the extreme antiquity, nay, the threadbareness of his subject, manages to say something of *an interesting nature*, with which, however, everybody will probably not agree. Mr. Waterbury believes that the development of a picture is of far more moment than the exposure, because, with judicious development, incorrect exposure can be corrected to a great extent. Admitting the latter proposition, we fail to see how it in any way supports the general view that development is of more moment, even from Mr. Waterbury's point of view, than exposure. In this part of the world, at any rates it is said, with a frequency that has almost become tiresome, that, if a plate has been correctly exposed, development is the simplest matter imaginable, and to that sentiment we ourselves subscribe. Some of Mr. Waterbury's axioms are forcible, if trite. He believes, he says, in allowing the light ample time to act on the sensitive film, for, without sufficient light action, tons of chemicals cannot produce a picture. And so say all of us. But, ah! Mr. Waterbury, what *is* sufficient light action? Does not that require as much attention as development, if not more?

FROM an interesting private communication by Professor Coleman Sellers, of Philadelphia, we gather that the weather in the States during the past summer has been, to say the least of it, trying. The temperature for weeks was abnormally high, being followed by phenomenal depressions and rises, which must have been very difficult to bear. Taking one consideration with another, the lot of the English emulsion-maker seems preferable to his American competitors', while, notwithstanding the vagaries of our own climate, and the storm of grumbles which it constantly provokes, it is likely that we might all in this respect go farther and fare worse. Professor Sellers, whose opportunities for forming an opinion on the matter are of an excellent kind, also tells us that the interest in amateur photography in the States seems to be greater than ever. A large number of ingenious hand cameras have been placed on the market, while a great many of the lantern slides that are made from these small negatives are of an unusually good quality. It is legitimate to speculate as to what would have been the position and extent of amateur photography, not only in the States, but in this country, but for the wonderful popularity of the hand camera. In all probability, decline would have set in long ago; while as a "fashionable amusement" it is more than likely it would have gone the way of other crazes. And now the puzzle is, after the hand camera—what?

THE PRINTING PROCESS OF THE FUTURE.

I.

IT will be a difficult task for those commencing to study the art of photography to choose among the multitude of positive printing processes the one best suited to their requirements. Surrounded by enterprising firms pushing the various rival papers giving shining surfaces, matt surfaces, all sorts of surfaces, the bewildered photographer seeks a refuge in the old-fashioned albumen paper. It has been said times out of number, by various masters, that the albumen process was doomed to be entirely supplanted by the new and superior processes; but, notwithstanding these statements, albumen paper has held its own, and the demand for it increases, instead of

decreases, each year. Processes come and processes go, but, like the brook, albumen paper seems to go on for ever.

The question now comes, How long will this last? Amateurs have already begun to find the fact that the albumen paper process is not the acme of perfection, and that already several papers are in the market which are bound to supersede it in time. I allude to the gelatino-chloride printing-out papers. This I consider the printing process of the future. The day will come—it may be delayed a considerable time, but it will come, nevertheless—when this process will be the one principally adopted. The platinotype will always have admirers; but, then, is it not possible to obtain just the same soft matt-surface effect with a paper coated with gelatine? We then have the advantage of being able to print the image right out—a very important advantage to many who object to developed images. But, with regard to the soft, matt-surface effect of the platinotype and other processes, it it is undoubtedly artistic and pleasing to the educated eye, although it must be admitted that the majority of persons prefer the shiny surface. Test the truth of this statement by showing a friend a well-executed platinotype. He will probably admire it and say, "Very soft," "Very pretty," and so on. Next hand him a highly surfaced gelatino-chloride print. The effect will be magical. "Beautiful!" "Splendid!" "How brilliant!" "What a splendid finish!" will be some of the exclamations that will be heard. It takes his fancy at once, as something with a perfect finish. Professional photographers seem slow—very slow—to recognise this fact. I do not remember at the moment one professional photographer who works this process. Many a friend to whom I have shown samples of my work on this paper have said "Splendid! Where can I procure such photographs?" and I have been compelled to acknowledge my ignorance.

As I claim that gelatino-chloride paper is the printing process of the future, it will only be fair to the reader that I explain my reasons for doing so. First, then, with regard to the manufacture of the paper. For the benefit of those who are ignorant of the method, I will explain that, first, a gelatine solution is made containing a chloride; nitrate of silver is then added, which forms an emulsion of gelatine holding silver chloride in suspension. Citric acid and other ingredients are then added for preserving, and the emulsion is ready for spreading on the paper. Tinted enamel paper is generally used, so as to prevent the emulsion from sinking in, the effect of which will be explained hereafter. Now, it will be seen that the operation is a very simple one; all that is necessary is to make the emulsion and float paper on it—no more trouble than sensitising the already prepared paper. The work being less, the cost of preparation should naturally be cheaper. At present it is not so, but when the demand reaches that of albumen paper, and competition arises, then the cost of gelatino-chloride paper will undoubtedly be less than for albumenised paper. From this I do not wish it to be inferred that the present manufacturers make such an enormous profit by retailing it at double the cost of albumen paper, because this is not so. The sale being so limited, the profit is reduced considerably.

Now, with regard to the prepared paper, it can be purchased ready sensitised, in various tints, and will keep for a great length of time. It becomes slightly yellow after a time, but should not be discarded on this account, as this discolouration usually disappears either in the toning or fixing baths. Here may be claimed an advantage over albumen paper. It is very useful to be able to keep a good stock of paper on hand, but this cannot always be done with silvered albumen paper, and the commercial ready-sensitised paper can never be made to give the same brilliant results as freshly silvered paper.

In printing we get another advantage, *i.e.*, in rapidity. I found that in winter it is possible to get two prints from a negative in the same time that one on ordinary sensitised paper would require to furnish, and in summer the proportion is about three to two. Surely this must be claimed as an important advantage with the long, dreary, dark winters that seem to be our lot, when the disheartened printer sits gazing vacantly at the slowly changing prints, and hoping for the sun which never shines.

With regard to the toning and fixing, these operations are very similar to those employed with albumenised paper. A very great variety of tones can be obtained, from red to a dead black. In washing, however, we obtain an advantage in the fact that the sensitive film is very compact, and lies on the surface of the paper; consequently the soluble hyposulphite of sodium is eliminated with much greater rapidity, and the permanency of the print is thereby undoubtedly improved. Besides this, the fact of the sensitive film lying on the surface of the paper gives other results. Among these may be mentioned absolute reproduction of the minutest detail of the image, the film lying in absolute contact with the negative. There are, I am sure, very few who really know the amount of loss of detail sustained with albumen paper. Those who are inclined to disbelieve this statement should prepare a very sharp negative by employing a very small stop, and then make a print upon albumenised paper, and one upon a gelatino-chloride paper. The superiority of the latter is at once apparent for faithful reproduction of the detail, a large portion of which is lost in the albumen print. When I term this property of gelatine paper an advantage, I presume my reader is not one of the naturalistic tribe, but one who delights in faithful representation of nature's works, and does not sit sighing poetic sighs over fuzzy monstrosities.

When an albumen print is finished and dried, it is mounted, and either rolled or burnished. The surface obtained by either method is neither one thing nor the other; it has not the brilliant finish of a gelatine print, nor the soft, dull surface of the platinotype. But mark the difference with our gelatine print. With this we are by no means confined to one method of finishing. We can either give it a high gloss, which serves to bring out all the detail and produce a most brilliant picture, or we can finish it with the matt surface of the platinotype. Further, if the medium surface of the albumen print is desired, it is only necessary to mount and roll the print. Another advantage lies in the variety of ways of surfacing. This is, that the operator can change the surface at will. For instance, if he has dried his picture on plate glass to obtain the brilliant polish, and finds that this kind of finish is not suitable to the picture, nothing is easier than to simply wet his print again and squeegee on to the ground glass. It is well known that for some subjects the matt surface is quite unsuitable, and for these the brilliant polish produces far superior results with this kind of paper. We have in our power the production of both, and the further advantage of being able, without any loss, to discover the most suitable method.

So far, I have endeavoured to point out the various advantages of this process of printing, and if I have succeeded in showing the reader that the old-fashioned albumen paper process is not perfection itself, as many seem to imagine, and also in giving substantial reasons for my terming the gelatino-chloride printing process the process of the future, my work has been done.

But I do not want my reader to imagine that even the gelatino-chloride paper process is absolute perfection. There are several little drawbacks in it. There have been many who have taken it up, and, after a few unsuccessful trials, have been compelled to abandon its use for the want of a helping hand. It will be my purpose in the next article to point out the stumbling-blocks where most fail, and to give the results of a lengthy experience towards assisting them to get clear of these places, and to show that, when once thoroughly mastered, this process is simplicity itself.

WALTER E. WOODBURY.

THE CLAIMS OF PHOTOGRAPHY TO RECOGNITION AS ART.

[A Communication to the Camera Club, and printed in their Journal.]

IN the paper which Mr. Pennell was good enough to prepare for our recent conference, he very laudably and candidly admitted at the close of the first paragraph that one of his objects was to contribute something "to the gaiety of nations." There can be no doubt that our best thanks are due to him for the artless and cheerful manner in which he has attained that object.

His discourse naturally falls into two parts, viz., Photography (1) as a Hindrance, and (2) as a Help to Art. The second of these is chiefly concerned with what we usually group together under the term Reproduction or Block processes. With this division of the subject we are not now so much interested as with Part 1, the text of which apparently is, "Photography is not a fine art and never can be."

Now this, again, may conveniently be subdivided into two parts, which I may, I hope without offence, term—

(1) The Dogmatic, and (2) the Prophetic. With this latter I freely admit my utter incompetence to deal. A man is seldom of much account as a prophet in his own club. Yet, perhaps, I might make one timid venture, and say that the prophetic aspect of the question seems greatly to be dependent upon the admission or refutation of the dogmatic statement; and, considering that photography is barely half a century old, perhaps it is early days to venture far in the prophetic direction. Mr. Pennell's avowal, "Photography is not a fine art," seems to rest like an arch upon the the two pillars of his faith, viz:—

i. "Photography never does, never can make selection. All great and good art is nothing more than selection and arrangement."

ii. "A work of art is the expression of one man's individual impression of an object. The moment that individuality is lost it ceases

to be a work of art." And in order to make his position complete we find also inserted as it were by way of a key-stone—

iii. "The photographer merely by calling himself one cannot become an artist when he has not the artistic temperament, and lacks the patience to acquire the technical knowledge. The absence of either of these two qualities is absolutely fatal."

The paper contains several other minor propositions, which seem to me to spring from the three just stated.

iii. 1. To take the last of the three first. It is cheerfully admitted on all sides that a man calling himself an artist, whether he be photographer, painter, etcher, sculptor, or what not, does not make himself an artist by that very simple process. "A rose by any other name would smell as sweet."

2. Next we are told that the artistic temperament is essential. This reminds one of the well-known definition of an archdeacon as "a person who performs archidiaconal functions;" or, in our case, an artist must have an artistic temperament.

3. The artist must have patience to acquire the technical knowledge of his art.

Now it seems that the term artist is a comparatively recent word, coined for the chief purpose of being applied to those skilled in the fine arts (at one time called the liberal or polite arts), so that this "artist" should not have his feelings trampled upon by being dubbed artisan, or skilled handicraftsman, as in the useful or mechanical arts. So far, then, the total result of the third proposition turns upon the meaning of the word artistic. This, in turn, is made to rest upon the two others—viz., "Photography never does and never can make selection."

Manifestly, so far as selection of point of view is concerned, where the pencil and paper can go, there can the irrepressible camera be taken, either on tripod, in the hand, or in the necktie. The difference of selection must, then, exist only so far as the subject, and not the operator, is concerned. The difference seems to be this, the painter can, with an equally disposed conscience, persuade himself that various fixed and stationary objects may, with equal truth and propriety, be represented on his paper in relative positions in which they do not and cannot, in the ordinary course of nature, impress themselves upon his retina. For instance, he can insert or omit a mountain, a lake, or a tree, at will, and may alter the curve of a river-bank, or the relative visual size and position of almost any of his objects. What I should be disposed to term *creation* or *destruction* he calls selection.

The photographer cannot perform these giant-like feats, and must either change his point of view or wait until such objects which, according to their nature may move or be moved, do so to the positions in which he desires to represent them.

It is a fair question to ask, Is not this nearer the true meaning of the term selection either of opportunity or subject?

That painters carry their powers to excess is a matter of ancient history. It was by a curious coincidence that I first read Mr. Pennell's statement, "It is a common thing for that dreadful person, the artless critic, to state that a work of art is no better than a photograph. Such an assertion would never be made if the photograph was placed alongside of the picture;" and a few hours after I found the following note* on Richard Wilson, the founder of English landscape: "The extent to which Wilson carried the Italianising process is well shown by the incident of his dealings with George III., who had given him an order for a view of Kew Gardens. Instead of painting the reality, Wilson substituted an Italian scene, illumined by a southern sky. The King failed to recognise any resemblance to Kew, and returned the picture."

Perhaps this shows us the possible origin of artistic selection and arrangement.

I have seen paintings of landscape scenery, alongside which if there were placed good photographs taken from the same standpoint, they would certainly have contributed some new sensations to the painter of these "selections."

It must be admitted that the apparatus of the photographer cannot make selection in the painter's sense of that word, but moderate-minded "selectors" will find as much power of selection as is good for them, or as much, and often more, than they can well manage in the proper choice of lens, focus, exposure, development, and printing process, to say nothing of a suitable light, point of view, and arrangement of those parts which are wont to change their places without the timely aid of an earthquake or volcanic eruption.

It would seem as though selection were rather a dangerous thing—a little of it ought to be made to go a long way; and it is possible that one of the great hopes for photography in the future is anchored to the limitations which the photographer feels—viz., that he must be content to put up with Nature as she is, and not as he thinks she ought to be.

iii. The final position now left us is one worthy of a most elaborate and thorough analysis, such as is quite out of the question now. I can, therefore, only say I respectfully beg to differ from Mr. Pennell's assertion concerning the six cameras worked by six different men producing practically identical results, and meet it with an equally candid assertion, based upon my own personal experience, that if any one of these six typical persons had a moderately competent knowledge of the means at his disposal he would be able to produce half-a-dozen distinguishably different negatives without even moving his tripod legs.

Without stopping to seek extreme cases of individuality, one may mention half-a-dozen well-known workers who would, from the same standpoint, give us each a distinguishable result—such men as, for instance, Davison, Robinson, Gale, Cembrano, Maskell, Wellington, Austin, Sutcliffe, Tolley.

Mr. Pennell attaches great importance to the expression of individual impression. His words are: "A work of art is the expression of one man's individual impression of an object." Now, this seems to me to involve a very complex psychological problem, which, if pushed to its legitimate issue, finally lands us on to one or the other horn of a dilemma.

Either we must all receive the *same* impression from the same scene, or receive *different* impressions.

If we receive the same impression, any number of people painting the same scene under the same circumstances ought, if artists, to produce results undistinguishable from each other. This is not in strict accord with either past history or the present demand for individuality.

This would leave us no room for individual taste, so-called genius, or development of art.

Secondly, if we receive *different* impressions, and assert that our productions record these impressions, are we to be condemned by those whose impressions differ from our own—who do not, and in the ordinary course of nature are not likely to, see with our eyes?

Is not this rather like that artless, but hardly generous, person who asserted that "*ortho*-doxy is *my* doxy, and *hetero*-doxy is *any other fellow's* doxy?".

A. Maskell.

* Cook's *Handbook to the National Gallery.*

THE DAWN AND DEVELOPMENT OF PHOTOGRAPHY.

[A Lecture delivered at the Birkenhead Photographic Society.]

The men who invent a new industry are benefactors to the world, especially when it gives countless millions employment, whilst it spreads unnumbered blessings over every portion of the globe; but in this instance the ideal far transcends the benefits conferred on labour, because its outflow brings pleasure and joy into every dwelling, both to the rich and to the poor.

The discovery of photography came with the first year of the reign of our beloved Queen. M. Daguerre presented it in the modest size of $2\frac{1}{2} \times 2$, and wiseacres said it would be a nine days' wonder, and would disappear like a falling meteor. You had to look on the small piece of silver plate about the size of your thumb-nail, holding it up to the light at a particular angle before you discovered the smallest resemblance to man or nature.

The French people hailed its appearance with great delight, and handsomely rewarded Daguerre with 30,000 francs. The French people gave this sum for a purchase for all the world, but Daguerre sold the right of patent afterwards to several parties in London.

It took twenty minutes' exposure in the sun to take a picture, and it was due to Mr. Goddard, of London, who sensitised the plate with the fumes of bromine as well as Daguerre's iodine, that really made it a commercial success, as it reduced its exposure from twenty minutes to twenty seconds. This process held its sway for ten years, from 1839 to 1850.

It was in August 1839 when Daguerre made an open declaration of his discovery. It was on January 25, 1839, when Professor Faraday described the new method of "Photogenic Drawing" (for so Talbot styled his invention) to the members of the Royal Institution, and invited the members to an inspection of the drawings made solely by the aid of light. On the 31st of the same month a paper was read by Henry Fox Talbot, the inventor, before the Royal Society; this paper was shortly afterwards published in the *Philosophical Magazine*, consequently the Englishman held the priority of invention.

The two discoveries differ totally from each other and therefore we are relieved from difficulty as to originality of invention.

Daguerre worked only on the silvered plate; Henry Fox Talbot only on paper. Improvements on Daguerre's plan took place as set forth in Mr. Goddard's introduction of bromine, whilst the same

changes took place in the case of Talbot by the publication in 1844 of the *Pencil of Nature*.

I place before you specimens of both plans, and I am sure you will be candid enough to declare in favour of Daguerre in preference to Henry Fox Talbot; and yet, in the face of this fact, the Daguerreotype ceased to exist in 1850, and paper is still a favourite, and seems to increase in value every year, both as a support to the sensitive film, and also as a support of the finished print. Its price is as nothing compared with celluloid.

In the early part of this year I sent a letter to THE BRITISH JOURNAL OF PHOTOGRAPHY that such an article is now made. I exhibited samples to this Society. I also tried the specimens in a tray with water, and it clearly showed that it would be superior to celluloid in limpness during the operation of development.

I place before you this evening negatives on Desiré England's celluloid films. I feel bound to admit they are the finest films I have ever worked, both for certainty and density.

Now I have done with history, and must refer you to the *History of Photography*, by W. Jerome Harrison, F.G.S., as a charming book on the subject—one that leaves nothing to desire.

My object is (for the first portion) to review the present modes of printing, and their claims as to permanence as compared with ordinary printing in books with ordinary type. This, of course, is not perfection in this direction, but it has the advantage of giving a fair comparison of longevity.

I hope as I advance in my next lecture to make it more interesting.

The pictures I present this evening are as follows:—

Three Daguerreotypes produced in 1844; three photo-galvano-engraving process, 1854; my first collodion picture, in 1852; six developed prints, by T. Sutton and others, 1850; five large (40 × 30) pictures, by Osmond R. Green, 1864 (collodio-bromide); one carbon picture, by Mawson & Swan, 1867; one large silver print, Jas. Mudd, as a representation of Taupenot process, 1860; six Eastman bromide prints; one platinotype picture, Charlecote, Warwick, 1891; one original picture of the moon, by J. Hartnup & self, 1854; one glass positive picture, Jos. B. Lea, Liverpool, taken in 1855.

JAS. ALEX. FORREST.

THE ILFORD PRINTING-OUT PAPER.

[A Communication to the Holborn Camera Club.]

IT is somewhat premature for me to come and tell you anything of our new printing-out paper—P. O. P., as it is frivolously called in our works—for I can only give you a lesson how to use it *when you get it*. Owing to the non-completion of a special new coating machine which we are laying down for the manufacture of this paper, we are not yet in a position to supply the paper to the public. I hope, however, that the specimens I show you, and the method of working, combined with the price, will make you feel anxious to try the paper, and ready to acknowledge that it is what we claim it to be—viz., a paper second to none of its class. I can promise you—subject, of course, to anything caused by the British workman's eccentricities—that the paper shall be on the market in three weeks from now.

The most important question in all matters seem to be the price, and, as we propose to sell the paper at 15*s*. per quire, you will recognise that we do not intend to depart from precedents we have made in other articles.

Not only is there so large a decrease in the price, but there is, at the same time, a great increase in the size of the sheets; we cut the sheets 17 × 24½, which is almost ten per cent. more area than the present sheets of photographic paper. An additional advantage, consequent on this, is that the sheets lend themselves to economy in use. As you are all aware, the present standard of size of photographic paper was not adopted with any reference whatever to photographic needs, but was the sizes of the sheets of uncoated paper which were most readily available. Hence the sheet does not cut without very considerable waste. Now, in deciding on the size of our sheets, we brought common sense, aided by past experience, into play, and adapted the sheet to photographic sizes, resulting in considerable economy and simplicity. For instance, if you require cabinets, the sheet is folding in four each side, and you get sixteen pieces, with ample margin for trimming. Quarter-plates give twenty-eight pieces; *cartes-de-visite*, forty-nine, and so on. But exact particulars with diagrams will be more useful than explanation.

Of the advantages of gelatino-chloride papers, I need only make mention of the speed and simplicity of use, and beauty of results. To these must be added now, economy of cost. Of the saving of time and trouble, the actual working, which I shall show you, will prove, and for the beauty of result I refer you to the specimens. Colours, from the warmest brown to a deep purple; surface, matt or enamelled; and ordinary plain mounted or burnished. Instructions as to working will be given with each packet of paper, and here I might favourably say a few words as to the style of packing we shall use. We shall only sell the paper in sheets, and not in cut sizes. There are sound commercial reasons for this, with which I need not trouble you. It will be sufficient to say that we could not do otherwise to give you such a high-class paper at such a low price. As you can buy either two, six, or twelve sheets, each in a sealed tube, you will not be able to complain that we make it difficult for the small buyer to use the paper. Besides, it is productive of both economy and artistic taste to cut your own paper. If you have bought a quarter-quire of half-plate paper, and want to print a dozen quarters, you must make waste, which is avoided if you buy sheets; or if you have a half-plate negative with too much foreground, you don't like to cut down the paper, and therefore you make a photographic print full size, whereas by the use of a little judicious cutting, you might have made the print into a picture.

Now, as to the actual toning processes. We recommend two: the first, a simple bath, tone first, and then fix; the second, a combined bath. The first consists of—

Water	16 ounces.
Sulphocyanide of ammonium	30 grains.
Gold chloride	2½ ,,

This *can* be used the moment it is made, but I certainly prefer that it should stand twenty-four hours before use. The bath keeps indefinitely, and works better as it grows older. If used at once, it acts, if anything, too rapidly; in fact, toning is complete in one and a half to two minutes, and the prints are apt to tone somewhat unevenly, so that, before they become toned all over, the tone is carried a little too far. After the bath has stood for a day or two, and specially after it has been matured by a little use, it works smoothly, and prints tone evenly, and can be withdrawn at any stage of warmth. In using this bath, care must be taken not to over-print, or else, before you can get the colder tones, the prints lose brilliancy, and become a little flat. That is my experience with the present run of paper, but this tendency will be obviated in future batches. If yellowness of the half-tones is found—as does occur, as you all know, with all papers of this class—it will disappear by a slightly prolonged fixing. The real cause of this slight colouration seems to be due to a slight over-toning, and a careful worker will not allow this to take place. When your bath is in proper working order, toning will take about six or seven minutes. The bath will, of course, need replenishing from time to time with a little gold—say, a drachm or drachm and a half of gold solution. The failure to add this gold impoverishes the bath, causes long toning, and tends to produce flat prints, whilst excess of gold has a somewhat similar effect. Experience soon teaches how to keep the bath at its best, and I only mention the matter so fully as I wish to smooth your way as much as possible.

When you want warm tones of course you withdraw the prints from the bath at the stage necessary, and I would remind you that colour must be judged by *transmitted*, not reflected, light. Look through the print, and when you have obtained the required colour, when thus examined, transfer to the washing water. On the surface the prints will appear to be several shades colder than you want. Five minutes' thorough washing in several changes, and then you transfer them to the fixing bath. Use fresh hypo for each batch to prevent stains or dirt. Fix for about eight to ten minutes, then take out and wash, as for albumenised paper. The prints are then finished, ready for drying and mounting. Of this I will speak after I have treated of the alternative toning bath. This is a combined bath, that is toning and fixing at one operation. Of course, this bath offers many advantages—saving of time and of several washings—and, if anything, a greater range of tones, and, not the least, perfect purity of the whites and absolute freedom from yellowness. Objections have been made in some quarters that such a bath as I will give you must result in acid toning, but I venture to differ from this opinion, and say confidently that there is not the slightest risk in using the formula, if the bath is made up as directed. The constituents are:—

Water	20 ounces.
Hypo	5 ,,
Citric acid	60 grains.
Acetate of lead	60 ,,
Sulphocyanide of ammonium	240 ,,

These are added, and dissolved in the order given, and the solution allowed to stand for twenty-four hours. A precipitate will then be thrown down, and the clear solution decanted off. Then add—

Chloride of gold	3 grains.

Put in a few strips of paper, which ripens the bath. It may then be used, but improves by keeping and by use, and will only need the addition of a drachm or so of gold from time to time, as requisite, to make a bath that will last for many months, and that will keep good whether in use or not. Both this bath and the one previously mentioned should be kept as much as possible in the dark, and, preferably, should be kept in dark blue bottles. When first used, this bath tones rather too rapidly in about five minutes; but this time gradually increases with use, until it takes ten minutes or so to obtain a warm purple colour. Then the bath is at its best, and remains so until, with constant use, it becomes dirty and charged with silver. Then the hypo, &c., will to some extent be used up, and it should be filtered, and the clear portions be used as part basis for another bath. In practice the use of this bath is simplicity itself, and I have gone into details so fully to warn you

what to do as time goes on. The amount of work that a bath will do without the necessity of attention is enormous, and you must not consider my condensed explanations as applying to a few weeks', or even a few months', work. Many months will elapse before you need do all I have sketched out.

Now, to use this bath, take the prints direct from the frame, and immerse in the bath at once. It is best to tone both in this and the previous bath face downwards. Keep them moving, and judge of the tone, as before, by transmitted light. When the required colour is reached, withdraw, and give the final washing. Nothing could be simpler or shorter, and those of you who have been accustomed to the ordinary toning process will never care to revert to it after having tried this method. To sum up, ten minutes in the combined bath and two hours' thorough washing, and your prints are complete.

Now we come to the final scenes in this play, for it is play compared with the tedious work usually entailed by methods hitherto used with albumenised papers.

If you want an ordinary surface, simply allow the prints to dry naturally, mount with starch paste, and, if required, roll as with ordinary paper. For an enamelled surface, the print is put down on glass, quite in the usual way, and the same for matt surface, with, of course, the substitution of a finely ground glass for the supporting surface.

I need scarcely go into the minutiæ of this part of the work before this audience, as you are all probably adepts at the work; but I would mention one point with regard to the means of obtaining matt-surface prints. After the glass is thoroughly cleaned, do not use talc, but simply rub the surface with the cotton-wool from the talc bottle, first shaking off all the adherent talc. This will get rid of the small bright marks sometimes noticed on matt-surfaced prints.

Now as to mounting. The usual way is to paste (with starch) one or more thicknesses of paper, waterproof or otherwise, on the print whilst it is still wet on the glass. If the paper used is waterproof, then the mounting can be done as usual, without in any way interfering with the surface. If ordinary paper is used, then a little more care is needed, and the best plan is to use thin glue, running it carefully round the edge after it is stripped from the glass and trimmed. Another way is to paste the back of the print itself whilst still on the glass, and put the usual mount down in contact with it under pressure. But remember, the thicker the backing, the longer the prints take to dry. There is still another way, which I think promises to be at once the easiest and the most practical, and one that will commend itself to men who do quantities of work. A special preparation of rubber solution is used. The solution is made by a secret formula, I believe, but it can be obtained from Adams's or the Photo-Artists' Stores, and probably from other dealers. It is called "Golledge's Rubber Solution." With this the surface of the prints is not affected at all, and mounting can be done as with albumenised paper. There is the further advantage that any solution that touches the mount or face of the print can be wiped off when it is dry without leaving any stain or mark.

With regard to the use of an alum bath, I think I may boast that the special nature of the gelatine we use will, in the great majority of cases, render such a bath unnecessary; but, if it is wanted, the prints should be immersed for five or six minutes immediately before toning, of course giving a good wash afterwards.

I do not recall any other point to be referred to, but think I have given you full instructions what to do, and what not to do, in order to obtain good results. Whether the paper pleases you, and our propositions as to its method of use meet with your approval, I must leave for you to decide; but I venture to predict that Ilford printing-out paper will be the standard of its kind in the very near future, and I will further say, that before very long it will not only be used by amateurs, but by those professional workers who value beauty of result, combined with economy of time, trouble, and money, for I am prepared to prove to any one that it takes less time to finish prints by this process than by any other method in general use.

JOHN HOWSON.

NOTES FROM GLASGOW AND THE WEST OF SCOTLAND.

The Exhibition has run through its second week, and its popularity continues to increase daily. Doubtless, a very attractive programme has much to do for the large attendances. A more varied or enticing list of lectures could not have been strung together, and the audiences comprise all classes of the community, from the hoary-headed Professor of Gelmourhill to the little schoolboy, the former of whom got something like a surprise on Thursday night, when Mr. Andrew Pringle came out in a somewhat new *rôle* as a bacteriologist. The hall was crowded with a large number of medical gentlemen—in fact, it would almost be difficult to mention the name of any prominent M.D. of the West of Scotland who did not put in an appearance. The lecturer chatted away for over an hour in his own happy style, and it will be surprising if, during the winter, he is not invited to pay the Philosophical Society here a visit. His *Chat about Bacteria* was quite delightful.

On Friday night the young folk had their innings, and another bumper house turned out to see Mr. Charles Reid's, of Wishaw, magnificent series of animal studies, which created enthusiasm. Mr. Reid unfortunately could not attend in person; but the writer officiated in his stead, and received from Mr. Reid, jun., who came in his father's absence, quite a stock of information as to how Mr. Reid obtained some of the marvellous results which were shown. I may relate this some day.

Mr. Lamond Howie also had a big night, his description of the Passion Play being listened to by a most appreciative audience, who, I have no doubt, would be delighted to see and hear him again.

Some idea may be formed of the nightly attendance from the fact that the Executive has found it necessary to discontinue selling season tickets. As yet the Exhibition, so far as the writer has been able to judge, has not been visited by many from over the border, or outside Glasgow; but, doubtless, before its doors close we shall see many from the sunny South.

Mr. John Stuart has been taking some interiors showing the various panels with their pictures, and I understand transparencies will be procured and thrown on the screen very shortly. He is trying Zeiss's new lens, and before long it is likely his opinion of these new instruments will be publicly stated. These interiors will be very interesting as souvenirs of the exhibition.

The local press speaks very highly of the Exhibition, especially the lecture portion of the programme, and looks upon the entire undertaking as one of great educational value, and one which the School Board for Glasgow would do well to recognise in several ways for the benefit of the scholars under their government. Were they to arrange series of night lectures on popular subjects for the scholars, and illustrate these by lime-light, it would be certainly a fresh departure, and one from which much could be learned by many a youngster who is too thick-headed to gather it in the ordinary class-room.

On Saturday night Mr. Andrew Pringle gave his Burns lecture; he was in fine voice, and had to repeat some of his songs. By the way, we are always picking up something new about the Scottish poet. A party in the audience interrupted Mr. Pringle when he was making a statement about Burns never having paid for the headstone he put up on the grave of Ferguson, and this took Mr. Pringle somewhat by surprise. At the close of the lecture, however, the gentleman waited upon Mr. Pringle, and produced the proof of his statement, viz., a letter, the original of which is now in Glasgow, which clearly establishes the fact that Burns did actually some two years after settle this debt, and, seeing that the mason took two years to erect the tombstone, he was not so slow after all in making payment, and so another stigma on the memory of Burns has been removed.

T. N. ARMSTRONG.

PHOTOGRAPHIC CHEMISTRY.*

A most useful form of table, showing the solubility of silver chloride in solutions of other chlorides is given by Hahn in Biederman's *Chemiker-Kalender*, and is here subjoined:—

SOLUBILITY OF SILVER CHLORIDE IN SALT SOLUTIONS, BY H. HAHN.

Salt.	Percentage of Salt.	Temperature of saturation.	Percentage of Ag Cl.	Percentage of Ag.	Specific gravity.	Temperature.	Grammes of Ag per 1000 c.c.
K Cl	24·95	19·6°	0·0776	0·0584	1·1774	19·6°	0·0688
Na Cl	25·96	19·6°	0·1053	0·0793	1·2053	19·6°	0·0956
NH_4Cl	28·45	24·5°	0·3397	0·2551	1·0835	30·6°	0·2764
$CaCl_2$	41·26	24·5°	0·5713	0·4300	1·4612	30·6°	0·6283
$MgCl_2$	36·35	24·5°	0·5313	0·3999	1·3350	30·6°	0·5339
$BaCl_2$	27·32	24·5°	0·0570	0·0429	1·3017	30·6°	0·0558
$FeCl_2$	30·70	—	0·1686	0·1269	1·4199	20°	0·1802
$FeCl_3$	37·48	—	0·0058	0·0044	1·4472	21·4°	0·0064
$MnCl_2$	43·85	24·5°	0·1996	0·1499	1·4851	30°	0·2226
$ZnCl_2$	53·34	—	0·0134	0·0101	1·6005	30°	0·0162
$CuCl_2$	44·48	24·5°	0·0532	0·0399	1·5726	30°	0·0627
$PbCl_2$	0·99	24·5°	0·0000	0·0000	1·0094	30°	0·0000

Similar tables for silver bromide and iodide would be of special value to photographic chemists.

The study of the forms of reduced silver will have prepared the way for taking into consideration the state of molecular aggregation of a substance as influencing its characters. The silver haloids should be dealt with from this point of view, both on account of the importance of bringing into prominence the factor of physical condition, and because of the possible practical bearing of the subject in connexion with the preparation of sensitive emulsions. According to the mode of preparation of the haloid, such important characters as solubility, reducibility, optical absorption and colour, and photographic sensitiveness are capable of being influenced. Thus, the state of concentration of a solution of silver nitrate, from which the chloride is precipitated by hydrochloric acid,

* Continued from page 586.

appears to influence the solubility of the chloride in the acid.* It is possible that this is due to the different forms of the chloride under these conditions. By dropping a solution of silver nitrate into strong hydrochloric acid, a considerable quantity of the chloride is dissolved; according to Pierre,† more than 0·5 per cent. of the weight of acid. The chloride, prepared in the ordinary way, by precipitation from silver nitrate and a soluble chloride, after being washed and dried, is certainly not soluble in hydrochloric acid to the same extent. Here, again, it is possible that precipitation in the presence of strong hydrochloric acid gives no time for the molecular condensation of $(Ag\,Cl)_x$ to $(Ag\,Cl)_{nx}$, and that the former of these aggregates is more soluble than the latter. The existence of silver chloride and bromide in several modifications was, as is well known, first established by Stas;‡ but the photographic bearing of the discovery did not become apparent till the general spread of gelatino-bromide emulsion processes led to the further study of these modifications, and especially those of the bromide, by Monckhoven, Eder, Abney, and Vogel.

I have called attention to this feature in the chemical history of the silver haloids, because, in the present condition of practical photography, no student should be allowed to neglect this all-important subject. The information is not to be obtained from the ordinary text-books used by chemical teachers; and it is instructive to note how a point of comparative insignificance in general chemical training may become exalted into importance as soon as the science becomes to be applied in a special direction. Every branch of technology abounds with illustrations of this principle. How far Stas's classification of the forms of silver bromide and chloride will stand the test of further investigation is at present doubtful.§ Some experimeters recognise only two modifications and others three; while Stas himself recognises four, viz:—

1. Flocculent, white or yellow. Produced by the addition of a solution of a soluble bromide or hydrobromic acid to a solution of silver nitrate in the cold. Both solutions must be dilute (0·5 to 1 per cent.); if the silver is in excess, the bromide is white; if the soluble bromide is in excess, the precipitate is yellow.

2. Pulverulent; obtained from the preceding modification by brisk agitation with water. This form is produced more rapidly in neutral than in alkaline solutions. It is described as a yellowish-white powder, which, when dry, becomes intensely yellow on heating.

3. Granular; produced by adding a very dilute boiling solution of ammonium bromide to a boiling solution of silver nitrate containing $\frac{1}{10}$ per cent. of this salt. Obtained also by the action of boiling water on the preceding modifications, the first (flocculent) giving a dull yellowish-white, and the second (pulverulent) giving a bright yellowish-white powder. By prolonged boiling with water, the granular modification gradually becomes subdivided, and, after several days' boiling, forms a kind of milky emulsion, from which the bromide settles out very slowly. The precipitate which then subsides is pearly white, becoming intensely yellow on agitation with a strong solution of ammonium bromide.

4. Crystalline, or fused; obtained by fusing any of the other forms. This modification is never employed in photographic operations.

It might perhaps be suggested that the first form is an unstable hydrate, capable of existing only in the presence of water; but, whatever view may be taken with respect to the actual number of modifications, the broad fact that the bromide is capable of forming different molecular aggregates possessing different colours and degrees of solubility may be regarded as highly probable. It is desirable, therefore, that the student of photographic chemistry should, at any rate, make some experiments in this direction in connexion with his laboratory work.

Among other points in the chemical history of the silver haloids which are of photographic importance, the relative reducibility claims special notice. In the earlier part of his practical work, the student will have obtained metallic silver from the haloids by reduction; but he must now be made to realise that this reduction is more readily effected in the case of the chloride than the bromide, and more readily in the case of the latter than with the iodide. And, first of all, in order that the true chemical significance of reduction may be made intelligible, let a simple demonstration be given, showing that by the action of reducing agents, such as ammonium pyrogallate, potassio-ferrous oxalate, &c., the halogen is actually withdrawn from the silver, and is to be found in the solution by the usual tests. Then, in order to show that the chloride is more reducible than the bromide or iodide, a solution of potassio-ferrous oxalate may be diluted till it becomes just too feeble to reduce the bromide. Some of the same solution will be found to reduce the chloride readily. Adopting the usual course, and passing from test-tubes to films, sheets of paper coated with the three silver haloids may be streaked with the same solution of ferrous oxalate or ammonium pyrogallate,‖ when the order of reducibility will be shown by the fact that the chloride gives a darker stripe than the bromide, and the latter a darker stripe than the iodide. The importance of these facts will become obvious when, at a later stage, the subject of photographic development has to be dealt with from its chemical aspect.—*Journal of the Society of Arts.*

(To be continued.) R. Meldola, F.R.S.

* Ruyssen and Varenne, *Bull. Soc. Chim.* [2] xxxvi., 5. See also Ditte, *Ann. Chim. Phys.* [5] xxii., 551. † *Compt. Rend.*, lxxiii., 1090.

‡ *Compt. Rend.*, lxxiii., 998; *Ann. Chim. Phys.*, v., 1874; *Chem. Centr.* 1875-81. For thermochemical confirmation, see Berthelot, *Compt. Rend.*, xciii., 870.

§ See V. Schumann in *Chem. News*, vol. liii., p. 97.

‖ The addition of some sodium sulphite is advisable, in order that the results may not be masked by the too rapid discolouration of the pyrogallate.

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

III.

The evening lantern lectures have proved a success beyond all anticipation, as they say at the theatres, "turning away people from the doors nightly," and figuratively this is correct, for, although they have room in the other parts of the Exhibition, the late visitors fail to get space within the large hall, and have to content themselves with inspecting the pictures and apparatus. A prospectus for the week is published on the Mondays, showing the lectures and lecturers for the next six nights, but had it been possible to have published one for the whole series it would have possessed a great advantage to many intending visitors, from the country especially. All those who can only arrange to make stated short visits would have been benefited by a complete syllabus, but the difficulty of getting the lecturers to fix given dates so far ahead has put it out of the power of the executive to publish a complete list.

The catalogue is good, in spite of some few inaccuracies, which, in the hurry of getting up such a work against time, are almost bound to happen. The illustrations in it are well worth a study, showing, as they do, many examples of the various classes of mechanical photographic printing, amongst the producers of which will be found Annan, Gardener & Co., Lafayette, Direct Photo-engraving Company, &c.

To return to the exhibits, we come to Class 5, Lantern Transparencies, Professional Set of 12.—The Judges had this section of pictures projected on the screen, the best way to judge slides, for it has been often found that a transparency, looking well to the eye, in many cases loses much of its value when shown by lime-light.

The silver medal was awarded to G. W. Wilson & Co., and the bronze one to West & Son. The most prominent feature of excellence in Wilson's transparencies, after allowing for skilful workmanship, is the steady uniformity of tone, rich and purply even in the most delicate parts, going from tint to tint like the gradations that used to be so admired in the small Lambertype work. The sunsets and general cloud effects are the most "taking" slides in this set. Although all over the work is equal, these are the specials that create instant enthusiasm.

West's *Yachts* are a fine set of pictures well manipulated. Comment on these is unnecessary, they are so well known. Adamson, who also shows yachts, comes very close upon West, but it seems to us that the beauty of the original negative has got lost to a great extent in the transparency manipulations. The comparison between Adamson and West is not so much a want of brilliancy and definition in the former, judging from the large work, but that these qualities have got lost in the production of the small work from them.

James Banforth's *Village Blacksmith*, 121a. These pictures are too much cramped up, squeezed into a corner, and too theatrical in arrangement to possess any artistic value whatever. The nearest approach to anything like prettiness is 4 and 9 of this set.

Dore, 122, *Various Subjects*, does not show up well; there are far too many varied tones in the set, which detracts much from them as a whole. The best picture in the lot is No. 7.

Green, 123, makes a good show, amongst a set of well chosen-subjects and careful work. *Bank Holiday at Hampstead* and *Elgin Cathedral* probably stand out as the best.

Two sets of pictures (125 and 126)—*Madeira* and *Germany*—by Fincham, form a very interesting collection, produced by a man who knows what he is about; if there is a fault, it is delicacy of tone, which will tend to do them an injustice when thrown on the screen.

Priestly sends a set of subjects various, which hold their own in this class for good and careful work all round.

Class 6 is devoted to amateur portraits, whole-plate, and over sets of four. This class is small, and not burdened by a clever show. There is in this class a general weakness all over, which is only redeemed by a set of pictures by Prince Ruffo, which, by the way, were catalogued amongst professional, and we had some looking round to find them. He was awarded the silver medal, and it could not be otherwise, the exhibit is so much in advance of any of the others as an amateur's work. These pictures are very perfect, both artistically and technically, and we feel sure that as studies of a very high order they cannot fail to impress the student who gives them a little careful study.

The bronze medal was awarded to Clarence B. Moore for the *Laughing Darkey*. This picture is fairly good, but considerably spoiled by being printed too much to the one side of the oval; in fact, the whole exhibit shows a want of discrimination in mounting otherwise good work.

The *Old Woman* is the best picture in D. R. Clark's set (130), and that picture shows too dark at bottom.

Mackenzie's 135 awkward in pose, and badly vignetted.

Ulmer's 142 shows careful technical work and good warm tones.

In Class 7, which was for amateurs' portraits under whole-plate, no exhibit was considered worthy of a silver medal, and the bronze medal was awarded to frame 159 (Mr. J. Jenkins). We had some little difficulty in finding this class, and, when we did come across it, it proved not worth the search. The next set to Jenkins, being by J. W. Eadies (154), shows some artistic grasp of his subject and posing, but the manipulation is bad and the mounting common and comeless.

Taking the work all over in these two classes, we feel sure that a far better show could have been made, and should have been made, by the amateur body represented in the other departments of this exhibition.

When examining these two classes just noted we came upon the pictures of G. Greul, of Bavaria, which are now placed. These are the pictures we stated last week that we were unable to find. You will remember he was awarded an extra bronze medal in the first class. He sends a large collection of pictures, besides the competition ones—a collection that is really a feature in the exhibition, the productions being far above the average, showing a remarkable skill in lighting and natural posing, which conveys that no study in producing had been used, the very natural use of it being the best of arts. As a whole, this exhibit must make its mark.

Amateur enlargements, Class 8, portraits only, is small and by no means up to average merit. No picture was found good enough to award a silver medal; the bronze medal was taken by 180, *Reviving a Helpmate* (W. H. Kitchin). A labourer in the field sharpening his scythe, the various farm implements lying scattered around the foreground, and figures are in shadow, the distant light beyond the horizon line throwing the figures into relief, makes up this picture.

It is the only one in the whole class that could make any pretensions to competition. 172 shows an easy, careful pose, and 170 comes very near being a good picture, but the background is too white, producing too hard a contrast.

Class 9, Amateur Enlargements other than portrait.—In this class the amateurs show up well. Ralph Elders, 195, takes the medal with an *Old Mill Scene in Brittany*. It is a careful and a pleasing study; the pictorial effect has been very happily caught, the shadows in the water are so suggestive and soft, which lends a charm to the picture which it never could have possessed had the outlines in the water been more clear, hard, and bold. The other study, *A Street Scene in Brittany*, we consider quite equal to the prize picture, but the depicting of street scenes does not seem to appeal to the sentimental part of our natures so quickly as the old-mills, placid-waters style of subject.

The bronze medal, 188, W. S. Anderson.—This is a boat leaving the harbour 'midst a flow of dancing water, with the town and shipping faintly showing up in the distance behind. This is one of W. S. Anderson's most artistic productions selected from amongst his choice of many fine negatives,—the boat sailing out of the harbour fair front, showing its full length and interior, the figures standing out in stereoscopic relief, the whole composition being pleasing and effective. It is superfluous to say that the technical part of the production had received the greatest care.

No. 190, *Mosque of Sultan Achmet*. By David R. Clark.—An interior delicately rendered, full of detail, very soft, and very charming. We have seen this picture before.

Nos. 193 and 194, *Sheep* and *Loch Lomond*, William Goodwin.—Good for hand-camera pictures enlarged to whole-plate. They lack contrast, however, which renders them flat. The group of sheep is the best.

The Old Mill, 199, by A. D. Guttirn.—This is an artistic little bit, well balanced and well lighted.

207 and 208, *On the Severn*, and *A Gateway House*. By T. L. Della Porta.—Both pictures show bold and appreciative work; we like 207 the best; a figure in the foreground of this picture would have improved it.

A Bit by the Way, 210, by Paxton.—A group of sheep and lambs feeding behind Old Childs Stains Dyke, with a rustic gate in it. It is very well managed, the whole feeling is pastoral.

212, *Gold Assaying*, a figure study, carefully worked out, by W. B. Smith.

213, *A View in Northern Italy*. By George Sherrif.—This picture suffers from the tone in which it is printed; it looks faded, and its surroundings do not help it. It is evident that the picture is taken from a first-class negative, and with more vigorous printing a much better result would be obtained.

Fishing on the Thames, 214. John Morison, jun.—The reflections in this picture are much too black; they immediately arrest the eye, and will not allow of the examination into the detail of an otherwise good picture.

215, by the same artist, is much happier in this respect, the balance of light being well all over, and the finished results showing a much better picture.

At the Well, and *Fireplace in Tower of Cardiff Castle*. By W. H. Kitchen; 216a, and 216b.—*At the Well* is much too dark all over, rending the picture dull and flat. With a few high lights judiciously placed, this, we think, could be made a very good picture. The *Fireplace* is well lighted all over, and shows much the better picture of the two.

We come next to Class 10—Lantern Slides by Amateurs.—This section is full and complete. It shows at a glance how this branch of photographic work is being prosecuted. The excellence of the work itself shown here, taking it all over, proves also that considerable thought, labour, and time have been expended upon it. We feel that this is not to be wondered at when we know that the results from this branch of photography are so far-reaching that they quite eclipse the paper picture. The pleasure that hundreds of people at one sitting can obtain from an exhibition of these three-and-a-quarter pictures enlarged on the screen, and the possibility of showing them again and again to delighted audiences, is the immeasurable advantage that they possess over paper work, and whether from pleasure, or working at it from an educational point of view, the lantern transparency is bound to become an increasing power in the land.

The silver medal was awarded to 224—Austin. For careful workmanship and the rendering of artistic effects, these pictures stand without rival in this class. *Cooling Waters*—cattle in the middle of a stream in a hot summer's day—and *Listening to the Bells* are works of art.

243, Watson, bronze medal. The yacht pictures show up well; in fact they are quite equal to any boat pictures in the transparency classes, the natural cloud effects helping them up wonderfully.

Various processes, illustrated by a set of various views, No. 222.—These were awarded an extra bronze medal. This set and a set of views in Spain are the work of Andrew Pringle. That they were up to the mark goes without saying.

When extra awards were being made, we wonder why the set 220, *Flower Studies*, by J. Carpenter, have been passed over without notice, for this set of slides show rare merit, and are quite conspicuous for their excellence. They must attract attention immediately one nears the frame in which they are placed, and, when projected on the screen, they showed up as perfectly as when examined in the hand.

223, W. Lamond Howie.—These pictures do not show up so well in the frame as many that were used in Mr. Howie's very interesting lecture. We think he might have made a better selection for competition from amongst his many fine pictures.

Snell Anderson, 205, *Sunshine* and *Beg for it*, are probably the best in a set all good. 228 and 229, Richard Crome, a show of vigorous work, rather too hard in tone for screen effect. 230 and 231, Ralph H. Elder.—The same class of subjects in little that he gained the silver medal for in enlargements, and the same careful manipulation is here conspicuous. The warm, black tone in which these transparencies are produced should show well when projected.

232, J. W. Evans, *Hoar-frost Studies*.—This set of slides is out of the beaten track, and considerable skill has been used successfully in producing a set of the most delicately difficult subjects.

Wayside Studies, by Harding, show too many tones and style of finish. They are hard-looking. The dog picture is the best in the set.

R. J. Hay, 236, shows clear pictures, and remarkably uniform in tone.

239, *Figure Studies*, printed in a brown, warm tone.—Each picture tells its little story. *Contemplation* and *An Interested Party* are telling subjects. Major Lysaght is the exhibitor of this very interesting set.

Good pictures are shown by Cutting, Morison, jun., Patterson, and many others. As a show of lantern work by amateurs it is very complete; in fact, we have never seen a better at any exhibition.

The lectures have been crowded every evening. Mr. W. Lamond Howie's "To Ober-Ammergau and Back" was so crowded that many people could not gain admittance. The lecture was listened to with rapt attention; the scenes and pictures shown were beautiful. Mr. Andrew Pringle had "A Talk about Bacteria" on the 10th; not a likely subject to draw, some said, but even dry science drew a crowded house, a great proportion of the audience being scientific men; and, if the manner in which they crowded round the lecturer for further information, after he had finished, is any criterion of success, then it was extremely successful. The subject was treated in a popular manner, and was enjoyed by all. On Saturday night Mr. Andrew Pringle again lectured, and gave "The Life, Land, and Lyrics of Robert Burns." Thus, turning from dry science to liquid song, at home in this as much as in the bacterian region, Mr. Pringle could not complain of the enthusiasm of his audience, which was expressed all through.

On the 15th, John Morison, jun., gives "Snapshots with the Hand Camera;" on Thursday, the 17th, Mr. George G. Napier (Glasgow), "The Homes and Haunts of Tennyson;" on the 18th, Mr. George E. Thomson (Liverpool) gives "Rambles along the Riviera;" and on Saturday night, the 19th, "Three Men in a Boat," by Ralph Elder. The entertainments given are so good that they cannot but demand attention and large audiences.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,181.—"Improvements in or connected with Sensitised Surface Paper, Woven or Tissue Fabrics, or other Material for the Production of Copies of Drawings, Designs, Pictures, Photographs, Writings, and the like, by the Action of Light." R. M. Shawcross.—*Dated September* 8, 1891.

No. 15,282.—"Improvements in Apparatus for Producing Enlarged Copies of Photographs." E. Clifton.—*Dated September* 9, 1891.

No. 15,334.—"Improvements in Photographic Cameras." C. R. Neve.—*Dated September* 10, 1891.

No. 15,434.—"The Preparation and Employment of Aromatic Amido Compounds as Developing Means in Photography." J. Hauff.—*Dated September* 11, 1891.

SPECIFICATION PUBLISHED.

1891.

No. 6845.—"Photographic Roller Slides and Cameras." Jones.—Price 8*d*.

PATENTS COMPLETED.

An Improved Method of Embellishing Photographs.

No. 10,379. Frank Sternberg, Hillside Cottage, Bushey, Hertfordshire.—*August* 15, 1891.

An improved method of photographically embellishing photographs with ornamental or pictorial borders, or partial borders, or with any ornamental, or

pictorial, or heraldic device, or with *facsimile* autographs or inscriptions; the photograph and its embellishment being produced on one and the same piece of material.

To produce these embellished photographs, a negative of the principal subject, and a negative or negatives of the embellishment are used, as well as shields specially prepared so as to exclude the light where a plain space is required, or from those parts corresponding to the position to be occupied by the principal subject or its embellishment in the resulting embellished photograph. Or positives may be used instead of the negatives just mentioned.

The negatives or positives are so prepared or arranged that, when placed in contact with the sensitised material to be printed upon through them, the principal subject and its embellishment will be printed in their proper relative positions. A sensitised material is then photographically printed upon through these negatives or positives in turn, care being taken, during each separate printing operation, that the light is excluded from the sensitised material, by means of the specially prepared shields, in that part which has already been printed upon through another negative or positive, or which is subsequently to be printed upon through another negative or positive, or which is to be a plain space. A negative or positive may then be obtained from the sensitised material which has thus been printed upon through the negatives or positives of the principal subject and its embellishment. The light-excluding shields may be used in the camera whilst the negatives or positives are being made, so that, when positives are taken thus, the light-excluding shields reserve a plain, blank, or opaque space on that part of the photograph corresponding to the position to be occupied by the other photograph. A negative may be made from these positives on one piece of sensitised material either by printing from them in turn by transmitted light or by taking or cutting away the plain space in one photograph (the plain space defining the part to be cut away) and making a negative from it in contact with the other photograph by reflected light. And when negatives are taken of the principal subject and its embellishment by using light-excluding shields in the camera, both negatives thus produced may be printed simultaneously by transmitted light upon one piece of sensitised material. Or instead of using light-excluding shields in the camera, the principal subject, or its embellishment, or each may be arranged with a substance that reflects actinic light, or a substance which does not reflect actinic light, so that when a negative or positive is made of each arrangement a plain, transparent, or opaque space is reserved or made in that part of each positive or negative corresponding to the part to be occupied by the image in the other positive or negative. And then a negative or positive can be made, on one piece of sensitised material, from these positives or negatives as if they had been produced by using shields in the camera, as just described above.

One part of a sensitised substance may be exposed, in the camera or printing frame, to the principal subject, and the other part of the sensitised substance may be exposed, in the camera or printing frame, to the embellishment.

The principal subject or its embellishment, or one of them, may be transferred by any of the usual methods to the same substance or to the substance bearing one of them.

A negative or positive of the principal subject may be made upon an ordinary gelatine film on glass, or upon any other sensitised substance, and the gelatine film or other sensitised substance cut away or removed in that part corresponding to the position to be occupied by the embellishment, and, likewise, a negative or positive of the embellishment upon an ordinary gelatine film on glass, or upon any other sensitised substance, having the gelatine film or other sensitised substance cut away or removed in that part corresponding to the position to be occupied by the principal subject; or the gelatine film or other sensitised substance may be cut away or removed in one negative or positive only if that one be on or is used in connexion with a light-excluding shield; no cutting away may be necessary if one negative or positive be smaller than the other negative or positive, and if it be on or be used in connexion with a light-excluding shield; a negative or positive may then be made from these negatives or positives together or separately.

The sensitised substance may be cut or prepared in any shape, or in corresponding shapes before being photographed upon.

Semi-transparent shields may be used to weaken or generalise the tone of the embellishment, or shields bearing a texture may be used to give a different quality to the principal subject or its embellishment.

The principal subject or its embellishment may be blended together at their edges in any part, or the edges of either may be made indistinct or lost.

Sensitised or other substances may be prepared of the usual sizes of photographic plates or films bearing negative or positive embellishments, either cut out or not to be sold for the purpose of embellishing photographs.

The light-excluding shields may be produced photographically, or in any other suitable way, such as by painting, stencilling, stamping, or printing with an opaque or suitable coloured substance, or they may be cut out of an opaque or suitable coloured substance, and they may form parts of the photographs or substances on which the photographs are taken, or they may be on separate substances.

In all, or any, of the methods mentioned above, the principal subject, or its embellishment, may consist of a print, or drawing, or painting, and may be used instead of a photograph of the same except in the complete embellished photograph.

Having now particularly described and ascertained the nature of my said invention, in what manner the same is to be performed, I declare that what I claim is:—To have invented the use of all or any of the above-mentioned methods, or any combination of the above-mentioned methods at any stage, for photographically producing embellished photographs, whether applied to the reproductive processes or not, and for whatever purposes they may be used. The embellishment being used purely as an embellishment, as distinguished from the principal subject; and the embellished photograph consisting of a photograph of the principal subject and a photograph of an ornamental border or partial border, or any ornamental, or pictorial, or heraldic device or *facsimile* autograph, or inscription, or monogram. The photograph of the principal subject and the photograph of the embellishment being produced on one and the same piece of material.

Without doubt, had the inventor secured the services of a qualified agent, the "claims" would have been expressed in a way quite different from the very unusual manner in which they are here presented.—Ed.]

Improvements in Photographic Camera Shutters.

No. 20,852. Joseph Thacher Clarke, Boston, Massachusetts, United States, at present residing at 3, College-road, Harrow, Middlesex.—*August* 22, 1891.

My invention has for its purpose to provide a photographic shutter of simple construction, by which light is not admitted to the lens during the act of winding or setting the shutter, and which is adapted for combination with a device for increasing or diminishing the size of the exposure aperture, and for visibly indicating upon the exterior whether the shutter is or is not wound and ready for exposure.

The main end in view is effected by making the movable plate or shutter of a circular shape, with a single exposure aperture, by causing it to revolve in one direction only, and by arresting it before the completion of an entire revolution by means of a secondary spring detent, which must be released before the shutter disc can resume its normal position for the next exposure.

A convenient arrangement and construction of the mechanism by which this improvement may be carried into effect is as follows:—The movable shutter plate consists of a disc of thin sheet metal or other suitable material, revolving in one direction only, and centered or mounted upon a pivot borne by the front board of the camera. In this shutter disc is pierced a single aperture, through which light is admitted during exposure, this aperture being situated in a concentric zone of the disc, and corresponding with the orifice of the lens tube, before, behind, or within which it passes during the revolution of the disc, according as the shutter is placed before the lens mount, within the camera or between the combinations of the lenses.

The motor mechanism of this shutter disc is an impelling spring, preferably made in the form of a spiral coiled round the before-mentioned pivot. This spring is tightened by winding it one revolution for each exposure by means of a resetting device, such as a spring-retracted ratchet drum revolving upon the pivot and operated by a cord, which is thereby withdrawn and returned to its normal position after each traction or setting. In order to assure the tightening of the spring by one revolution, and by no more nor less, there need be but one single ratchet tooth in the circle of the resetting device. Means of permanently increasing or decreasing the tension of the impelling spring may be provided by the well-known device of a ratchet and pawl located at the outer end of the pivot.

After the impelling spring has been wound, the shutter disc is revolved and an exposure effected by releasing a spring lever, detent, or exposing click, which has held the shutter in position, by bearing upon a single notch or pin in or near the periphery of the disc. The single aperture of the shutter disc is thereupon passed at once before the lens, and the exposure is completed.

Opposite the exposing click is a secondary or retaining click, which is kept in constant contact with the periphery of the shutter disc by a light spring, and which engages in the before-mentioned single notch or pin in or near the periphery of the disc. Thus the shutter disc, on being released by raising the exposing click, is permitted to make but one-half a revolution or thereabouts, being arrested at this point by the secondary or retaining click. This retaining click must be released in order to permit the shutter disc to complete its revolution and stand ready for the next exposure. An advantageous method of performing this is to connect the lifting arm of the retaining click with the before-mentioned cord for setting the impelling spring, which may conveniently be done by passing the said cord through a loop formed in the lifting arm of the retaining click. The act of winding the impelling spring thus releases the secondary or retaining click, and the shutter disc is thereby freed to perform the second half of its revolution and to resume its normal position ready for the next exposure. It will be readily understood that this co-operation renders it impossible to revolve the shutter disc more than one-half a revolution by releasing the exposing click, and likewise impossible to make a second exposure before having drawn the winding cord of the impelling spring.

In order to vary the size of the aperture in the shutter disc, a secondary or auxiliary solid shutter, fan, or stop, likewise of thin metal, or other suitable material, may be attached to the face of the shutter disc in such wise as to cover more or less of the aperture therein. This auxiliary stop may conveniently be made of a concentric or of a semicircular shape, and of a radius somewhat smaller than that of the shutter disc (in order to avoid interference with the engaging notch or pin in or near the periphery of the disc), yet sufficiently great to extend beyond the limits of the concentric exposure aperture of the shutter disc. This auxiliary stop may be attached to the shutter disc by one or more screws with milled heads, or by other means, suitable to permit of its being moved, so as to close a greater or less extent of the exposure aperture of the shutter disc, and yet to retain it with sufficient firmness to prevent its relative position being unintentionally altered. The ratio of the apertures uncovered in the shutter disc, by moving the auxiliary stop to and fro upon it, may be engraved or otherwise marked upon the shutter disc with visible lines and figures, to which the stop can be accurately set.

When an auxiliary stop of the nature described is combined with the shutter disc, the exposure aperture in the disc may be extended concentrically to a length of 180° or thereabouts, so that when the auxiliary stop is entirely slipped aside from the said aperture the exposure effected by permitting the shutter disc to make one-half a revolution will be a so-called "time" exposure, the shutter disc, when engaged by the secondary or retaining click in this case, still presenting a sufficient portion of its aperture to entirely open the lens. The time exposure thus effected is not concluded until the winding cord of the impelling spring is drawn so as to permit the release of the retaining click, or until light is otherwise excluded from the lens, as, for instance, by the employment of a separate cap. If, however, no auxiliary stop be connected with the shutter disc the aperture in this disc must not extend so far in a concentric zone as to admit light to the lens when the shutter disc is engaged by the retaining click after one-half a revolution. In order to effect a time

exposure under these conditions it is convenient to add to the mechanism above described a third or time-exposure click engaging with the notch or pin in or near the periphery of the shutter disc, and so situated as to hold the disc, when retained thereby after its revolution through a small arc, with the exposure aperture before the lens. This third or time-exposure click would, when the exposures are intended to be rapid, be withdrawn from all contact with the shutter disc by means of a screw or other similar device.

When an auxiliary stop is combined with the shutter disc the outer surface of the stop may be brighter and more highly polished, or of a lighter colour than the disc, the bright surface of the auxiliary stop being visible from the outside of the camera, while the shutter disc is held by the secondary or retaining click after one-half a revolution, the darker surface of the shutter disc itself being visible when the shutter is fully set after its entire revolution. It will by this means be readily ascertainable whether the impelling spring has, or has not, been wound for the next exposure. If no auxiliary stop be combined with the shutter disc, the latter may itself be polished or coloured in such a manner as to differentiate the portions visible at the two positions.

The cycle of operations may be reviewed as follows :—

For rapid exposures :—The shutter being set ready for operation, the primary or exposing click is released by pressure exercised upon its lifting arm, this pressure being either directly applied by the finger or communicated by any of the well-known devices for this purpose. Exposure having been thereby effected, the shutter disc is automatically arrested at half-revolution by the secondary or retaining click. The act of winding the impelling spring so as to tighten it by one turn thereupon releases the retaining click, and the shutter disc completes its revolution, being held again in position for the next exposure by the primary or exposing click.

For time exposures the auxiliary stop is withdrawn entirely from the aperture of the shutter disc, whereupon the exposure is commenced by pressing the exposing click, and terminated by drawing the cord of the winding device, which frees the retaining click and allows the shutter to return to its normal position, closing the aperture; or the third click, introduced in case the shutter be constructed without auxiliary stop, is brought into operation so as to bear upon the disc, and the primary or exposing click is pressed, whereupon the lens will remain open to light until the said third click be released, so as to free in its turn the shutter disc for further revolution into engagement with the secondary or retaining click. A winding of the resetting device by traction of the cord completes the cycle of operations in all cases.

The claims are :—1. A photographic camera shutter comprising a disc revolving in one direction only, and having one notch or catch for each exposure aperture pierced therein, this notch or catch being engaged alternately by an exposing click and by a secondary click or detent, which must be released before the next exposure can be effected. 2. In a circular photographic shutter, a segmental or fan-shaped obscuring stop or plate, revolving with the exposing disc, and so affixed to it as to permit of relative adjustment for the purpose of increasing or decreasing the size of the exposure aperture. 3. In a circular photographic shutter, a two-armed or double-tongued exposing click or detent, capable of engaging simultaneously with both the shutter disc and the setting or winding wheel of the impelling spring. 4. In a circular photographic shutter, a secondary or auxiliary retaining click or detent placed upon the side of the shutter, opposite the exposing click, so as to engage with and arrest the shutter disc before the completion of an entire revolution, and so as to be released automatically by the process of rewinding the impelling spring. 5. In a circular photographic shutter, a setting or winding wheel, pierced with apertures of definite ratio, and serving as a plate diaphragm or Waterhouse stop. 6. The several arrangements and combinations of parts constituting the apparatus for the purpose explained.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 22 ...	Great Britain (Technical).....	50, Great Russell-st., Bloomsbury.
,, 23 ...	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 23 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 24 ...	Burton-on-Trent	The Institute, Union-street.
,, 24 ...	Halifax Photographic Club	Mechanics' Hall.
,, 24 ...	Liverpool Amateur.....	Crescent Chambers, 3, Lord-street.
,, 24 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 24 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 10,—Mr. A. Cowan in the chair.

Mr. H. E. Davis was elected a member of the Association.

In reference to the invitation issued by the Photographic Society of Great Britain to the Association to send a collection of lantern slides for display during the forthcoming exhibition, it was agreed, upon the suggestion of Mr. Freshwater, to forward a hundred slides for that purpose.

Mr. W. E. DEBENHAM promised to read a paper at a future date dealing with the means for curing distortion when enlarging from negatives having that defect. The matter had been mentioned by Mr. Debenham at the meeting on the 3rd inst., when examples were exhibited in illustration of the various points involved.

Mr. T. E. FRESHWATER gave an account of the Association's very successful outing at Greenwich, under the guidance of Mr. Haddon, to whom he (Mr. Freshwater), on behalf of the members, expressed their acknowledgments for the kindness and hospitality displayed by that gentleman on the occasion. Mr. Teape took a capital group of about twenty members. A considerable number of plates were exposed, prints from some of which, from negatives by Messrs. Freshwater, Weir Brown, Atkins, and Teape, were passed round. The absence of halation and blurring in the results obtained on backed plates was generally remarked. In reference to the group, which was printed in platinum, an inquiry whether a silver print would not have given better gradation was made, and Mr. Teape undertook to take a silver print from the negative in order that the members might have an opportunity of comparing one with the other.

The subject for discussion was *The Keeping Qualities of Plates*, and Mr. A. L. Henderson mentioned that recently he had exposed some plates made in 1887, sensitometer No. 22, against some ordinary plates supposed to be of the same speed. The former proved to be very considerably over-exposed, the inference being that they had increased in sensitiveness. Plates undoubtedly gained in rapidity with age, especially if they originally contained some hygroscopic substance, such as glycerine.

Mr. EVERITT had recently used some plates made in 1884. He exposed them in a dining-room window for five minutes, but no halation resulted. The plates were of a slow kind.

Mr. DEBENHAM remarked that no system of packing plates was so good as that of placing them face to face.

Mr. BARKER'S experience of plates in which glycerine had been used was that they got thinner and thinner by keeping.

Mr. DRAGE had taken twelve dozen plates to Australia, no extra precautions as to packing being observed. They crossed the Equator twice, and he found them to keep good up to the last.

Mr. HENDERSON had exposed plates on board ship, and found that upon development a reversed action was set up, which he attributed to the action of the saline matter in the atmosphere. This tendency was obviated by soaking the films before development in a bath of lithium carbonate.

The CHAIRMAN asked what effect the lithium was supposed to have, but Mr. Henderson was unable to explain.

Mr. FRESHWATER had sent plates to the West Indies, and in two years' time, when they came back, they were useless.

Mr. DRAGE had recently developed some of Kennett's plates with satisfactory results.

Mr. BARKER remarked that, as a rule, gelatine plates will keep as long as you want them to, although it was true that some did not. He would like some of the people who made their own plates to give their methods and experiences. He always made his own, and found that long stewing invariably produced fog. He then dwelt upon the most important points conducive to imparting good keeping qualities to plates, and remarked upon the tendency which the use of ammonia had in promoting defects in an emulsion if it is kept in contact with it too long. The shorter the time the ammonia is in contact with the emulsion, the better the plates will keep.

Mr. HENDERSON disagreed with some of Mr. Barker's opinions, and remarked that a small portion of ammonium carbonate was one of the best antiseptics that could be used. Such plates develop easily, and are very rapid. One grain to the ounce of emulsion was sufficient.

Mr. COOKE asked how long an ammonia-treated emulsion would keep.

Mr. HENDERSON replied he had kept one five or six months.

Mr. COOKE said that he had kept some for three or four years, but in reply to a question said that it was in a state of jelly, and that he had not coated plates with it and tried it. It did not, however, change in appearance.

Mr. HENDERSON regretted the absence of Mr. Crosbie, who had promised to be present that night. He was one of the few photographers who still made their own plates, using the ammonia method, which he did with great success.

A long discussion upon the best method of making plates then followed.

Mr. HENDERSON observed that the best formula for the purpose had yet to be published. He would shortly give a good formula for a perfect method of emulsion-making, in which, however, a separator would have to be employed. He would only say then that by such a method one would commence with a dilute emulsion and finish with a highly concentrated one.

Mr. Henderson's offer was warmly accepted, and the meeting concluded.

HOLBORN CAMERA CLUB.

SEPTEMBER 11,—Mr. T. O. Dear (Vice-President) in the chair.

Mr. JOHN HOWSON gave a lecture on the new *Ilford Printing-out Paper* [see page 600.] Mr. Howson toned a number of prints by both baths, which, together with some finished prints, showed to a considerable extent the advantages of this new paper. He also showed a portrait print which had been burnished in the usual way.

ON Saturday fourteen members attended the Keston outing.

To-night (Friday, September 18) *Lantern Slides*, by Mr. A. Plumbridge.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

A MEETING of the Council of this Association was held on Tuesday evening, the 8th inst., in the Pillar Room, Anderton's Hotel, Fleet-street, London. The following members were present :—Messrs. H. J. Whitlock (President), John E. Shaw and Robert Slingsby (Vice-Presidents), Barry, Fall, Elliott, Warwick Brookes, MacIver, Eddison, Roxby (Treasurer), and C. P. Richards (Hon. Secretary). Apologies were received from Messrs. Abel Lewis, R. P. Gregson, T. Birtles, and J. E. Bruton, all of whom were unable to attend owing to business engagements.

The minutes of the last meeting held at Birmingham having been read and confirmed, Mr. WHITLOCK, in the course of an able speech, alluded to the growth of the Association, and the absolute necessity of engaging the services of a paid Secretary, at the same time paying a high compliment to the Hon. Secretary for his able services.

Mr. RICHARDS thanked the meeting for the compliment, and expressed his regret that business had not allowed him to attend to the duties of the office as well as he could have wished.

The names of several gentlemen were mentioned as suitable for Secretary and ultimately a Sub-Committee was appointed with power to interview an engage a gentleman for the position.

A discussion took place upon the important question of Trade Price Lists, and a course of action agreed upon.

Reports from the various branches were received of a very encouraging character, and the Council generally expressed every confidence in the great future of the Association, and its power to remedy many anomalies now existing.

The place and date of the next meeting having been decided upon, the meeting closed with a hearty vote of thanks to the Chairman.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

SEPTEMBER 14,—Mr. J. Stewart in the chair.

Mr. J. HOWSON, of the Britannia Company, demonstrated the working of "Alpha" paper, and passed round a number of prints. These were admired for their brilliancy, the softness of the half-tone, and the transparency of the shadows, as also for the vast range of colours. In his preliminary remarks, Mr. HOWSON pointed out that an amateur frequently had little time for daylight printing; this process would enable him to obtain warm tones when they would otherwise be impracticable. It had been said that bromide printing was the salvation of a poor negative. "Alpha" was, however, suitable equally for the dense or the thin negative, and instanced two of the prints he showed, one being a platinotype and the other an "Alpha." The points to be observed were to follow the instructions closely, and to expose always for the same time at the same distance from a uniform light when uniform results were desired. Six inches from a bat's-wing burner was the distance recommended for a small negative. A greater distance would be necessary with a large negative to equalise the light. From two to three minutes would be necessary for a moderate dense negative. To obtain brilliant prints from a weak, flat negative, develop deeply with half old and half new developers, and allow to remain in the clearing bath till the high lights were sufficiently reduced. The red tones obtained by prolonged exposure would be retained after fixation even if the prints were not toned, but slight toning was generally desirable even for the warmest tones. It should be borne in mind that, if the tones obtained were too warm, the prints could be toned to colder shade, even after they had been dried and stored for any length of time. Mr. Howson then developed and toned a number of prints, showing the range of colours obtainable from equal exposures and development.

The audience were much amused at the rough treatment to which the prints were subjected when squeegeed during washing. The amusement turned to admiration when the surface of the prints was shown to be quite uninjured by the treatment.

Mr. HOWSON said that the Company prided themselves upon the quality and hardness of the gelatine used, and, in answer to a question, said that blisters were unknown.

Many questions were asked, and satisfactorily answered. Cloud printing by combination was, doubtless, difficult, by reason of the difficulty of differentiating the exposure to the two negatives to obtain identical tones.

A member was of the opinion that this would be overcome by making trial exposures.

A vote of thanks was passed to Mr. Howson for the demonstration.

The usual competition of prints of views at the Society's field days was held. Mr. Marchant received the vote of merit for Reydon, Mr. Gregory for Loughton, Mr. Staveley for Edgware, and the Secretary for Kew.

An ingeniously made shutter, sold by Messrs. Perkins & Rayment, was shown; and prints on matt-surface paper by Obernetter, and a very bright surface paper, by the Blackfriars Sensitising Company, were much liked. Mr. H. Smith reported that he had found Mr. Barry's printing meter invaluable in printing-in clouds in platinotype. Mr. Taylor showed prints from the negatives he made when demonstrating development at the last meeting, making clear the points he had dwelt upon in his address. Two reversed negatives—snapshots with a medium stop—were shown by a member. As the conditions under which they were taken precluded the possibility of supplementary exposure, and as the edges of the plates were plainly oxidised, and as another brand of plates, exposed and developed at the same time and under the same conditions, were satisfactory, the unanimous verdict was "stale plates." As the brand of plates complained of enjoys an excellent reputation, the dealers—a large establishment—from whom they were purchased are, apparently, to blame for faulty storage.

One new member was elected and three candidates nominated.

The next meeting was announced for the 28th inst. Mr. C. Beadle will be in the chair. Subject: *Photo-mechanical Printing*, by the Americo-European Company.

HACKNEY PHOTOGRAPHIC SOCIETY.

SEPTEMBER 10,—Mr. Arthur Dean in the chair.

Work was shown by several members.

The HON. SECRETARY then gave an illustrated lantern lecture on *A Holiday in the Isle of Man and Ireland with a Hand Camera*. Several of the views shown illustrated very well the powers of a hand camera.

Mr. Dean showed numerous views of Ireland, and Mr. Day gave an account of the geological formation of the rocks at the Giant's Causeway.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 7,—Mr. Mark Boxall in the chair.

Mr. Crouch, of Barbican, was present, and brought a hand camera for the examination of the members.

As the President was unable to deliver his paper on *Enlarging and Copying Negatives*, Mr. CROUCH kindly gave a lecturette on the uses of lenses, in the course of which he gave a formula for re-blacking diaphragms that had become bright by wear.

The SECRETARY announced that he was unable to obtain permission to photograph at Lambeth Palace.

PUTNEY PHOTOGRAPHIC SOCIETY.

SEPTEMBER 10,—Rev. L. Macdona in the chair.

A motion, proposed by Mr. Barrett, seconded by Mr. Martin, that the word "amateur" be struck out of the Society's name, was unanimously carried, as was also a motion proposed by Mr. Zachariasen, seconded by Mr. Gorin, to render the rule *re* balloting less exclusive.

For the future, the Society's year shall end in April and begin in May, in which month the election will take place. The financial year to remain as at present—January to December.

The members of the Council having tendered their resignations, elections to fill the vacancies will be at once proceeded with.

October 14.—Mr. T. C. Hepworth on *Illustrated Journalism*.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 9.—Annual General Meeting.—The President (Mr. William Shaw Adamson, jun., of Careston) in the chair.

Six new ordinary members were admitted, viz., Rev. T. L. Ritchie, Messrs. G. T. Robertson, B.Sc., A.M.I.C.E., G. M. Scott, J. Buchanan, Innes, and Smith.

The usual reports of the Secretary, Treasurer, and Curator were read and adopted, and on the motion of the President these officials were thanked for their services. The report of the sub-committee appointed to revise the rules was adopted, and the new rules agreed to. The night of meeting has been altered to the third Wednesday of the month.

The office-bearers for the coming year were elected as follows:—*President:* Mr. William Shaw Adamson, jun., of Careston.—*Vice-Presidents:* Messrs. G. Mackie, A.Ph.S., and H. Braid.—*Committee:* Messrs. Ferguson, Buchanan, and Dakers.—*Treasurer:* Mr. Innes.—*Curator:* J. C. Middleton. *Secretary:* James D. Ross, 6, High-street, Brechin, N.B.

Correspondence.

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

EXPANSION AND CONTRACTION OF PAPER PRINTS.

To the EDITOR.

SIR,—A difficulty is often met with in copying fine line engravings by those not familiar with that class of work, the real cause of which is frequently unsuspected. The difficulty alluded to is that of obtaining the fine lines, particularly at the margin of the picture, clearly defined in the negative, however good the lens employed may be. Most of your readers are familiar with the expansion and contraction of paper under varying hygroscopic conditions, but it is not all who will attribute the trouble in question to this cause.

If an engraving has been kept in a place that is moderately dry, and it be pinned on to the copying board in a studio which is only slightly damp, the paper will at once commence to expand, and will continue to do so for some time. If the process used, as is frequently the case when reproducing line work, be the wet collodion, and a small stop be used in the lens, the alteration in size during the exposure is quite sufficient to destroy all fine definition. Conversely, if the print has been stored in a more or less damp place, its contraction while fixed for copying in a dry atmosphere will, in like manner, prevent a sharp negative being obtained. Those who make a specialty of this kind of work always take the precaution of allowing the engravings to lie exposed for an hour or two to the atmosphere of the place in which they are to be copied before commencing the operation. By this means the paper acquires the same hygroscopic condition as that of the air, so that there is no further alteration. Again, when a lens has to be tested for flatness of field and defining power, it is no unusual thing for an engraving to be used as the test object. Now, it is very clear that if there were any, however slight, contraction or expansion of the paper during the exposure, the definition in the negative would be considerably interfered with. Hence a really good lens might unwillingly get condemned.—I am, yours, &c., ENLARGER.

Stoke Newington, September 14, 1891.

AMERICAN BLUE TONING BATH.

To the EDITOR.

SIR,—In reply to Messrs. Eastment & Sons, the following formula will give the tones they require:—

Chloride of gold	2 grains.
Pure rain water	24 ounces.

Make the solution slightly alkaline with—

Saturated solution sal. soda (ordinary washing soda).....	6 to 8 minims.
Chloride of sodium (table salt, in weight).....	½ to 1 ounce.

Place the gold to be used in the dish at one corner, and in it a piece of blue litmus paper, which will turn red. Now take the bottle of sal. soda, and drop into the solution in the dish until the litmus paper turns a decided blue; which will take about six or eight drops. Then add the water, and last of all the salt. Stir up well, let stand from five to ten minutes, and it is ready for use. The bath should be made up as per formula every night. In toning with this bath, should it become exhausted, add more ingredients in the same proportions as were used in making it at first. Tone in a weak light. The prints are toned when the high lights and

half-tints of the face appear clear and a little blue when they are lyin down in the dish and examined in a weak light.—*From Hearn's Practica Printer.*

In the case of ready-sensitised paper, or paper with which an acid preservative has been used, I should put carbonate of soda in the second washing water, and let prints stay in it for about five minutes, and then remove to toning bath.—I am, yours, &c., W. Lladnar.

3, *Bournemouth-terrace, Folkestone, September* 11, 1891.

LENSES FOR HAND-CAMERA WORK.

To the Editor.

Sir,—In "Answers to Correspondents," in Number for May 15, 1891, p. 320, you say, in reply to H. G. M. Conybeare, "A lens having an open aperture of *f*-6 will work as well when stopped down to *f*-16 or less as one having an open aperture of *f*-8," and two answers further down, to "W. C. W.," "The use of wide-angle lenses should be discouraged except in special cases." Now, Mr Dresser has repeatedly affirmed the propriety of using a wide angle for hand-camera work, *e.g.*, Almanac 1889, p. 413, and *Scovill's American Annual*, 1890, p. 38. Of course, this is only for enlarging purposes, and I have seen it alleged that, when enlarged about three times from a quarter-plate negative, it appears correct to the the eye. Again, if the euryscope at every stop possessed the same rapidity and general qualities as the rapid rectilinear, the latter would have lost its *raison-d'être*, but when the "Memorandum Camera" was being exhibited (I think at the Camera Club) Mr. Debenham expressed the opinion that there was a difference.

An article from your pen, dealing exhaustively with these questions as affecting hand camera and *enlargements*, would, I am sure, be appreciated.—I am yours, &c., Nemo.

New Amsterdam, British Guiana, August 25, 1891.

PHOTOGRAPHY AND ART.

To the Editor.

Sir,—I should like to say a few words on the above, as, to my mind there has been a deal of powder wasted; and, if I can, by a few plain words—by way of bullet—hit the bull's eye, I shall, perhaps, help some to a common-sense understanding of the facts. I have had over twenty-eight years' practice in studio work, and in hundreds of instances my sitters have declared they never had a good likeness before, the best they ever had, and suchlike assurances, and yet I had no real difficulty in securing these portraits. Indeed, those who never had a good one have been amongst the most easily taken by me; and why? Because the art of doing it is natural to me. I cannot help doing it; I could scarcely do it otherwise if I tried. Therefore, at the risk of being thought egotistical by some, I have not the shadow of misgiving or doubt in my mind but that the art is in the *man*, rather than otherwise; and, when it is born in him, it is of a totally different description to that which is only acquired by practice. Photography is a science—yes, an art-science, without the shadow of doubt; for, while it is a science itself, the art is in knowing how to practise it so as to utilise its possibilities to the highest extent and advantage in every direction. There is art in grasping the principles and working the smallest details, from the erection of the studio to the completion of the finished picture. Unless an artist is at the helm in the designing and erection of a studio, what absurd and costly mistakes occur! There is art in choosing the arrangement of the lights and blinds, the colours of the walls, and in adapting the accessories to the requirements of both sitters and operator; and, when the ladies and the children come, there is art in talking to them, so as to bring into them that "at-home" feeling which is the necessary groundwork for a genial expression, full of sparkle and pleasantness, which will make the portrait so satisfactory as to delight your sitters and their friends, who will be coming very soon themselves in consequence, bringing orders and re-orders in plenty.

And then the posing! Why, there is as much art in posing a sitter for a photograph as in posing a sitter for a painting. Then, the power of lighting the sitter, and of knowing the effect of variations in the light, so as to get the best exposure possible with different subjects, and different diaphragms used, and different degrees of light power. There is art in all this, and then there is the art of developing them all so as to bring out the whole batch in similar softness, and brilliancy, and fineness, and force; and, if any of you gentlemen who are fond of saying there is no art in photography will do the thing for a year, you will most assuredly alter your views. It is the same all through the after details—retouching, printing, toning, &c. Retouching, especially, is worthy of note, as it affords wonderful scope for artistic manipulation, but the artist must know what to do with the face he is working upon—what to subdue, and what to increase, and what to remove altogether, and yet to retain the likeness faithfully, for there is no art in a picture where the likeness is gone. It is simply an abortion, no matter what fine work may have been put into it. Printing, also, and toning are both capable of being executed artistically, or otherwise, with corresponding results.

It is, perhaps, because the £ *s. d.* have so much to do with the execution of most photography that there is not time for art considerations to have their due attention; and so, if they receive that attention in the midst of the rush and push of the present day in some places, the greater is the credit due: for what comparison is there between the leisure of an artist painting a picture, and a photographer, taking sitter after sitter, and more waiting very often? Last, but not least, there is art in keeping your temper and a pleasant face amidst crying babies, unruly children, and other unpliable circumstances. Therefore, let the critics say on. It is like the working-man said, whose better half had a sad habit of telling him her mind; when asked why he never took any notice, he replied, "Oh, it amuses her, and it does me no harm."—I am, yours, &c.,

Longton, Staffordshire, September 11, 1891. Photographic Artist.

THE KIMBERLEY EXHIBITION.

To the Editor.

Sir,—Might I, through the medium of your Journal, draw the attention of photographers and photographic dealers to the general exhibition which is to be held in Kimberley about September, 1892. It will be the largest ever held in South Africa and would be a splendid opportunity for dealers and manufacturers to bring their goods before the amateur and professional photographers in this colony which is receiving so much attention from folks in the "old country" at present. As three members of our local Camera Club are on the committee, due consideration will be given to the photographic department.

Should any photographers send us any views, they will be carefully looked after, and arrangements made to return exhibits in time for reshipment to the "World's Fair."

We have no less than six professional photographers in this town, and, although they complain of bad trade, they seem to jog along all right.

Should any one desire further information, I shall be pleased to give it, or they could write direct to the Secretary of the exhibition.—I am, yours, &c., M. Macfarlane, *Hon. Sec.*

Kimberley Camera Club, Kimberley, S.A., August 20, 1891.

THE "ACME CAMERA—A CAUTION.

To the Editor.

Sir,—We have to-day had sent to us by a gentleman a camera which he had bought as one of our patent "Acmes," but from which the name-plate hap been lost, asking us to put in a new tablet; but, although the camera is an exact copy of ours in every respect, it is not of our make, and is of decidedly inferior workmanship. We therefore wish to warn the public against purchasing such cameras, and to state that we shall be pleased to verify for anybody a camera that they may have bought, described as of our manufacture, while we shall be much obliged for any information which may help us to discover who is making these cameras, so that we may take such measures as the law allows to protect both ourselves and the public. Perhaps you will be good enough to publish this letter in your Journal.—We are, yours, &c., W. Watson & Sons.

313, *High Holborn, W.C., September* 15, 1891.

THE NEW METHYLATED SPIRIT REGULATIONS.

To the Editor.

Sir,—In the No. 1635 of your valuable Journal, the leading article entitled "Methylated Spirits," &c., you take in hand the question of the new regulation introduced by the Excise authorities, in virtue of which all the alcohol sold for industrial purposes is to be mixed with a certain amount of mineral naphtha. This new regulation, as you very properly say, especially interests photographers who have to use alcohol. It not only interests photographers, but it must be considered as simply fatal, if means cannot be found to evade it. We are not yet sufficiently familiar with the practical working of this regulation to form a decided opinion whether it is so extremely obnoxious as to necessitate starting a strong opposition to the measure by the aid of the Photographic Section of the Chamber of Commerce or otherwise.

But your authoritative opinion on the influence of the addition of the mineral naphtha may have an undesirable effect on the agitation, if such will be necessary. I have in view the following sentence of the article:—"However, the small addition of mineral naphtha may not largely affect photography, as its use is now principally confined to varnish-making. . . . . Few people now precipate their emulsions with spirit. . . ."

One of the very important uses of spirit is not only to precipitate the emulsion from the solutions, but in adding it to the finished emulsion, without which, coating of the plates or papers will be very imperfect. The quantity of alcohol used for this and other purposes is very considerable, and addition of mineral naphtha is fatal.—I am, yours, &c.,

Silverhowe, Champion-hill, S.E., September 15, 1891. L. Warnerke.

The forthcoming exhibition of the Hackney Photographic Society on October 21 and 22 will be opened by Sir Charles Russell, Q.C., M.P. In addition to the usual display of pictures, concert and organ recitals will be given, as well as working trade exhibits, optical lantern displays, and an exhibition of photographic apparatus. Captain Abney will present the prizes to the successful competitors.

On Wednesday and Thursday last, September 9 and 10, Mr. T. J. Edwards, of West Bromwich, photographed 320 babies, free of charge, giving each mother one print of her child. He used Ilford ordinary plates, Dallmeyer 2B lens, and a Thornton-Pickard shutter. Out of the number 310 are successful, and will be exhibited shortly in his windows, with a bust of the police-constable whom he employed. Seventy or eighty mothers had to go home disappointed.

Exchange Column.

Photographic News, 1867 to 1889, unbound; will exchange for 12×10 outdoor camera, or 9×7 ditto and lens, of good make.—Address, J. HOLMDALE, Hayes, Middlesex.

Will exchange quarter-plate 1889 Instantograph camera by Lancaster & Sons, with lens, instantaneous shutter, two double backs, and stand, complete in waterproof cases, good as new, cost 3*l*., for half-plate doublet lens (by good maker), suitable for portrait and architectural work, in good condition.—Address, WALTER BROADBENT, Central View, Delph, *viâ* Oldham.

Answers to Correspondents.

LECTURE.—We shall be pleased to consider it.

B. CLARK.—Any good soft gelatine may be used as a mountant for prints.

E. M. ASHLEY.—You can register the name as a trade mark. Consult a patent agent.

M. E. N. wishes to be told the "estimated cost of a sheet of paper silvered, printed, and toned."

W. E. CROWTHER.—The plates referred to are not now obtainable. We believe they have not been commercially supplied for the last year or so.

R. ARMSTRONG.—We believe that most, if not all, the class of work you refer to is done abroad. We cannot give you the names and address of the firms in question.

H. HUNT.—1. Messrs. Perken, Son, & Rayment will probably be able to supply you with what you require. 2. We should recommend you to try a harder pencil for working up platinotype prints.

LAMP.—There are several magnesium flash lamps that will answer your purpose, of which you will find particulars in our advertisement pages. Any photographic dealer will supply you with one.

MAX JAFFÉ.—We regret that by a mistake of the translator you were made to say something altogether different from what you intended. If you will kindly forward the correction you desire, we will with pleasure insert it.

A. DOBSON.—To avoid prints on "double albumen" paper curling up so that they cannot be opened when dry without cracking, they should be dried between blotting-paper, so that they are kept flat all the time. When this is done there will be no cracking whatever.

A. FORBES.—If the article is marked "By Royal letters patent," and it has not been patented, the manufacturer, as well as the vendor, render themselves liable to a penalty, which can be recovered. The Patent Act specially provides for this. It is a fraud on the public.

SENSITISE.—Surely your albumenised paper can have suffered no harm by being kept in the cellar during the past four months; but can you not sensitise a few sheets for yourself and see how they behave? Before we can advise as to the correction of the old silver bath we would require to be informed as to what is wrong with it, seeing no fault is alleged.

A. HEWITT asks if there would be anything to prevent him reproducing the whole of the Art Union pictures, and publishing them as a series of lantern slides?—We cannot say whether the Art Union of London would make any objection or not. As the majority of the pictures are copyright, they cannot be copied without the Union's consent. Why not write direct to the Art Union? Its address is Strand, W.C.

A. DABBLER, who says he is desirous, after over a year's experience as an amateur, of entering photography as a professional. He is offered a business at —— for three hundred pounds, and asks us if we think the business is worth the money. We cannot undertake the valuation of businesses, and, what is more, we have never been in the town named in our lives, therefore we cannot even say whether it is a flourishing place or otherwise—a point he appears to be most anxious about.

HUSSAR writes: "In THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1891, article on 'Construction of Camera Bellows,' p. 522, a material called 'casban' is mentioned. I cannot discover what this is. A draper told me that he had been forty years in the business, and he had never heard of it. Probably it goes by some other name. Kindly inform me what it is."—From inquiries we have made, it appears that "casban" is not now sold. Black silesia, however, is said to be a perfect substitute for it. Apply to any dealer in tailors' trimmings.

APPRENTICE writes as follows: "Every day I have to sensitise from three to six quires of albumenised paper. The stench from the paper is most sickening, and quite destroys my appetite. I cannot eat my meals, as I cannot leave the premises during the business hours. Do you think there is anything injurious to health from the effluvia given off?"—We have never heard of any serious injury arriving from the use of paper prepared with putrid albumen; but, if our correspondent cannot take his food owing to nausea, that will eventually affect his health, no doubt.

M. D.—Your patient is evidently suffering from the effects of the bichromate of potash. There is no cure but to abstain from the employment of the salt, when the disease will subside. Of course, if the work be done in indiarubber gloves, no injury will arise. As a means of alleviating the irritation, the best lotion we have heard of is one of alcohol, glycerine, and carbolic acid, and in the earliest stages *Unguentum Hydrargyri Nitratis* well rubbed, but sparingly, on the affected parts. Dr. B. W. Richardson investigated the subject some few years ago, and gave the results in the *Æsclepiad*.

A. VIVIAN writes: "Enclosed is part of a mounted print. You will notice how it is faded, although only mounted some three months. Can you tell me the reason? Is it hypo in the mount, or what? If the mount is in fault, have I any remedy against the dealer?"—It is impossible, by merely looking at the print, to say the cause of the fading. Without making a chemical examination of the mount, we could not say whether or not it is at fault. Better send it to an analytical chemist for examination. If you can prove that the mounts are the cause of the fading, you have your remedy against the one who supplied them.

J. DUTTON says: "Can you tell me how to precipitate the gold from worn-out toning baths? I have only found the difficulty since using ready-sensitised paper. The baths are of a dark purple colour, showing the presence of gold to some extent, and yet the sulphate of iron does not have any effect. Is there anything in the preservative used that can prevent the precipitation?"—If the toning baths are really worn out, there is no gold left to precipitate. The purple colour only shows that a little gold has been reduced and is held in suspension. If sulphate of iron does not precipitate the gold, it may be taken that there is none to precipitate.

SILEX inquires whether a stereoscopic view that is intended to be examined in an instrument having eyepieces of short focus should be taken with rectilinear or single (distorting) landscape lenses. We reply that, seeing the eyepiece will assuredly show distortion, of the curvilinear class, in a rectilinear picture, it is necessary to meet this by having the picture itself distorted to a slight extent. A perfectly square photograph, when being examined through an eyepiece of short focus, assumes a pincushion form; and to obviate this the photograph should possess so much of the barrel shape as to permit its being brought into rectilinearity by the eyepiece. But, so long as eyepieces having foci exceeding six inches are employed, such nicety as that here implied need not be adopted.

REV. W. S. W. writes: "I have not unfrequently come across the name of Dr. Norris in connexion with the invention of a dry plate many years prior to the introduction of gelatino-bromide plates. As I am preparing a lecture on photography, will you kindly give me an outline of Dr. Norris's process, with such other particulars as you can?"—In reply: The process of Dr. Richard Hill Norris, of Birmingham, was patented in September, 1856, and consisted in first collodionising and sensitising a plate in the usual way, then washing it, and finally immersing it in a solution of gum arabic, or of dextrine, starch, gelatine, albumen, caseine, or other like substances, by which the pores of the collodion were filled up so as to be amenable, after the plate was dried, to the action of the developer, which, it was understood, would not be the case if the collodion film were dried without such treatment. This, so far as we remember, was the gist of the invention.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, September 23, *Enlarging*. September 30, *Mounting and Finishing*. Outing, Saturday next (September 19), to Perivale; train from Paddington to Castle Hill at thirty-five minutes past two. The last outing of the season (Hampstead) has been postponed to Saturday, October 3.

A TRAVELLING photographer, named Thomas Johnson Grocott, was charged at Burnley with stealing two photographic lenses, valued at 6*l*., the property of William Hudson, a photographer, of Ripon-street, Preston, carrying on business at Padiham. The offence was fully proved, the chief witness being Alfred Goodhall, assistant to Mr. William Jackson, at 71, Oxford-street, Manchester, where prisoner had pledged the lenses for 5*l*. He had known prisoner previously to be engaged in the photographic business, and for that reason took the lenses in. Prisoner was committed for two months' hard labour.

THE AUTOMATIC PHOTOGRAPH (FOREIGN AND COLONIAL) COMPANY, LIMITED.—According to the Official Receiver's report, it appears that this Company was formed in May, 1890, for the purpose of acquiring the patent rights in connexion with an improved coin-freed apparatus for automatically photographing persons and objects, and for delivering the same. By an agreement dated May 16, 1890, a trustee on behalf of the Company, which was then about to be registered, acquired from Mr. J. B. Joel, a diamond merchant, of Drapers'-gardens, E.C., the whole of the colonial and foreign rights (with the exception of those for Spain) for the consideration of 201,000*l*. in cash and fully paid shares. By a subsequent agreement, dated September 2, it was stipulated that the purchase money should be satisfied by the allotment to the vendor, or his nominees, of 500 fully paid founders' shares of 1*l*. each and 40,000 fully paid ordinary shares of 5*l*. each. At the time when the first contract was signed the vendor was possessed of letters patent for certain countries only, but undertook to procure for the company the necessary rights for other parts of the world. The promoters of the Company are stated to have been Mr. Joel, the vendor, and the National Debenture and Assets Corporation, Limited. On July 28, 1890, a sum of 5000*l*. was paid to the Corporation, wherewith to promote a company to acquire the French and Belgian rights in the patent. It appears that in November, 1890, when the Corporation went into voluntary liquidation, no material steps had been taken towards promoting the new company, and the payment of the 5000*l*. is alleged by one of the directors to have been made *ultra vires* by two of the others. The Company has been made a party to various actions brought against the vendor, disputing his right to the ownership of the patent disposed of by him, and a large proportion of the vendor's shares have been allotted by the Company under the direction of the Court. The failure of the Company is alleged by the secretary to have resulted from its inability either to raise additional capital or to dispose of any of the patent rights, owing to the litigation in which it was involved. The liability as regards contributories is returned at 216,159*l*., against assets estimated to produce 10,033*l*., the deficiency being explained chiefly by depreciation in the value of the patents, returned at 200,000*l*.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1638. Vol. XXXVIII.—SEPTEMBER 25, 1891.

IDENTIFYING PLATES IN THE DARK ROOM.

We have been urged by an esteemed correspondent to put the "strongest pressure possible" upon the manufacturers of dry plates to carry out a suggestion that appeared some time ago in these columns, as regards the ready identification in the dark room of the particular make of plate that is being used. There are, of course, many workers who use one, and one only, particular brand, and in many respects they are wise; but there are also others who see reason to change their plate-maker; others, again, who like to try a variety of makes, and still another class who habitually employ plates by several makers, though restricting each to a special kind of work, and using it for no other. The advantage of using only one kind of plate is obvious. When in the hands of a careful, thoughtful worker, he knows, to the utmost nicety, exactly what he can do with it, how far to urge it with ammonia, what range of accommodation, as regards exposure, it possesses; and, above all, he knows at a glance when the image begins to appear, what the finished negative will be, and, further, he can develop several in one dish. To do all this with three or four different makes (not restricted to a special class of subject) is either impossible or involves so much expenditure of time as to be impracticable. It thus needs only to be mentioned to be accepted that it is essential for all systematic, quick, and exact development that each maker's plate should be developed apart from the rest where several are in hand awaiting development.

When an amateur is *en tour* he cannot always confine himself to one maker, from the difficulty of supplying himself when his stock is exhausted. Naturally, all photographers make, or are supposed to make, memoranda of each plate and exposure; but, as a matter of fact, they do not. What a very great assistance to them it would be if, in the dim light of the dark room, they could, the moment they got a plate in hand, know at any rate what make it was. What is the use of a pencilled memorandum on the edge of the film when there is not light enough to read it by, or else too strong a light for it to be rashly exposed to? How many a fogged negative may be traced to reading pencilled memoranda upon it in too strong a light.

Then, again, in the course of a season a certain number of plates are left aside for further experimenting, or development at leisure, and these things are apt to accumulate, only to be worked off at intervals; sometimes they are left for a long while. How are they to be identified when the time for development comes on? A plate may be irretrievably ruined by adding to the developer an amount of ammonia that fogs the shadows, though another can bear the same amount with impunity; and, contrariwise, the best qualities of a plate may be lost through failure to bring out all detail, owing to a fear of clogging it through excess of alkali.

Still, again, we have alluded to pencilling a negative for reference when developing. How much better if this could be done on the back of the plate instead of the film, by means of a ready attached label. "Let every one put his own label," some readers will at once reply; but we consider that every facility for rapid and exact working should be afforded by the manufacturer; for of a surety the one who offers the greater conveniences must, *cæteris paribus*, win in the long run against those who are less thoughtful for the comfort of their customers.

Our suggestion is that every maker should label his plates upon the back with, firstly, maker's name; secondly, kind of plate (most makers have more than one variety); and thirdly, but least important, with the date. Originally we suggested that each maker should have a particular shape of label, so that at a glance it could be seen what plate was in hand; but we think it will be better for the labels to bear the maker's name, &c., in bold thick letters, and with a blank space below for any memorandum the user may desire to place upon them. The first objection that would be raised would probably be that the label would cause its form to be impressed upon the film through reflection from the back. This difficulty would at once be obviated by printing on a deep orange paper, or on the white side of a black surface paper.

We are now about to adduce one or two experiences that may be considered typical, and which point out very forcibly the advantage of a ready-labelled plate. One of our correspondents has about a dozen and a half of dark slides of 12×10 size, a plan which he prefers to changing his plates in the middle of a day's work. He uses, altogether, three kinds of plates, a very slow, a medium, a very quick, occasionally taking one sort, sometimes two, and at others all three. To avoid any confusion, every time a slide is changed, the make and date of plate are entered in a book kept for the purpose; and thus no matter how long the slides have been charged, whenever he starts on an expedition, he knows what tools he is working with. On one occasion his assistant forgot to make the regular entry upon charging the slides. A week or two afterwards, the principal was called upon to do some photographing, and, upon inquiring what the slides were charged with, it was found that no one could tell him; but his assistant believed they were So-and-So's "slow." He had no time to take them out and charge them with "certainties," so made his exposures for a "slow plate." The plates were really the quickest in the market, and his negatives were almost worthless. Now, even if this photographer had had time to change his plates to insure certainty of action, the unknown plates would have been worthless, or perhaps put aside to test later on; forgotten and used at some future time, with complete ignorance of their qualities.

In the other case we remember a photographer had taken a number of negatives of a few difficult figure-subjects, and had put aside in a grooved plate-box for future experimenting some

that he thought were of little value. Later on, he had to put some plates (taken out of the maker's box) on one side, and these he placed in the same box as the exposed plates, but on the opposite side. The sequel will be guessed. All were forgotten, and twelve months afterwards he set off with a light heart to photograph a group, his slides charged out of this box with those already exposed. Of course, he ought to have labelled his plates; but he did not do so. If the maker had already left him a nice little blank space on a ready-attached label, how easy it would have been to have marked a black cross on the exposed plates, and, more, it would be plainly visible without searching for, which would not be the case with a suitable pencil-mark on the film. Cases *ad nauseam* might be quoted to show the need of labelling; but we trust that we have said enough to induce makers to send out every plate with a label plainly giving maker's name, kind of plate, and (preferably) date, with also a blank space for memoranda.

THE STABILITY OF OLD SILVER PRINTS.

In an article last week on *The Genesis of Albumenised Paper* reference was made to the greater permanence of some of the prints executed thirty or forty years ago over many of those produced within the last year or two. The subject is certainly an interesting one. Seeing that silver prints which were produced so long ago are now as good as when first they were made, surely, with our increased chemical knowledge, we, at least, ought to be able to produce equally as permanent results at the present time. This being the case, we shall here explain wherein consists the difference of working then and now, and it will be seen that, according to modern notions, in some respects—particularly in the toning—the conditions are precisely those conducive to fading.

There can be no question whatever that a large proportion—indeed, we might say the majority—of the pictures were then toned entirely by sulphurising. In some instances gold was not even a constituent of the toning bath. In the article just referred to the difference between the albumenised paper of the present time and that which passed under the same name in the early days of photography, as well as the amount of chloride it contained and the strength of the silver solution upon which it was sensitised, was fully dealt with. Therefore it is not necessary to dwell further on this portion of the question, though it should be kept in mind, as it has a very important bearing on the subject.

It may be interesting, if not amusing, to many of our readers if we give two or three formulæ for the toning baths of old. Quoting from the *Journal of the Photographic Society* (1853), Mr. Pollock—afterwards Lord Chief Baron Pollock—gives the following for a toning bath:—

Water	6 ounces.
Hyposulphite of soda	1 ounce.
Nitrate of silver (fifty grains to the ounce)	15 minims.
Iodide of silver, dissolved in a saturated solution of hyposulphite of soda	10 „
Chloride of gold	3 grains.
Chloride of silver, blackened by light	5 „
Acetic acid	2 drops.

The bath was said to improve by keeping, and the time taken for toning was from one to twelve hours. After this long toning—and at the same time being fixed—they were to be still further fixed for half an hour in a fresh solution of hyposulphite of soda—one ounce of the sal to six of water. the same volume Mr. Maxwell Lyte, a well-known name, giv the formula:—

Water	1 pint.
Hyposulphite of soda	3 ounces
Chloride of silver	120 grains
Iodide of silver	20 „
Pyrogallic acid	½ grain.

This solution was to be exposed to the air for three week preferably longer, before use.

We imagine that neither of the above baths would com themselves to modern workers on the score of yielding perm prints. Yet some, toned and fixed with these or similar tions, are still in existence. Ultimately this class of bat abandoned, and what was known as the compound toning fixing bath of hyposulphite of soda and gold, with sometim little silver added, substituted. Here is the formula giv Hardwich, third edition (1856):—

Chloride of gold	4 grains.
Nitrate of silver	16 „
Hyposulphite of soda	4 ounces.
Water	8 „

This bath, with perhaps a little modification in the propor was universally used for several years, when it was super by the alkaline method. The toning was generally a matt hours, and the baths were often continued in use long they must have been completely exhausted of their gold, w of course, the colour was obtained by sulphur. Now, it is clear that the permanence of the old prints cannot be d the system of toning adopted. Indeed, they may rather be id to have endured in spite of the treatment. Therefore it is obv that we must look for the stability in another direction. The st likely one appears to be, and doubtless is, the comparatively la amount of reduced metal of which the image was composed

Let us consider the conditions under which the pictures re made. The paper, as we have said, was but slightly a menised, yet heavily salted and strongly sensitised. Wh little albumen was used existed more in the paper than o surface, for no attempt was then made to retain it as a superfi layer, as is the case at the present time. Then, again, prints were made from very much stronger negatives t those now in vogue. In the "fifties" and early "sixties a, say, portrait negative was not considered satisfactory unle it did not range from clear glass for the shadows—not, bea mind, what is generally understood as "clear glass" in gela negatives, but absolutely clear glass, that would not deg the purity of white paper when placed beneath them, actual opacity for the highest lights. Such, indeed, were negatives produced during the "*carte* mania" by the lead men—M. Silvy, Southwell Bros., Clarkington, and others, a at a much later date, by the late Adam Salomon—indee negatives of this description were then looked upon as the ac of perfection. These negatives usually took many hou sometimes an entire day, to print. By the time they were d the shadows were very deeply bronzed, and the image show strongly on the back of the paper.

The printing, when the compound toning and fixing was used, was carried to a much greater depth, that is, more o printed than at present, as they reduced very much in after operation. If one of the old prints were torn, it show that the image was in the body of the paper, penetrati nearly, if not quite, through to its back, instead of bei as at present, confined almost entirely to the albumen on

face. That this is the case may easily be proved by separating the albumen from the paper of a blistered print.

A very important point in connexion with this matter is, that albumen itself forms a compound with the silver, "albuminate of silver." This compound is but very slowly dissolved hyposulphite of soda, though its solubility may be somewhat accelerated by the addition of ammonia or its carbonate. With the highly albumenised paper now in use, the time allowed for ing, and the strength of solution employed, very little of this mpound is dissolved, while with the old prints there was t little albumen to form the compound, and the toning and ing solution contained half as much hypo as it did water, d the time of immersion was a question of hours rather an minutes as at present. Hence, under this treatment, the ints might be considered free from albumenate of silver, hich is always looked upon as being conducive to fading.

There is no question that, if silver prints were made under same conditions as those of old, taking advantage of dern knowledge, they would prove far more stable than the jority of those now produced. If a print, be it in silver anything else, remains unchanged for, say, thirty years, it y, to all intents and purposes, be considered a permanent otograph.

TERING THE CHARACTERISTICS OF DRY PLATES.

not unfrequently happens that a batch of plates, especially ongst the rapid kinds, turns out slightly inferior in the aracter of the image given, or it may happen that for some cial purpose a plate different from those immediately avail- le is required at short notice. Under such circumstances nethod of "doctoring" an inferior plate, or of modifying its aracter, will often be useful. Some little time back, being in nt of an extremely clean and vigorous film, whose sensitive- ss was of no consequence, it being at the time inconvenient manufacture such an article *ab initio*, we proceeded to treat few existing films by the method of "bathing," as it has been lled, and with such satisfactory results that we were induced experiment further in the same direction.

"Bathing" has been practised for a variety of purposes, but best known in connexion with the orthochromatising of ied films; but the system was, we believe, first introduced in rmany for the purpose of increasing the sensitiveness. With is end in view the plates were immersed in a solution of trate or ammonio-nitrate of silver for a certain time, and, ter thorough washing, were redried, or might be preferably ed at once while wet, for the films so treated were found to main good only a few days or hours. The sensitiveness, owever, was said to be very materially increased. In this rocess the gelatine basis of the film was submitted to the full tion of free silver without the slightest attempt beyond wash- g to prevent or remove the effects of the combination that as bound to ensue, and those who know how powerful is the finity of silver and gelatine for one another will scarcely be rprised at the rapid deterioration of such plates after treatment.

In our experiments the objects were to modify the character of ne image in the direction of greater vigour—for all were made ith plates that were faulty in that respect—without reducing ne sensitiveness below what would be useful for general pur- oses, and without materially affecting the keeping qualities of ne films after treatment. In the two first of these objects we ucceeded perfectly, but time alone can prove the last; still, lms that have been tried several weeks after treatment have ot shown the slightest sign of deterioration.

The first experiment was tried on a number of odd plates, remnants from one source or another, but all of which had been set aside as practically useless on the score of incapacity to give density. These were treated to a bath of *very* weak iodide of potassium, followed by copious washing previous to drying, the object being, to test whether the conversion of a small proportion of the bromide into iodide of silver would have the desired effect. In the majority of instances the only result was found to be more or less loss of sensitiveness, without the least improvement to the image; but in two or three cases a very decided strengthening of the deposit was apparent on development, accompanied by, singularly enough, less decrease of sensitiveness than when the image remained unaffected. Unfortunately, we had no data to go upon to assist in explaining the difference, as we were totally unable to identify any of the plates employed.

There may be circumstances under which the conversion of a small portion of the bromide into iodide may be useful irrespective of its effect upon the density of the image, as, for instance, when it is desirable to increase the opacity or non-actinic quality of the film to prevent halation, or to give that special clearness for which bromo-iodide plates are noted. In applying the iodide bath, however, it will be well to bear in mind one or two facts. In the first place, the solution, if allowed to act long enough, will convert the whole of the bromide; and, in the second, that a film of pure iodide of silver is practically unacted upon by the alkaline developer. The proportion of iodide to bromide must be very small, not more than five per cent., and, therefore, the solution must be extremely weak, and applied only for a limited time. Uniformity of action will be promoted by lengthening rather than by curtailing the action, hence a comparatively prolonged immersion in a weak solution is better than a shorter one in a stronger solution. A strength of half, or even a quarter, of a grain of iodide of potassium to the ounce of distilled water will be sufficient, the period of immersion depending upon the effect required.

When the quality of the plate is already satisfactory, and it is only required to alter its physical character, the above treatment will suffice, bearing in mind always the necessity for thoroughly removing the excess of salts by washing. When, however, it is desired to add to the vigour or "robustness" of the film, a more elaborate method of treatment will be necessary, as in the great majority of cases it will be needful to introduce more silver into the film, not necessarily because it does not carry sufficient already, but because it is of the wrong quality and incapable of modification; but, by introducing a small proportion of bromide or iodide of the slow and density-giving kind, the whole character of the developed image will be altered, a very small proportion sufficing to effect its purpose, while the more delicate kind will preserve the sensitiveness.

To commence the process by immersion in a bath of silver nitrate, in which case the bath will exert its full influence on the gelatine, for it has nothing else with which to combine, would be simply to destroy the keeping qualities of the film at once, unless, indeed, subsequent precautions were taken which would be equally fatal to their sensitiveness. The plan we adopted consisted in first soaking the films in a weak solution of bromide of potassium, two or three grains to the ounce, for about half a minute to a minute, according to the absorbent character of the film, and then with a camel's-hair brush, previously moistened in the bromide solution, removing the surplus and placing the plates in a *horizontal* position until perfectly surface dry. A good long rest at this stage will go

far to assist uniformity, as the bromide will have time to diffuse itself equally throughout the film.

The plates, having become surface dry, are next immersed one by one for a couple of minutes in a bath composed of five grains of nitrate of silver, and ten grains of nitrate of ammonia in each ounce of water, the latter salt contributing to the sub sequent clearness of the image in the same manner as acid in the old silver bath. When the requisite time has elapsed, the plates are removed from the silver bath, well washed, first, under a tap or from a jug, and then left to soak in clean water until every trace of free silver has gone, in which condition they may be exposed wet, or, if not required to be kept more than a week or ten days, dried.

When required to be kept for some time, the plates, after having soaked in one or two changes of water for at least a quarter of an hour, may be immersed for five minutes in a ten-grain solution of common salt, and afterwards the soaking in water is resumed until the last traces of salt have been got rid of. This treatment has the least effect upon the sensitiveness of the films, but it cannot be relied upon as an infallible preventive of deterioration, so great is the affinity between the silver and gelatine. When a slight reduction in sensitiveness does not matter, as would be the case with a plate whose ultra rapidity caused its want of density, a bath of two grains to the ounce each of bromide of potassium and bichromate of pot assium, may be substituted for the salt, and followed by a very thorough washing.

Plates may be made in this manner that rather excel the ordinary ones in quality, while they equal most in sensitiveness.

With regard to the action of light on coal-tar colours it may be mentioned that the British Association appointed a committee to experiment and report upon the question. The method adopted has been to dye with various pure dyes patterns of silk, wool, and cotton. The committee reports that the work of purifying the dyes and exposing and recording the results necessarily require much time. The greater part of the money already voted is spent, and this year another sum of ten pounds has been allocated. The exposing frame on which the various dyed samples are placed in the sun is erected at Adel, near Leeds.

The electric light has always had a fascination for photographers, a portable dark-room electric lamp being an especial desideratum. The convenient properties of acidified bichromate solution as used in the once popular bottle batteries have been utilised by M. Radiguet in his latest invention, which he terms the electro-photophore. The great ingenuity of this purveyor of electric apparatus is well known, and predisposes to a belief in the possible utility of this latest candidate for employment. It is stated to be a useful article for the photographer's laboratory, and may, besides, be found useful for domestic purposes, mines, &c. The apparatus consists of a jar containing these bichromate elements joined up in tension. The zincs can be raised or lowered at will so as to avoid loss, and the current is capable of giving a light of one-candle power. The lamp is fitted with a metallic movable reflector so arranged that the light can be concentrated in any given direction. If desired, the glass can be made of any suitable dark-room colour.

Those who have had much to do with optical work, especially for lecture purposes, are aware of the difficulty experienced in obtaining a Nicol prism of suitable size, quite apart from considerations of cost; but, at the British Association meeting, Prof. Thompson described a new form, which can be made at a slight cost of almost any dimensions, while the increasing dearth of Iceland spar renders prisms impossible of attainment. The method he proposes consists in reflecting the light from a black glass mirror whose surface is covered with a plate of clear glass. In this way less light is lost than if black glass alone were used. The light from the lantern is reflected on mirror by means of a totally reflecting prism. After being polari it is again turned back into its original axis by a second reflect prism, which, however, requires very careful annealing, or other it would lose its character of plane polarisation.

There is something novel about the determination of the Brec Photographic Association's projected effort to prepare sets of lant slides illustrating the various industries of the town. We await result of the endeavour with curiosity, as we are inclined to th that some owners of machinery would probably look at the suggest with no great amount of favour. Manufacturers sometimes go great trouble and expense to provide themselves with spec machinery, which they are not too eager to have copied or imitat This is only natural, and hence such an experiment as the Brec Society's is one which possibly would not pay for extensive imitati All the same, we wish well to the particular attempt referred to.

In the report of the Richmond Society, which is printed elsewh we are told that time did not allow of the subject for the even being thoroughly dealt with. That subject was, *Defects in Gela Plates*. We can thoroughly understand it. The moment we be to talk about defects, whether in inanimate objects or in our nei bours, we seldom find time enough to exhaust the topic.

The exhibition of the Photographic Society of Great Britain op (to-morrow) Saturday evening. This event, as well as the revi activity of the various Societies which usually accompanies it, c stitutes a sort of dividing line between the summer and win seasons in photographic work. We do not doubt that it has b looked forward to with more than usual interest, by reason of discussions and criticisms to which some of the awards at l year's exhibition gave rise. It is to be hoped that there will be occasion for anything of the kind this year, as it is, to say the le of it, unpleasant to exhibition judges to have their decisions vigorou attacked and derided. Besides, this sort of thing must operate prevent really good men undertaking the "thankless office," an eff which would be deplorable.

The *Daily Chronicle*, in reviewing the annual volume of one of illustrated monthly magazines, laments that so many of the pictu are process reproductions. We fail to see either the point or ground of our contemporary's objection to the employment of pho graphy for this purpose, even were it the very highest class of bo illustration work, unless it be that the reviewer is as yet so unacc tomed to the small advantage of fidelity to the original draw which photography insures, that he mistakes its appearance fo drawback of the process. As regards the artistic properties of t class of work, it is far too late for us to say anything—even for behoof of a benighted daily journalist.

We understand that Colonel Gouraud is having many of the popu street cries and sounds of London phonographed for the edification an American Society that has a *penchant* for such phenomena, and the same time is also having photographs taken of the individuals a sources from which they emanate. If the thing is done with a thing like completeness, the phonographs and photographs will productive of a great amount of instruction and amusement for kin beyond the sea. Might we suggest that if some of the str criers and callers could, by courtesy of the Colonel, be allowed to themselves as the camera (and others) see them in the act of inflict torture upon their helpless hearers by their indescribable vocal effo existence in the Metropolis would be less intolerable than hitherto

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REDUCING NEGATIVES.

In reviewing the various plans adopted or suggested from time time for reducing the intensity of negatives, Mr. Duchochois, in article which he contributed to a recent number of the *Photograp Times*, leaves little of the ground uncovered, as, although he does

nake mention of every individual process that is known, those that ıe specifies are in every way typical. The one he attributes to Mr. J. Spiller, in which a negative is treated with cupric bromide and ›ommon salt, was not previously known to me in that shape. Do I ınderstand Mr. Duchochois to mean that silver bromide dissolves in ı solution of common salt? If so, I fear he is mistaken. Probably, ;upric chloride is meant in the first instance, and in that case the ·ationale of the process is clear enough.

Mr. Duchochois leads us to suppose that he objects to the various)ld reducing processes which he mentions, because, as the intensity is ·educed by dissolving the metallic silver forming the image, there is a ›onsequent loss of gradation and delicacy of detail when employing hem. If this were unavoidable, I should be inclined to join him in ›ondemning the use of them; but, in my experience and practice, it s not, and hence, as nobody else appears to regard the matter worth lisputing, I will, with your permission, shortly give my reasons for liffering from Mr. Duchochois in regarding these old methods as ıltogether irrational, and therefore unsuitable where the preservation)f gradation and detail is imperative.

I fully grant that by any process of universal conversion of the leposit into silver haloid, and its dissolution by a fixing agent, the langer of eating away the image, which Mr. Duchochois noticed, is)y no means imaginary. But it may very easily be obviated by the ımple process of local reduction, which Mr. Duchochois appears to gnore or to overlook, and which is applicable to the whole of the leposit as well as to just those parts where, on account of abnormal lensity, it is only necessary to apply the converting solution by neans of a brush. In my own experience I seldom have negatives)f such a character as will admit of local reduction without the ıtmost care being taken to prevent any disturbance of the scale of ·radation.

Monckhoven's process is an old favourite of mine, and I usually mploy it in the following manner. Supposing the negative to be fflicted with excessive local density, I apply the ferric oxalate olution with a brush, and fix as usual. But if the excess of deposit ı universal, and *the gradation is not well balanced throughout the ıiddle tones*, I first of all, with a brush, bleach out the densest ›ortions of the picture, and then lay the negative in the solution, in rder to allow the whole of the deposit to be attacked, taking care, ›owever, that in the harmonious parts of the pictures the conversion nly proceeds to a comparatively slight extent. In this manner, both ı general and local reduction, I have gained such command over the arious bleaching-fixing processes of reduction that I personally egard them as difficult to improve on for the purpose.

But, besides Mr. Duchochois, most people lose sight of the fact that ı the processes he names and condemns there is a considerable lasticity of power at one's command. It is not sufficient that any egative should simply be bleached and fixed without some regard to he conservation of the necessary density, gradation, and detail of the esulting picture. The indiscriminate employment of these methods ı, I am convinced, at the bottom of half the failures with them. A ttle study of what is sought to be obtained, and the best means for btaining it, is necessary in all cases; and a judicious combination of ›cal with general reduction will always pay for the small amount of xtra trouble taken.

As regards Mr. Duchochois' rational method, I should like to ask im whether there is not always, and in all cases, an almost certain hance of leaving some unaltered chloride or bromide in the film, no ıatter how long the luminous action be permitted access to it, and ·hether the use of the hyposulphite bath, which he condemns with ıe other processes, is not, therefore, an absolute necessity? Con- der. We have the deposit converted into chloride or bromide of lver, as the case may be. The light turns it to a bluish or violet- lack, it is true, but the light in all probability does not reduce the ·hole of the deposit. This experiment may be confirmed by placing gelatine plate in the light for an hour or two. The light will be ·en not to have penetrated to the back, and, if this latter be exposed ı its turn, there will still, I am afraid, remain a thin layer of unaltered ılt between the two reduced surfaces.

The process may be all that Mr. Duchochois claims for it if the ·esence of some unaltered salt in the film is of no consequence; but, it is, fixing is necessary, and in that case where does its superiority over the older processes appear? Again, where is the practical advantage of altering the actinism of a film by colour over that of changing it by reduction?

JAMES R. HOPWOOD, Ph.D.

CONTINENTAL NOTES AND NEWS.

YET another discoverer of photography in natural colours! A Swiss paper informs us that Lucerne has the honour of numbering the newest genius among its inhabitants. His name is Dr. Raphael Kopp No details of his method are forthcoming yet a while, so that it would be premature to doubt the fact alleged; but we will humbly express the hope that Dr. Kopp at least will not be the victim of any disappointment in the matter. For ourselves, and for the public, however, such a hope is needless, even if it is not denied us.

IN France, we are told, the annual consumption of silver nitrate for dry-plate making is 12,000 kilogrammes. In every hundred kilogrammes of the salt there are slightly more than sixty-three kilogrammes of metallic silver. Taking the mean price of the latter at 175 francs per kilogramme, it appears that 1,373,000 francs worth of metal are employed for the purpose, or, in round numbers, 55,000*l.* worth. These statistics reach us without any clue to the means taken for ascertaining their accuracy.

EQUALLY obscure is the evidence upon which a Transatlantic journalist professes to have arrived at the number of different shutters which exist throughout the world. In three or four years, he says, he counted over a hundred thousand of them, and then he goes on to make the remark that, if each inventor (?)—the note of interrogation is his, not ours—only made fifty shutters, the number produced would total up to five millions! With the judicious elimination of a nought or two our American friend is probably correct in the first and third sets of figures; but, as regards the second, in this country at any rate, the estimate is far too high. The average number is, doubtless, nearer five than fifty.

Helios contains an item of news which, *apropos* of M. Lippman's recent experiments, will be read with interest. We translate it in full, merely omitting the name of the gentleman quoted, which some of our older readers may be able to fill in for themselves. "Mr. ——, having in his possession a silver plate on which were impressed, *in their natural colours*, the different bands of the solar spectrum, has recently exposed the plate to the light for a fortnight without any change being produced in it. From this Mr. —— concludes that it will be possible to fix these natural colours, although the contrary has so often been affirmed." Yes, yes, good *Helios;* your information is correct enough down to the smallest detail, but it is rather stale. Mr. —— made the exposure considerably more than a quarter of a century ago, which is not *very* recently, you must admit. There are some news paragraphs which, when once started, lead ever afterwards a wandering existence, and we suppose the above is one of the kind. But surely a technical photographic publication should not be caught napping so easily.

A PROCESS of printing without salts of silver, and attributed to M. Roussin, is given in a contemporary. Prepare the following solutions:—

A.—Acetate of lead	.....	150 grammes.
Acetic acid	.....	2½ c.c.
Water	.....	450 c.c.
B.—Potassium iodide	.....	150 grammes.
Water	.....	450 c.c.
C.—Sal-ammoniac	.....	250 grammes.
Water to make a saturated solution.		

Float the paper for five minutes on a bath of A, and then dry; next, float on B, and again allow to dry. The paper is sensitive to light. An exposure of four seconds in the printing-frame suffices to print out, but in diffused light the time may be varied to a minute. The image appears green upon a yellow ground. The paper should be slightly moistened before printing. The image is fixed in a bath of C,

and when finished is said to be of blue-violet colour. Half an hour's washing completes.

In a recent communication of some length, E. Valenta deals with a new method of increasing the sensitiveness to light of asphalt. The object with which Herr Valenta commenced his experiments was to succeed, if possible, in rendering ordinary Syrian asphalt as sensitive to light as the specially prepared sensitive asphalts. Kayser had already discovered that the sensitiveness of asphalt was closely connected with the presence of sulphur in it. Valenta consequently directed his attention to ascertaining whether other resins—such, for example, as those of the coniferæ—might not be made sensitive to light by treatment with sulphur. Collophonium was melted, and to it was slowly added about fifteen per cent. of sulphur. Four parts of this mixture, after allowing it to cool and solidify, were dissolved in 100 parts of benzol, producing a dark-brown, transparent solution. A film produced from this solution received satisfactory impressions from a negative, which, however, did not resist the action of dilute acids—a circumstance which renders it unsuitable for zincographic purposes.

Other resins were also treated in a somewhat different manner, six to seven per cent. of sulphur being added, and the mixture thinned by the addition of turpentine. The results so obtained were considerably superior to those obtained with collophonium, mentioned above, and, to judge from the two plates published in the *Correspondenz*, leave little to be desired. The alteration of asphalt under the action of light is ascribed by Herr Valenta to an oxidising action.

Dr. Eder also gives the results of his examinations of Steinheil's new focussing lens. This instrument is practically a small microscope of a magnifying power of about twenty, and about six inches in length. It contains six lenses—two of them achromatic—and is said in the Vienna laboratory to have given first-class results.

Dr. Vogel's communications are completely taken up with a lengthy series of researches into the orthochromatising effects of various colouring matters, most of which have most terribly long names. He finds that the best sensitisers of all the eosine colouring matters are the tetra-iodo-fluorescein, and the di-iodo-fluorescein, the iodine and chlorine derivatives of resorcin and phthallic being less satisfactory.

A useful hint for photographing waterfalls is given by F. Schmidt. He recommends one of some length for the surroundings, and an instantaneous exposure for the fall itself. From the first negative he removes the waterfall by retouching, and prints from it; for the surroundings, introducing the waterfall into the positive from the second negative. This will, doubtless, get rid of the smudgy effect so common in the waterfalls usually shown in photographs, and due to over-exposure.

An innovation has been introduced by a St. Petersburg banking firm which, doubtless, meets with the complete approval of their clerks. Instead of the tedious entry of cheques in the bank-book, they are photographed as soon as they come in. The negative is dried quickly, and flashed on bromide paper. Whether this process can give rise to much saving of time is doubtful, but it certainly may lay claim to great accuracy. Probably writing takes longer in Russia than in the more developed European languages. If it doesn't, it ought to.

The Hamburg Steam Packet Company has recently started a service of Oriental steamboats, commencing with the *Augusta Victoria*. Messrs. Strumper & Co., of Hamburg, despatched a representative on board the vessel, with orders to take views of all spots of picturesque or historic significance passed on the voyage. The result has now been published under the title of the *Mediterranean Voyage of the Augusta Victoria in* 1891, and consists of two portfolios, each containing fifty views in excellent collotype, 18 × 24.

We some time ago commented on the tragi-comic occurrence of M. Schlumberger of Paris being fined for explaining to the Bank of France that one of their notes was capable of being reproduced with absolute fidelity by means of photography. An enterprising German has similarly been reproducing fifty-mark notes, though with less laudable intent. Unfortunately for him, the size of his paper was slightly too large, and this fact led to his detection and arrest.

The present month has witnessed the death of one of the oldest and most respected photographers of Berlin. Mr. Carl Suck died in his fifty-eighth year, after long suffering from disease of the kidneys. Among the many inventions and improvements in photography which owe their origin to the deceased gentleman may be mentioned the "swallow-tail" connexion for camera and stand. Mr. Suck, who was very active in promoting sociability amongst the members of his profession, was very popular in Berlin, where his loss will be deeply deplored.

Schott & Co., of Jena, who have already earned the thanks of the photographic world for their improvements in glasses for lenses, are, we understand, about to devote their attention to the manufacture of really reliable ruby glass of a non-actinic character for use in dark rooms. Considering the very unsatisfactory nature of the glasses at present in use for this purpose, it is safe to predict that the advent of a red glass on which reliance could be placed would be hailed with general satisfaction, and would in all probability bring in a handsome return to its manufacturers.

Liesegang recommends one more amongst the many methods for reproducing faded manuscripts. It consists of applying with a camel's-hair brush a solution of sulphide of ammonium. The faded writing immediately becomes thick and legible, a legibility which in the case of parchment is permanent, though with paper it gradually disappears; in either case, however, it is a valuable assistance in the photographic reproduction.

DOUBLES.

The making of double pictures has been a hobby with me for some time—in fact, several years; but I find I have kept the secret too long to of any material value to me, or to receive any benefit from my patent application, having paid second money and received nothing. For, as you may know, I have experimented with pictures and the lantern since I was a boy. I remember when I was a child I threw the house into confusion with a tiny lantern. But it was always a passion with me, and what I am about to show you is one of my old tricks. I tried various methods of producing these doubles, with more or less success, as you will see. I finally hit upon a little box, a common cigar-box, with flaps or doors. With this little box attached to the hood of the lens, the door or flap opened on the side toward the subject, the first exposure is made—viz., with uncapped lens (doors closed); open first half (exposure), close again; and after the subject has changed position the other side, or double exposure, is made. This method is an attachment to the lens, and the doors being opened, first on one side and then the other, the cap cannot be used. But I do this same doubling without the box on any apparatus. This is it: A plain cigar-box, blackened on the inside, is placed in front of the lens, covering one-half of the subject. It is as if the lens were an eye, the same as if I placed something in front of my eye. With the box cutting off one side, it takes only what it sees. What the eye does not see it cannot take. This is a great aid to carry out Mr. Champney's instructions in reference to composing your foregrounds. When I went view-shooting in Europe, and when I went to make a picture, I got down crouching behind the camera, and what I could not see I knew I should get on the plate. I had no need to use a finder. So you have the same principle in taking double pictures.

I also make curious pictures with the guillotine shutter. Open the slide of plate, pull up the shutter, close, cover plate as if finished, change to opposite shutter, pull open the slide of plate again, pull up the shutter, close over plate, and develop. The result will be one background, but one or more figures repeated as placed on either side at the time of the exposure of the plate.

The best plan to double images on the plate, maintaining an undisturbed background, is as follows: To use a cap for the lens, also a box (cigar-box will answer), black on the inside and edges at its opening. Place the box in front of the camera on a small stand, at the distance that the plate is from the lens when the focus is obtained. Make a mark on the table at the end of the box, so as to know, in changing its position, that the precise opposite is secured. Now to operate: Box in place,

igure to be seen by open half of lens, expose, replace cap, change box and figure, uncap, close, and develop; result, two figures—one and the same—one background, and no line of demarcation in its taking. Many lantern slides were exhibited to fully illustrate the successful use of the box with doors, the guillotine shutter, and the plain box. The simplicity of the process is at once evident. GEORGE R. CROMWELL.

—*Photo American Review.*

BUSINESS OR PLEASURE.

PHOTOGRAPHY has the rare advantage of combining both these qualifications. When followed with the first intention, we get the professional; and, when with the latter, the amateur. One works for pay, the other pays to work. As the happy time for most busy people is at hand, or already in full swing, and as a photographic outfit is by many considered a necessary accessory to an outing, we will confine ourselves to photography as a pastime, and venture a few remarks on what to do, and what is better left undone.

Pleasure is an undefinable condition, depending on personal equations. What may be one man's food may be another man's poison. Downright hard work may be the pleasure of some; loafing about, doing nothing, the pleasure of others. Photographers, as a rule, incline to the hard work; witness the return home of the wanderer, after a hot day's outing with a heavy kit. Whether society will benefit by the exertion is a secondary matter; there is no doubt about the hard work, which even then is not ended, for, after a little rest and refreshment, development will be undertaken—say two hours' more work—and then we either observe a light and airy gait and genial glow of happiness, or a gloomy, despondent, thoroughly done-up sort of look, the indices of success or failure.

Taking it on the whole, this sort of thing is called having a "rest;" any way, it is a thorough change from every-day occupations, ideas are diverted into new channels, for no rest is so perfect as when the mind is pleasantly and agreeably occupied with novel associations. As to the amount of actual bodily exercise, it depends on one's physique. Enforced inaction is to many more trying than actual hard work; here photography comes in, affording exercise in the most accommodating fashion, from strolling about weighted with a few ounces to doing a twenty miles' tramp with half a hundredweight.

Possibly the hand camera provides the easiest amusement; it wastes more plates and material than any other device in the camera way, and for this reason seems to be a great favourite. The intelligent use of this instrument is to be noticed only now and again, but when it is the results are remarkably pleasing. The facility with which grosses of plates or yards of films can be spoilt acts as an incentive to spoil. "The means to do ill deeds makes deeds ill done," so says Shakespeare, and had he lived in the days of hand cameras he would probably have had something to say about them, both in sorrow and in anger. The utter want of courtesy and good feeling so often exhibited in taking sly shots at unsuspecting individuals, to afterwards hold them up to ridicule, cannot be too much deprecated. There is plenty of material on which skill can be exercised in a legitimate fashion without the exhibition of bad taste and questionable morality. Snapshot pictures are frequently taken with the intention of making them into lantern slides. Witnessing a display of this kind, we are often struck with the bad or indifferent composition of the pictures on the large scale. This is quite unintentional, and the result comes frequently as a surprise to the maker of the slides, who probably had no opportunity of seeing them in an enlarged form previously.

There is no reason whatever why a small picture should not produce a result as artistic as a large one taken direct, but in composing it heed must be given as to its appearance in an enlarged form. A small picture, say a quarter plate, necessarily looks a little more crowded than the same composition on a larger scale, and if the nicest effect is chosen for the small picture, irrespective of enlargement, the probability is that when enlarged it will look somewhat bare and wanting in accessories, there will be too much foreground, and figures and forms that occupied but a subsidiary place in the small are too conspicuous in the large picture. If this is all duly considered, both small and large pictures can be made satisfactory. In all this small work more attention should be paid to the actual view than to the image on the ground glass so far as composition goes. We can only photograph the view we see, and if we do not see it looks right it is useless to expect the camera will make it otherwise; it is a mistake to confine the composition of the picture entirely to its appearance on the focussing screen; to a certain degree it is of course necessary, but merely as a corrective of an arrangement already set down in the mind by observation of the reality. With the majority of hand cameras the photographer has one very great disadvantage to contend with, the limitation to a lens of one focus. This necessitates moving about from place to place nearer the object or further away until it appears of a suitable form on the focussing screen. Nine times out of ten this is not from the point of sight the photographer himself desires or judges to be the best; but force of circumstances compels him to accommodate his camera at the expense of his judgment, or relinquish the idea of taking the picture. This sort of thing continually repeated causes a habit of dodging about with the camera to make the best of it, which habit has much to answer for in the production of bad pictures. With only one lens it is almost unavoidable, until by experience with the one particular instrument, views get judged from about the point that the lens will give with the best effect, and all other points are passed over. There is no doubt whatever, in picture-making by photography, restrictions of this sort are entirely wrong. The subject should be selected from the best point of sight, and then a lens used that will represent it in the camera as near as may be as it is seen. This would in a great measure do away with exaggerated perspectives and out-of-proportion foregrounds that we see so continually, besides giving a much more pleasant view of the matter generally. Hand cameras are frequently so made that interchange of lens is out of the question. One special lens, and that not very easily got at, completes the affair. It stands to reason that with such instruments the photographer is very restricted in his work; the camera rules the photographer, and not the photographer the camera.

The question arises, If we really want good work, would it not be better to put up with a little more weight and make fewer exposures? Profusion always leads to waste, and a plethora of plates and films is not exempt from this charge. It is advisable for the photographer to have as many lenses of different foci as suitable for his length of camera and his purse, and never to use a wider angle than is absolutely required. The more narrow the angle, so long as it includes all that is required, the more pleasing the picture. One taken with a wide-angle lens giving much in excess of the requirements of the case, even if there is no conspicuous exaggeration of perspective, is not nearly so artistic.

Another matter, equally important, is exposure. I wonder how many negatives are spoilt on this account alone in the course of a summer's holiday. I hesitate even to guess. The ruling idea of the present day is rapidity; a tremendously rapid shutter and plates of the most exalted sensitiveness, a lens in accordance therewith, and a developer of abnormal energy, more frequently than not results in negatives that can claim little else than sharpness for good qualities. I do not wish to decry in any way either rapid materials or rapid exposures. These qualities are estimable when used for suitable subjects; but take my objection to the indiscriminate exposures on all sorts of unsuitable subjects, that would certainly be much better for a longer exposure. Take any combination of figures and foliage—a dark figure against a leafy background in the shade, for instance. A very rapid exposure will possibly give the figure sharp, the figure being the principal thing; but the green surroundings will mix with and merge into the shadows of the figure, and entirely destroy the effect of solidity. This is purchasing definition at too high a rate. Either other surroundings should be chosen, or longer exposure given. Sometimes this is impossible, and the best has to be made of it; but a photographer working for amusement can generally select his own views, and should avoid such combinations as instanced. The idea of expecting definition to outweigh all other qualities had better be discarded; it is only mischievous. Plenty of exposure is a lesson many hand-camera men should take to heart. A time exposure, when practicable, will give, nine times out of ten, the best results; a little extra time very often means a great deal extra quality.

Another thought: A quick plate and a lens well stopped down is, in most cases, preferable to a slow plate and wider diaphragm. A very much stopped-down lens is held by some to flatten the picture. This idea cropped up in the wet-collodion days, and then there was a show of reason for it, the exposures being necessarily prolonged by stopping down; the negative was frequently under-exposed, in comparison to negatives taken with a wider aperture. The extra definition gained helped to give this impression. The want of definition, when large apertures were used, gave a factitious aerial effect; and this, added to the fuller exposure, completed the idea of flattening the picture by using a small stop.

A negative *properly exposed*, no matter how sharp the definition may be, will give as much aerial perspective as exists at the time in the view to be photographed. I have always made it a rule to stop the lens well down, and give a rather long exposure, as conducive to the best results. The stopping down is, of course, meant that much that will give the necessary definition. There is no rule on this point; it is generally best to have objects in the foreground sharp, whatever the distance may be; but to get distance sharp and well

defined at the expense of the foreground is seldom satisfactory in anything but seascapes, where a vessel may be the principal point of interest, and should be well defined, whatever the rest of the picture is.

Much of the attractiveness of a picture depends on the focussing; the whole of the negative should be fairly sharp, but specially so on those points on which interest centres. Some little experience is required to decide which are the most important points. It may be either shape, position, lighting, or action; whichever it is that draws attention to that particular part determines the necessity of having it well defined. In case of figures being a component part of the scene, they should invariably be well made out, as the first things looked at in a picture are figures. No matter how beautiful a landscape may be, an insignificant figure or two claims the first attention. This indicates the importance of a good choice in the matter of pose and grouping, that both are easy and natural and in harmony with the surroundings.

River scenery is often exceptionably suitable for the camera. A rapid river rushing over boulders is always more effective looking up stream, and when a still and glassy pool, reflecting like a mirror, comes into the picture, avoid having the principal part of it reflecting the sky, which, in the photograph, looks an unmeaning white patch. A little ripple on the surface in parts gives a much better effect and more variety than an absolutely mirror-like surface. If, therefore, it is quite motionless, fling in a stone or do something to disturb it. No condition is better for effect than the smooth, oily undulations we sometimes see, and nothing worse than the sharp, small ripple caused by sudden and sharp gusts of wind. The one gives us reflections picturesquely broken up, and the other destroys them entirely, giving about as much effect as a piece of ground glass.

In choosing a landscape avoid as much as possible straight lines, either of trees, hills, hedges, or buildings, one parallel with the other, unless considerably broken up by foreground objects. They may look very well to the inexperienced eye, but their beauty often depends on local colour, which counts for very little in the photograph. Distant and panoramic views always are better for some bold object in the foreground to act as a foil, and make the distance assume its proper value.

One of the most difficult subjects to treat satisfactorily is a view with the sea on one side and cliffs on the other; it is so apt to look lop-sided. The only way of setting it right is the introduction of some object that will boldly relieve against the sea side of the picture, and so restore the balance, otherwise the result will be unsatisfactory. These remarks especially apply to pictures on the usual size of English plates, upright ones particularly. Narrow or panoramic pictures are not so difficult to deal with in this respect.

Boats and shipping almost always make pleasant pictures, being eminently picturesque in form; they harmonise and contrast nicely with their surroundings. Wherever a boat or vessel lies by river or sea, in perfect trim or in the last stages of decay, it will help to make a picture. A dismantled wreck, lying on shore, will, with its gaunt, black timbers and dilapidated hull, contrasting so strongly with the sea-line, prove a treasure trove to the photographer who knows what he is about. But river scenery, on the whole, is the most prolific in bits for the camera, more diversified than the coast, and forms more beautiful combinations with foliage, water, and rocks than anything else. A tidal river will perhaps not merit so much encomium, especially as it nears the sea, but possesses characteristics of its own that often supply most beautiful effects.

Those who follow photography solely for amusement will find that not only can specially romantic districts supply their wants, but that many an unattractive spot will, by some fortunate concurrence of forms, give them a picture of exceptional interest and beauty.

EDWARD DUNMORE.

PRINTING ON WOOD.

A PROFESSIONAL photographer, who does a great deal in making prints from negatives on sensitised wood blocks for the use of wood-cutters, was kind enough to demonstrate to me the other day his mode of working. It will, perhaps, be of interest to some of your readers:—

Gelatine	8 grammes.
White soap	8 „
Water	500 „

The gelatine is allowed to swell, dissolved by means of a hot water bath, and the soap added gradually with constant stirring. Finally, the solution is filtered through muslin. With this mixture, to which some zinc white is added, the wood block is well rubbed in, and allowed to dry; the film should be as thin and even as possible.

The wood block is then, by means of a broad brush, coated with the following solution:—

Albumen	30 grammes.
Ammonium chloride	1·2 gramme.
Citric acid	0·2 „
Water	24 c.c.

The albumen is beaten up to a froth, and allowed to settle; then the water, the ammonium chloride, and the citric acid are added in the order indicated. After the coating has dried, the film is sensitised by means of

Silver nitrate	3·2 grammes.
Water	32 c.c.

Of which solution a little quantity is poured on and distributed with a glass rod. The surplus is poured off, and the block allowed to dry. Printing is done as usual, but it is not necessary to over-print. After printing, the surface of the block is immersed for about three minutes in a weak solution of common salt in water, in which the print will be bleached to some extent. It is then rinsed under the tap, and fixed for from four to five minutes by means of a concentrated solution of hypo. Finally, it is washed for about ten minutes under the tap, and then dried.

—*American Journal of Photography.*

THE PRINTING PROCESS OF THE FUTURE.

II.

IN my last article I pointed out the advantages possessed by gelatino-chloride printing-out paper over other methods of positive printing, and my reasons for terming it the printing process of the future. It is my intention here to point out the most difficult parts of the process, and to assist the beginner in overcoming them. With every packet instructions are sent, and the suitable formulæ given; but this is not all the beginner requires. He reads, for instance, the method of squeegeeing the prints to glass as follows: "Rub the glass over with French chalk, squeegee the prints face downwards, and when dry they are removed and will be found to have a very fine polish." He tries this; but, when his prints are dry, he finds them holding on to the glass with herculean strength. After the care and trouble he has taken with them, it is not by any means a pleasant job to have to scrape them from the glass in shreds. He tries again, perhaps with the same result, and, having no one to give him friendly advice, gives the whole thing up in disgust.

We will, then, follow, the process from first to last. First, with regard to the paper itself. There are now many in the market, including one English and several foreign. It is not my intention to advocate any particular one, but I consider it only the duty of every right-thinking Englishman to support home industries, so far as lies in his power. The purchased paper can be kept for a considerable length of time by placing it under pressure. An old letter-copying-press is a very handy contrivance for this purpose, or, if not obtainable, the packets should be stored one upon the other, and a heavy weight laid on the top. This, of course, has the effect of squeezing the air from between the sheets, and preventing its injurious effect upon the paper.

In printing on gelatino-chloride paper, no special instructions are necessary. It has already been stated that the paper is more sensitive than albumenised; extra precautions must therefore be taken. A point which I omitted to mention in my last, when speaking of the advantages derived from this kind of paper, was the property of giving brilliant images from even weak negatives. The effect is pretty much the same as with albumenised paper printed under green glass. This method of printing, although an old one, was not long ago revived and discussed. The reason that a thin negative gave more vigorous prints when the light is first filtered through a piece of green glass than when it reached the negative direct may be easily explained. Albumen paper contains two principal compounds—silver chloride and silver albumenate. Now, these compounds are both sensitive to light, but in different degrees. The action of light upon chloride of silver is almost entirely confined to the ultra-violet rays, while the albumenate of silver is altered by the blue rays, and some distance into the green, which have hardly any effect upon the silver chloride. The chloride of silver gives more gradation than the albumenate, so that, if we place the green glass over the negative, we prevent to a certain extent the action of the light on the silver chloride, and confine it almost entirely to the silver albuminate, which gives much greater contrasts. Hence the results we obtain.

Now, with gelatino-chloride paper the same effects occur, only we have here silver citrate instead of silver albumenate, and silver citrate

gives much more abrupt gradations than the silver chloride. Hence, from a weak negative we are able to obtain good pictures, full of detail, and with rich contrasts, from weak negatives without the use of green glass; but by employing it a still greater effect is produced. This will, no doubt, be held a very great advantage by the amateur, the majority of whose negatives are usually of the wishy-washy, under-developed kind.

In washing the prints previous to toning, many often obtain stains. The proper method is to first fill a large dish with clear water, and immerse the prints one by one. As soon as all have been immersed, the water is thrown into the residue tub, and a fresh supply poured on immediately. If the prints are allowed to remain too long in the water without a change, they will rapidly stain. It is also important to save the washing waters, especially the first two, as these are usually rich in silver chloride.

In toning, almost every toning bath known can be employed with a great variety of results. The one usually recommended is the sulphocyanide. Chemists have declared this the least recommendable, as the permanency of the prints is not likely to be so great. For the same reason, the combined toning and fixing bath is not considered advisable to be used, although it has its attractions for the amateur, who likes to have as little trouble as possible. I don't mean the "touch-the-button-and-we-do-the-rest" style, but the one next door to him. With this bath the operation is, of course, reduced to a very simple one, all that is necessary being to remove the prints from the printing-frame and immerse them in the bath until the desired tone is obtained. This is simple enough, but if the photographer wants his work to last this method is certainly not to be recommended. A very great mistake that many a one makes in toning is the endeavour to tone too many prints at once; the consequence is that some of them get completely out of his control, and leave patchy and unevenly toned. In my practice I never attempted to tone more than twelve prints at one time. These I immersed in the bath in pairs back to back, and in this position I manipulated them—that is, kept them constantly moving and under control by continually drawing the underneath pair of prints and transferring to the top. By this means I was able to remove any print at the required moment, and replace it with another untoned one. The method of placing back to back was also effective in saving the gold solution, as it was not then absorbed so freely by the paper supports.

Fixing is accomplished with greater rapidity owing to the compactness of the image film lying on the surface. The solution has not, as in other papers, to gradually work its way through the paper in which the film is partially imbedded. In washing we get a similar effect, the hypo being quickly eliminated from the print. An hour should suffice to accomplish this work, if the washing be thorough. There are few, however, who know what thorough washing is; many consider, if they leave their prints in a running stream of water for a whole night, or possibly longer, that they have removed all possibility of hypo remaining in the film. Possibly they have, but they have also in all probability decomposed the film more or less, which effect will eventually be as bad as if they had left the hypo remaining in the film. I wish I could make it clear that a running stream of water is not the most effectual eliminator. If we take a dish of water and empty in it a bottle of Judson's dye, the whole water is darkly coloured. If now a stream of water is allowed to run continuously into the basin, observe the length of time before the coloured is entirely removed. If, on the other hand, we were to empty the water away and refill the basin, and repeat this operation once again, we have quickly lost all traces of the colour. The same effect is obtained with the soluble hyposulphite of sodium; only this is, of course invisible. The most effective method of freeing the fixing salts would be to immerse the print in water for a few minutes, then to lay it on to a sheet of clear glass and with a squeegee remove all superfluous solution, and then return the print to the dish, which has in the meanwhile been emptied and refilled with clear water. Repeat this operation two or three times, and in a quarter of an hour, or less, you can have your print as free from hypo as possible. I once adopted this method with some prints that were required in a hurry. This was several years ago, and, although they have been very roughly handled and exposed to the light for considerable periods, there is as yet not the slightest signs of fading. I do not, of course, recommend this method for every-day work, it would be far too troublesome; but, instead, rather to show the importance of thoroughly changing the washing water as often as possible.

The washed prints should not, of course, be dried between sheets of blotting-paper. If only to be rolled or burnished, they are laid face upwards upon slanting pieces of blotting-paper or board. The usual method with this kind of paper is to finish with a bright or dull surface by squeegee on to glass plates. This is a part where so many fail; it will therefore be my intention to explain the chief points where failure is likely to occur. But this I will reserve for my next article.

WALTER E. WOODBURY.

EFFECTS OF ELECTRICAL DISCHARGES ON GELATINE PLATES.

SOME time ago I spoilt a photographic dry plate while exposing it in the camera, and as it was useless to attempt to develop it, I took it out of the dark slide, and placed it on a table where my Wimshurst machine stands.

For some days the plate remained exposed to full daylight, under the action of which it gradually darkened. When using the Wimshurst machine one evening, I casually took up the plate and held it between the discharging knobs, and allowed one or two heavy sparks to play across the film, and then laid it on the table again.

Next morning I was surprised to find the sparks had made black lines on the film. This attracted my attention, more particularly as on the previous evening I had not observed any trace of the sparks. I again discharged the machine across the film in several new places, and, though no trace remained at the time, half an hour's exposure to light was sufficient to bring them up as black as the first sparks.

I also tried the effect of sparking across the film and keeping the plate for several days in a dark drawer, the result being that the new sparks had not become visible. Only a short exposure, however, was necessary to bring them out very distinctly.

These results encouraged me to make a series of experiments, on a more extensive scale, with new, unexposed plates of several makes, and I met with a rather unexpected result. In not a single case would the sparks develop out with any amount of exposure to daylight, so I concluded that to produce the effect a preliminary exposure to daylight was necessary. Some of the new plates were exposed until they assumed a brownish hue, and, though the first sparks never became visible, yet the others, which were allowed to cross the film after the preliminary exposure, developed up dark.

From these experiments I gather that, allowing a high-tension discharge to travel across a sensitive gelatino-bromide plate, which has been previously exposed some time to bright actinic light, an impression of the spark will develop on the film, without the employment of a developer, if the plate be exposed after the discharge to bright actinic light; but no trace of the spark will be found as long as the plate is kept in a comparatively dark place.

I am led to record these little experiments in detail, as I am unable to account in any way for this behaviour of the plates under the action of the discharge, and in the present day, when the march of discovery is so rapid, small and apparently unimportant experiment often help to enlighten us on matters chemical and electrical if brought before those who make such matters their special study.

W. P. ADAMS.

PHOTOGRAPHIC CHEMISTRY.

II.

CONTINUING the study of those properties of silver salts which are of photographic importance, the next point to be dealt with is the vexed question of the existence of sub-salts. Here, in the present state of knowledge, it is most advisable to avoid dogmatic statements. The utmost that can be done is to summarise the evidence, and to let the student see therefrom that, from a scientific point of view, the existence of such sub-salts has not been conclusively demonstrated. To all who are familiar with the course of investigation in this direction, it will be evident that the current statements in text books, and which are repeated in photographic manuals, must be taught with due caution. I have no time to go over the whole of this familiar ground again, and I must content myself by giving references.* I will only repeat now what I said some years ago, viz., that so far as analogy is to be trusted as a guide, it would seem improbable that the sub-haloid salts of silver should be highly coloured compounds, because the analogous salts of copper, mercury, and thallium, are not highly coloured.† Now, all the attempts which have been made to produce sub-haloid salts of silver by partial reduction or by other methods give rise to coloured products, which have been held by some investigators to consist of the sub-haloids, and by others (Carey Lea) to consist of molecular compounds of the sub-haloids with the haloids proper. It may further be suggested that these coloured compounds might consist of oxyhaloids, mixed or combined (molecularly)

* See *Chemistry of Photography*, Lecture I., pp. 39 *et seq*; also *Nature*, Vol. XLII., p. 246 (July 10, 1890). A brief historical summary will also be found in Carey Lea's paper on the allotropic forms of silver already referred to. Some of the earliest experiments on this subject were made by Wöhler, and will be found referred to, together with much additional work, in a Report published by a British Association Committee in 1859.

† Thallous iodide is yellow, and mercurous iodide greenish yellow.

with the haloids, that in some cases they might consist of metallic silver or its oxide in molecular combination with the haloid, and that in other cases they might consist of the foregoing compounds or mixtures, or of the true haloids coloured by the retention of a small quantity of some metallic oxide as an impurity.*

The study of these coloured products is of importance to the photographic chemist, whether they are definite chemical compounds or whether they are molecular compounds, or whatever subsequent research may prove them to be. They are of importance to us here, among other reasons because there may be some relationship between these compounds and the products formed by the photo-chemical decomposition of the silver haloids. I have thought it desirable, therefore, to summarise in a collected form, the various methods by which these compounds have been produced:—

1. Rose-coloured silver chloride, obtained by reducing a hot solution of silver citrate with hydrogen, exhausting the dark product (before complete reduction) with citric acid, and then treating it with hydrochloric acid. Obtained also by reducing the dry nitrate in hydrogen at 100° C., extracting the product with water, and treating the residue with hydrochloric and nitric acids. (*Brit. Assoc. Rep.*, 1859, p. 105.)

2. Chocolate-coloured chloride, obtained by adding a solution of silver arsenite in nitric acid to a strong boiling solution of caustic soda, when "an extremely black powder" is produced. This, on treatment with hydrochloric acid, becomes grey, and the washed product on boiling with dilute nitric acid loses silver and leaves the chocolate-coloured chloride. (*Brit. Assoc. Rep.*, 1859, p. 106.)

3. Coloured products obtained by acting upon silver with solutions of ferric or cupric chloride have long been known. (Becquerel's films, see G. Staats in *Ber. deutch. chem. Gesell.*, 1887, p. 2322, and 1888, p. 2199.)†

4. Coloured products obtained by Carey Lea, and described as "photo-chloride," "photo-bromide," and "photo-iodide" ("photo-salts").

(*a*) Purple or black chloride, obtained by the action of alkaline hypochlorites on finely divided (reduced) silver.

(*b*) Red chloride, prepared by adding ferrous sulphate to an ammoniacal solution of silver chloride, and then acidifying with dilute sulphuric acid. The precipitate is washed, boiled with dilute nitric acid, washed, and finally boiled with dilute hydrochloric acid.

(*c*) Red, or copper-coloured chloride, prepared by heating silver oxide or carbonate to a point short of complete reduction, and then treating the residue with hydrochloric acid.

(*d*) By precipitating silver oxide in the presence of the lower oxides of iron, manganese, &c., and treating the product with hydrochloric acid.

(*e*) Dark purple chloride, obtained by treating finely divided (reduced) silver with a solution of ferric chloride. (Contains 76·07 per cent. of silver.)

(*f*) Red chloride, similarly prepared by the action of cupric chloride.

(*g*) Red chloride, prepared by pouring dilute solution of silver nitrate on to cuprous chloride, and boiling the black precipitate thus obtained with dilute nitric acid.

(*h*) Brownish purple chloride, prepared by pouring an ammoniacal solution of silver nitrate into a strong solution of ferrous chloride, and treating the dark precipitate with dilute sulphuric acid. Becomes lighter with nitric acid. (Similar to *b*.)

(*i*) Purple chloride, prepared by reducing the citrate in a current of hydrogen at 100° C., and treating the product with hydrochloric and nitric acids successively. (Similar to No. 1.)

(*j*) Red and purple shades of chloride, obtained by reducing (partially) a silver salt with alkali and an organic reducing agent, such as milk-sugar, dextrine, &c., and then treating with hydrochloric and nitric acids successively.

(*k*) Red, brown, or lavender chloride, produced by treating the white chloride with a boiling solution of sodium hypophosphite. The dark, chocolate-coloured product is washed, and boiled with dilute nitric acid.

By somewhat similar methods, coloured forms of the bromide and iodide have been obtained; but it will be unnecessary to trouble you with the details, as these will be found in the original papers. (See *American Journal of Science*, vol. xxxiii., May and June, 1887; and vol. xxxiv., July, 1887.) It is quite easy for the student of photographic chemistry to repeat some of these experiments, and to prepare some of the coloured products. Especially simple are the processes *b*, *g*, *h*, *j*. The repetition of these experiments will not only be useful as practical exercises, but they will serve to enlarge the ideas of the worker with respect to such familiar compounds as the silver haloids, which, in ordinary work, are generally regarded as mere tests for the halogens, and to show him that a wide domain for exploration lies beyond the region of his ordinary chemical experience. In this connexion, also, it is desirable to call attention to the tendency of the silver haloids to retain traces of other chlorides, such as those of iron (ferric), cobalt, manganese, nickel, copper, &c.*

From these special studies of the silver compounds we may now pass to another phase of the subject, viz., the combination of silver and its salts with organic compounds. At this stage the technology, *i.e.*, the sources and methods of manufacture of the more important organic compounds used by the photographer, may be conveniently introduced. The ordinary organic acids, such as acetic, oxalic, citric, tartaric, &c., will, of course, have been dealt with in the preliminary training; but, in addition to these, special attention should be directed to the chemistry and technology of cellulose (including paper, collodion, and celluloid), albumen, and gelatine. Let it be realised in the course of this work that albumen is of the nature of an acid forming salts with various metals. Show the precipitation caused by such salts as those of mercury and silver. Let the precipitated "albumenate" of silver be collected, washed, and dried, and then the presence of silver proved by burning some of the compound, extracting with dilute nitric acid, filtering, and testing in the usual way. The similar tendency of gelatine to combine with silver compounds is very striking, and of fundamental importance to the photographic technologist. The best way of approaching this is to let the student make experiments for himself. A sheet of gelatine can be prepared by coating a glass plate with a warm, strong solution of the substance, and allowing it to dry for some days in a warm place. When stripped off, the film is floated for some hours on a solution of silver nitrate, then removed and washed with water. It now remains to be shown that silver in some form or other has actually been withdrawn from the solution, and has entered into combination with the gelatine. In order to prove this, some of the gelatine compound can be dried, and burnt, and tested, in the same way as the "albumenate." The "gelatino-nitrate" can also be proved to darken on exposure to light. An experiment of this kind will prepare the way for the all-important subject of the preparation of emulsions.

The proportions of materials and the various technical details are fully treated of in all works on practical photography, and need no special description in these lectures.† The first point to which attention must be called is the nature of an emulsion, and the influence of the vehicle in keeping the silver haloids in suspension, An easy experiment will bring this home to the student. To a solution of common salt or some soluble bromide add some silver nitrate, and notice the immediate separation of the silver haloid on agitation. Now take some of the same salt solution, add a little strong gelatine solution to it, mix by agitation, and then again add some of the same silver nitrate solution. It will be noticed that the separation of the silver haloid takes place more slowly, and that, when formed, it does not subside, as in the previous experiment, but agitation simply helps to make the contents of the vessel (now an emulsion) more uniform. A similar experiment may be made with ordinary alcohol and ether containing a soluble haloid ($ZnBr_2$, or $CdBr_2$), and then, by way of comparison, with the same alcohol and ether containing dissolved pyroxyline (collodion).

By such experiments as these the principles of emulsification will be clearly brought out. The student should, in connexion with these experiments, be well practised in calculating the necessary quantities of the different haloids for precipitating given weights of silver nitrate. At this stage the practical preparation of emulsion might well be commenced, and plates should be coated with gelatino-bromide emulsion, prepared in accordance with any of the adopted formulæ. This should at first be carried out with the object of imparting skill in the *technique* of the operations, the scientific reasons for having an excess of soluble bromide, and for washing out excess of soluble salts, being explained in the course of the work. These explanations will, of course, only be fully appreciated after the action of light upon the silver haloids has been dealt with, and the practice of emulsion-making can, if thought desirable, be deferred to a later period.

In the same way that the compounds of silver are prepared and studied, the other photographic materials should be dealt with. Their ordinary chemical properties should be familiar to the student, not only through reading or attending lectures, but by laboratory work. His knowledge should be as wide as possible, and should embrace the compounds of iron, chromium, manganese, uranium, copper, mercury, platinum—in short, of all the metals having any connexion with photography, and, it is hardly necessary to add, that the special uses of any of these compounds in photographic processes should be dwelt upon exhaustively. To this knowledge it is desirable to add an acquaintance with the formulæ and mode of preparation of the reducing agents, both inorganic and organic, used for development, such, *e.g.*, as hydroxylamine, pyrogallol, hydroquinone, eikonogen, and so forth.

Armed with this general chemical knowledge, specialised in the direction of his subject, the student will be in a position to proceed to the particular kinds of decomposition, viz., photo-chemical, upon which the art of photography is based. This part of the subject must also be dealt with as broadly as possible, for it is of the utmost importance that

* Since the delivery of the lecture M. Güntz has contribnted a paper to the *Comptes Rendus* (vol. cxii., p. 861), claiming to have isolated the snb-haloids by preparing, in the first place, the snb-fluoride by the electrolysis of a saturated solution of silver fluoride. By the action of HCl, Hl, H_2S, H_2O, &c., on the sub-fluoride, the other sub-haloids, and the sub-oxide, Ag_4O, are said to have been prepared (see *Nature*, April 30, 1891, p. 620). Seeing the tendency possessed by fluorine compounds to become polymerised, it is, however, by no means certain that the "sub-fluoride," which is described as a crystalline powder resembling bronze filings, has the simple formula Ag_2F.

† The coloured films produced by this method do not always owe their tints to the formation of a coloured product of the nature of a pigmentary colonring matter. The chromatic effect is, in many instances, purely optical, *i.e.*, due to the phenomenon of "thin plates." The coloured spectra recently obtained by M. Lippmann are of the same nature; see Berget's *Photographie des Couleurs*, Paris, 1891.

* Carey Lea, *American Journal of Science*, vol. xxxiv., p. 384.

† Abney's works are, of course, familiar to all practical photographers in this country. The latest edition of Dr. Eder's *Photographie mit Bromsilber-Gelatine*, &c., will be found invaluable to those who can read German.

the principle should be realised that the photo-chemical decompositions made use of in photography are but particular instances of a general class of such decompositions, some of which are at present not available for photographic purposes. It must be pointed out that a study of some of these collateral decompositions is likely in the future to lead to results of practical value, and may certainly be expected to throw great light on the nature of the photographic image.

The broad distinction between purely physical changes induced by light and actual photo-chemical decomposition may be maintained, although it is often difficult to refer a particular case to one or the other of these classes. Complete lists of all the known instances of the physical and chemical action of light will be found in the works of Eder and Vogel,* but it is advisable, in treating the subject as a branch of chemical technology, not to bewilder the student at first with a vast array of facts, but rather to enforce general principles by a few well-chosen illustrations which the student can work out for himself without much difficulty. The simplest kind of photo-physical action is that which produces a change in molecular structure, either temporary or permanent. In connexion with this, the action of light upon selenium is perhaps the most striking illustration that can be given; and where the necessary apparatus is at hand, it would be well to demonstrate the point experimentally in the usual way. As examples of permanent change of molecular structure, the modifications in crystalline form undergone by certain substances on exposure to light may be appealed to and illustrated. The following experiments can be easily done in the laboratory:—

1. A saturated solution of sulphur in carbon disulphide is prepared, and two or three tubes are filled with the solution and sealed up. The contents of a tube kept in the dark will remain clear for an indefinite time, but on exposing one of the tubes to sunlight, the contents become turbid, and a gradual separation of insoluble sulphur crystals will take place.

2. A plate of glass is coated with a silver mirror by any of the usual methods of chemical reduction. The mirror is iodised by exposure to the vapour of iodine,† and then exposed to bright light (electric arc or sunlight) for ten to fifteen minutes, one portion of the film being protected by a dark paper screen. The film is semi-transparent at first, but, after the experiment, it will be found that the exposed portion has become yellower and more opaque than the screened portion, the change being apparently due to a physical modification of the silver iodide.

Such experiments as these will serve to impress the mind with the fact that light can cause purely physical changes. Attention may be called to the existence of other changes of a like nature, such as those which occur in red cinnabar, in red realgar, in the crystalline form of nickel sulphate and zinc selenate, &c. From cases of this kind we are led, in the next place, to other changes, which serve to connect photo-physical with photo-chemical action, viz., photo-polymerisation. The meaning of the term polymerisation will be familiar to the chemical student. It must be pointed out that many of the changes in crystalline form, &c., alluded to in connexion with the previous examples, may be really cases of photo-polymerisation or depolymerisation. Then the known cases of the polymerisation of organic compounds, such as anthracene to paranthracene, styrene to metastyrene, vinyl bromide, thymoquinone to an insoluble modification,‡ and so forth, may be dealt with and illustrated, as far as possible, experimentally. Pointing out, by way of caution, that it is often very difficult to discriminate between photo-polymerisation and photo-oxidation, the action of light upon asphalt and bituminous substances may be taken as an illustration of the difficulty in question; and a study of the action of light upon such films will naturally lead to the various heliographic processes based upon the original method of the elder Niepce. How far it is desirable to lead the worker in this direction from the practical side must, of course, be determined by circumstances.

The action of light upon asphalt and similar substances is not only of practical importance, but its scientific aspect is worthy of the most serious attention, both by the student and the investigator, who, after all, is himself only a student at a somewhat more advanced stage of his studies. There is some doubt at present whether the insoluble asphalt resulting from the action of light is a polymeride, or whether it is a product of photo-chemical oxidation. According to some authorities, the change does not take place in a vacuum, neither in nitrogen nor in hydrogen. On the other hand, it is stated by Kayser, in favour of the polymerisation theory, that no increase of weight occurs in the film, that the insoluble asphalt is converted into the soluble form again by fusion, and that a solution of asphalt in a closed vessel also deposits the insoluble modification on exposure to light. The decision of this point rests with future investigators, but certain facts have been discovered with respect to the constituents of asphalt which must be emphasised in connexion with photographic chemistry. It has heen found that Syrian and Trinidad asphalt contain a small quantity (four to five per cent.) of a substance soluble in alcohol and insensitive to light, another portion (forty-four to fifty-seven per cent.) soluble in ether, and a residue insoluble in ether, varying from fifty-two to thirty-eight per cent. The portions soluble in alcohol and ether, and the insoluble residue, all contain carbon, hydrogen, and sulphur; and Kayser, who has investigated these compounds, has gone so far as to assign formulæ to them. The portion which is soluble in ether is sensitive to light, but not so sensitive as the insoluble residue, which contains the constituent of the greatest value for the heliographic processes. The practical outcome of these investigations has been the preparation of a high-quality asphalt, consisting essentially of the portion insoluble in alcohol and ether. It may be added that the property of becoming insoluble in hydrocarbon oils on exposure to light does not appear to depend upon the constituent containing the sulphur, as some specimens of asphalt from different parts of the world, which possess the same property, have been found, on analysis, to be free from sulphur, and to consist of hydrocarbons only.

Before leaving these facts concerning asphalt, I should like to point out that there is a promising line of investigation here, which would well repay a few years' patient work, even if it led to no practical result. I am inclined to believe, however, that the results would be of practical value, and especially in the direction of increasing the sensitiveness of the asphalt film. Asphalt is a complicated mixture of hydrocarbons, &c., and it is probable that the sensitiveness is due to a few or possibly to only one of its constituents. It would be worth while, therefore, to make a further series of experiments having for their object the isolation of the sensitive constituents. I need hardly pause to point out of what immense value it would be to have a bitumen film possessed of a sensitiveness approximating only to that of the silver bromide emulsion.

From these cases of photo-physical action, of polymerisation, and of possible photo-chemical oxidation, the study of true photo-chemical decomposition may be taken up. On account of the comparative simplicity of their decomposition, the salts of iron lend themselves admirably for demonstration at this stage. The study of the ordinary chemical reactions of iron salts will have prepared the way. Having shown how reducing agents convert ferric into ferrous salts, let it be demonstrated experimentally that many organic compounds, such as alcohol, oxalic acid, &c., do not immediately reduce ferric salts. It must then be pointed out that these organic compounds are susceptible of oxidation by ferric salts under the influence of light—that they are, in fact, potential reducing agents. This can be done in test-tubes or flasks in the first place, and then on paper films, leading to the ordinary cyanotype and blue printing processes. A few hints for the carrying out of the experiments may be found serviceable:—

1. A solution of ferric chloride (two to three per cent.), mixed with a solution of oxalic acid* will, of course, on testing with potassium ferricyanide give no blue colouration. Some of the same solution, exposed for five minutes or so to strong light, will be found to contain ferrous salt, on again testing with ferricyanide:—

$$2\,FeCl_3 + H_2C_2O_4 = 2\,FeCl_2 + 2\,HCl + 2\,CO_2.$$

2. By using ferricyanide with the ferric salt, and exposing to light, the reduction is made visible by the formation of Turnbull's blue. This can be done by adding ferricyanide to the foregoing, or preparing two solutions, one containing eight grammes of potassium ferricyanide in fifty cubic centimetres of water, and the other containing ten grammes of ammonio-ferric citrate in fifty cubic centimetres of water. The solutions are mixed before use, and then exposed to light, first in a test-tube, and then on paper coated with the solution, and allowed to dry in the dark. The practical application of this method for copying and printing will be obvious.

The chief point of general theoretical importance brought out by such experiments as these is, that light only reduces the ferric salts in the presence of oxidisable compounds of sufficient instability. It is advisable, at this stage, to introduce the notion of *sensitisers*, and to point out that oxalic acid, citric acid, alcohol, &c., may be regarded in this light in the experiments referred to. The demonstrations with ferric salts may, of course, be extended in many directions, and made the basis of numerous practical exercises and lessons in the application of general chemical principles to special cases. All that has to be borne in mind is, that a surface of an organic salt exposed to light under a stencilled design (or a picture) gives ferrous salt on the exposed portions, leaving the unexposed portions unchanged. Various reagents may then be used to reveal the chemical difference in the two portions, the subject of photographic development being thus introduced, and the changes involved being explained by ordinary chemistry. By way of example:—

1. A design printed on paper coated with ammonio-ferric citrate is developed by ferricyanide. The exposed (reduced) portions come out blue, owing to the formation of Turnbull's blue. Supposing ferrous citrate to be formed:—

$$Fe''_3(C_6H_5O_7)_2 + K_6Fe_2Cy_{12} = Fe_3(Fe_2Cy_{12}) + 2\,K_3(C_6H_5O_7).$$

The blue design, after being well washed, can be made the subject of many further experiments, all instructive as illustrating chemical principles with which the student should be familiar. Thus, on treatment with a dilute solution of caustic soda, the blue is at once decomposed with the formation of Fe_3O_4, which remains on the paper. We have thus a faintly visible brownish design, which can again be developed by taking

* *Ausfuhr. Handb.*, part i.; Vogel's *Handb. d. Photog.*, part i.

† Such films of silver haloids on glass are very convenient for experimental purposes, as they are (when dry) absolutely free from anything that can be regarded as a sensitiser, and are therefore particularly well adapted for purposes where films of the pure haloids are required.

‡ H. W. Vogel has obtained a positive print in thymoquinone by making use of this property. See his *Handbuch*, part i., p. 41.

* The addition of some alcohol increases the sensitiveness of the mixture.

advantage of the property possessed by the oxides of iron of forming coloured compounds with organic substances, such as gallic acid, alizarin, nitro-sophenols, &c.

2. The design printed on the ferric salt may be developed by taking advantage of the reducing power of the exposed (ferrous) portions and the non-reducing power of the unexposed (ferric) portion. Thus, with a solution of silver nitrate :—

$$2\,Fe''_3\,(C_6H_5O_7)_2 + 6\,AgNO_3 = 4\,Fe'''\,(C_6H_6O_7) + 2\,Fe'''\,(NO_3)_3 + 3\,Ag_2.$$

With a solution of auric chloride :—

$$2\,Fe''_3\,(C_6H_5O_7)_2 + 2\,AuCl_3 = 2\,Fe'''Cl_3 + 4\,Fe'''\,(C_6H_5O_7) + Au_2.$$

Similarly with platinic chloride, chromates, mercury salts, and other reducible compounds.

3. Development can also be effected by utilising the oxidising property of the unexposed (ferric) portion, and the non-oxidising power of the reduced (ferrous) portion, such, *e.g.*, as by immersing in a solution of potassium iodide, mixed with starch paste.

Such demonstrations as these cannot fail to give a vivid idea of the effect of photo-chemical decomposition, and the striking results that can be obtained by the application of familiar reagents. It may be pointed out that the photo-chemical reduction of ferric salts, although practically useful for printing purposes, takes place too slowly to enable these compounds to be used at present for the production of camera pictures. But there is no reason why the rate of photo-chemical reduction—*i.e.*, the sensitiveness of these compounds—should not be increased by admixture with some easily oxidisable substance and a sensitive film prepared by this means, which would cheapen photographic processes by dispensing with the use of silver salts.

In the same way that the photo-chemistry of iron is studied, the other sensitive metallic compounds may be dealt with. The reduction of uranic salts, and the development of uranium prints by various reagents, will naturally be connected with the analogous ferric salts. The photo-chemical reduction of chromates in the presence of organic substances, such as gum, albumen, and gelatine, will lead to the numerous practical applications of chromated gelatine in the processes of etching, pigment printing, collotype, &c. In these processes practical instruction may be given at this stage as far as thought desirable. The salts of mercury and copper may also be studied with advantage, as illustrating the nature of photo-chemical decomposition. The well-known greenish mercurous iodide is easily prepared by decomposing freshly precipitated and washed mercurous chloride with a solution of potassium iodide. Some of this salt, washed by decantation, and exposed under water to the action of strong light, rapidly darkens, owing to the liberation of metallic mercury. According to H. W. Vogel, the decomposition may be represented by the equation—

$$3\,Hg_2I_2 = 2\,Hg + Hg_4I_6.$$

The compound Hg_4I_6 is mercuroso-mercuric iodide, Hg_2I_2, $2\,HgI_2$. The decomposition of mercuric chloride in the presence of ammonium oxalate is also an instructive illustration of photo-chemical decomposition, as it takes place with comparative rapidity, being the reaction made use of in Eder's chemical photometer—

$$2\,HgCl_2 + (NH_4)_2\,C_2O_4 = Hg_2Cl_2 + 2\,NH_4Cl + 2\,CO_2.$$

—*Journal of the Society of Arts.* R. Meldola, F.R.S.

(To be continued.)

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

IV.

The classes from 11 to 25 inclusive in this exhibition are open to both professional and amateurs, and the amateurs make a good show and hold their own right through all classes as far as the awards are concerned. The special gold medal in the larger-size landscape class was won by an amateur, and we find, on taking all the classes above noted together, that the amateur has carried away fifty per cent. of the awards at least. This speaks well for the non-professional productions. Of course it might be, and is, argued that the amateur has more time, money, and appliances, and that he can devote more study to any special class of work. That is so, but the professional is at it all the time, and what is a considerable set-off as against the amateur's advantages is the fact that the professional can exhibit work part of which may be produced by his hands, whilst the amateur is supposed to do all the work himself, even to the mounting, so that it seems to us that the advantages and disadvantages are pretty well mixed, and that neither stand heavily handicapped.

In Class 11 David R. Clark got a special gold medal award for *The Trysting Tree*, No. 280.—This picture is one of the most artistic pictures in the exhibition, the rendering being natural and careful, with very perfect clouds and reflections, soft yet tellingly printed, with no indecision in any part of it, no glaring spot, but full of quiet light. It is printed in a brown-black tone, the faint warmth of which adds to the charm of the picture. 277, by the same artist, is not nearly so interesting, being dull and flat by comparison. Also 278 fails to convey any feeling of rest to the eye, the black parts of figures, &c., stand out from the gray white of the houses and sky and spoil the general effect. 279, produced in a darker tone, and much more vigorously printed, shows up much better.

H. P. Robinson gained a silver medal with set 262 to 265. 263, *What Sport*, pleases us best. We think that Mr. Robinson in his selection has not done himself justice, and that the four pictures sent, although fine, are not up to his usual standard of excellence. We have seen so many pictures filled with artistic merit by this artist, that we think a better selection might have been made.

A silver medal was awarded to A. Horsley Hinton for his set of pictures, 308 to 311.—Charming effects in deep, rich, brown tones. Decidedly Emersonian, with this exception, that the planes of the picture do not recede from any given point, fairly in focus. All the picture seems to be out of focus together, some parts of it more so than others certainly, but all out of focus as if a stop, larger than would allow of, sharpening the picture, had been used, and that the plate had been exposed so; but there is no doubt about the artistic effect produced, especially when the picture is viewed from a little distance. Not much subject in these pictures—more suggestive than pictorial. 310, *When Swaying Reeds Eternal Summer make*, reminds us of Keely Harswell's compositions and treatment.

J. G. Pratt, Greenock, with 328, was awarded bronze medal in this class. These four pictures are printed upon dull surfaces on chloride paper, and toned red, the tone showing slightly too red, we think, but they are very delicately printed, and the cloud effects tell well. Why, Greenock looks quite bright and sunny—one would never dream when looking at this successful production that it represented a town with such a rainfall as it gets credit for. *In Peaceful Waters* is very successful as a composition.

255, Landscapes by Bernard Alfieri.—These pictures are on emulsion paper gold-toned. They have the appearance of fine steel engravings, tender and delicate.

256, the same class of subject by the same artist, printed in red-brown, which lends the picture more vigour, but less artistic in general effect.

267 to 270 is a set by the Countess Loredana da Porto. The whole four pictures carefully composed. Her figures look like models accustomed to the work. There is that unconscious ease about them that is rarely obtainable when using untrained material. 269, the roadway broken by the standing figures by the pool, and the faint reflection of the figures in the water with the background of softly defined trees in the distance, is very effective, and 270, *The Love Making* at an old, quaint farmhouse with its nooks and angles, is a story without words well told. This picture attracts much attention.

271, by W. S. Anderson.—Landscapes in platinum grey tone, well rendered, and full of detail.

301 to 307.—A series of pictures by Gibson, of Hexham. We have fully examined this artist's beautiful productions on former occasions. The examples here shown are quite up to his usual standard of excellence.

338 to 342. By W. M. Warneuke. The large view work by this artist is very promising. 340 shows a little too white all over for sunshine. It has a feeling of winter as much as sunshine, 339 being much the best in this respect.

His case of landscapes, however (342), are charmingly executed. They are catalogued as platinum; but this is evidently a mistake, as they are printed on aristotype paper in a beautiful tone. These pictures are full of detail, with not a hard line to mar them. They are clear and soft, and well defined. The cloud effects subdued yet tellling.

This class, No. 11 of the Exhibition, is very large and full of good work, most of the sets showing far above average merit. We cannot find time and space to detail many of those pictures that are really worth special mention, notable amongst those being Emmons, Hugh Reid, Falconer, Done, McKenzie Sherriff, Archibald Brown Smith, &c.

No. 12 class—Landscapes under whole-plate size.—Both for quantity and quality this section is fair; but they are at a considerable disadvantage in being located in one of the passage rooms—they get no chance of showing up well. In this class no exhibit was thought worthy of the silver medal, but two bronze medals were awarded; the first to T. A. C. Ruthven, Dublin; he shows two frames of *Norway Views*. They show subjects well chosen and careful manipulation; they are well printed, but the clouds are too dark, especially the *Naerœdal* picture.

No. 377 set gained the other bronze medal, by Mrs. J. N. Hignett.—These pictures are printed in platinotype, in a grey tone, with wonderful definition. *The Mill on the Ouse* is a very delightful little bit.

345*a* and 345*b*, two sets by Alexander Meah.—These pictures are very artistic and capital renderings of the scenes depicted. We think, if the skies had been printed a little lighter, it would have improved these pictures very much.

372, a set of pictures by A. C. Gibson, printed in a red tone, which is very pleasing; the pictures themselves are carefully rendered.

388, by Millar, and 349, by Caneroli, are good pictures, spoiled by being printed far too dark.

All over this section there is a tendency to printing much too dark.

378, *Hooding*.—The different tones of pictures in the one frame, followed up by three different tints in the matt, spoil the pictures completely—pictures which, taken individually, show first-rate work, good choice, and good manipulation.

391, Set by J. G. Pratt.—If these pictures had been a little more subdued in printing, they would have shown up very much better. The very

intensity of tone makes the clouds look spotty. *A Rural Spot* is the best composition in the set.

Class 13, *Marine and Cloud Effects*.—This is a very small show, and nothing very striking in it. No merit enough in it for a silver medal—so thought the Judges. A bronze medal was awarded to Clement Millard Malba for his set 407. The most telling and artistic pictures in the section, however, are the *Sunsets*, &c., by A. Swan Watson. Adamson's *Ships* are good.

Class 14, *Animal Studies*, 437 and 438.—J. Catto gained the silver medal. These two pictures are very "fetching;" they are entitled *Rats* and *Rats Again*. The rush of the dogs to the door, every position showing business of a deadly nature, is very happily caught; but we feel that they are exceptional pictures, more a lucky chance than a study. We are of opinion that Mr. C. Reid's studies of animal life stand on a higher plane, his frame of fowls in this class, quite irrespective of being perfect from a technical point of view, are really works of art; but this artist's work is so well known and so highly appreciated, that further comment is unnecessary.

441, by Donald Done.—These pictures are spoiled by mounting such large figures in so small an opening. They would have shown ever so much better with a broader margin to the picture.

443, by F. McKenzie.—An artistic set of cattle subjects, too darkly printed to do them anything like justice.

446, by E. J. Jackson.—The sheep in these pictures are charmingly rendered; the backgrounds, however, look much too dark, as if considerably under-exposed.

Class 15, Out-door groups.—461 took the silver medal, Karl Greger.

The whole set of subjects show most careful work. The grouping has been done by one possessing the hand and the eye of an artist, for the effects produced are very perfect.

The bronze medal was awarded to F. Bremner. Large pictures printed in silver.

Groups of native Indians.—These pictures show great technical excellence, and the deep shadows thrown from the figures, due to the intense light in India, lends great vigour to the subject parts.

457 to 460, Glazebrook.—These are capital pictures, and well worked out. The great proportion of the productions in this class is the ordinary group, which does not lend itself to pictorial effect, good manipulation being their special virtue; they show well from that point of view.

Class 16, Architecture.—One award, bronze medal, Cecil V. Shadbolt. *The Alhambra, Spain*.—These show soft, clear, well-defined photography, but nothing special in the selection of subject.

The whole section shows very ordinary merit.—Falconer's *Melrose* is an exceedingly good picture.

Class 17, *Interiors*.—This class shows up fairly well, many frames of well-lighted interiors being exhibited. The silver medal was awarded to C. C. Cole, and the bronze to W. J. Byrne.

The Library Scene, by Cole, is beautifully and delicately rendered.

Class 18, *Still Life*, is very small, and no awards were made. 491, Terras' *Flowers*, is the only noticeable set. They show up from a very dark background, and are very effective. They seem mounted in optical contact, which sinks the very dark grounds, giving them considerable liquid transparency.

Class 19, Flashlight, very few exhibitors.—The silver medal was awarded to Mr. John Stuart for his pictures, 497 and 498. We have commented on these pictures on a former occasion, and as we then thought so think we now, that they are by far the best flashlight pictures of the class "Photography at Home" that we have ever seen, both for artistic and technical excellence; and this artist has proved by his productions that a really good and artistic picture can be produced at home by the flashlight that those who desire such would be proud to possess.

Some frames of pictures by Surgeon Newland, of Burmah.—These pictures seem to have suffered in transit somewhat, the emulsion paper showing signs of bad usage; but as a set of figures, story subjects—they are entitled *Incidents in a Subaltern's Life in Burmah*—they must create a lively interest for the visitor, and so will prove a very welcome addition.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,544.—"Improvements in and in connexion with Cameras." A. M. Gillham.—*Dated September* 14, 1891.

No. 15,553.—"Improved Movable Graduated Backgrounds for Portrait Photography." G. W. Morgan.—*Dated September* 14, 1891.

No. 15,615.—"Improvements relating to Photographic Apparatus or Devices for Automatically Registering and Indicating the Number of Exposures." Communicated by E. E. Moore. Complete specification. W. P. Thompson.—*Dated September* 15, 1891.

No. 15,657.—"Improvements in Photographic Cameras." F. Shew and L. Henry.—*Dated September* 15, 1891.

No. 15,700.—"Improvements in and connected with Sensitised Surfaced Paper, Woven or Tissue Fabrics, or other Material, for the Production of Copies of Drawings, Designs, Pictures, Photographs, Writings, and the like, by the Action of Light." R. M. Shawcross.—*Dated September* 16, 1891.

No. 15,861.—"Improvements in Photographic and Telescopic Apparatus." T. R. Dallmeyer.—*Dated September* 18, 1891.

No. 15,908.—"An Improved Photographic Shutter." W. A. Smith.—*Dated September* 19, 1891.

PATENT COMPLETED.

Improved Photographic Camera with Plate-exchanging Device.

No. 12,579. Rudolf Stirn, 34, Sebastianstrasse, Berlin, Germany.—*August* 29, 1891.

My invention relates to a photographic camera in which the exchange or transfer of the plates is so effected that the plates arranged close behind each other in a partitioned-off chamber can be singly removed for exposure, and can then be returned to the same or any other desired part of the partitioned chamber, the camera having as many partitions or spaces as plates can be contained in the same.

The plate exchange is effected by means of a case or sheath advantageously of sheet metal or other suitable material, of a size corresponding to the size of the plates employed, said sheath being so arranged on the upper outer surface of the camera that the same can make a part revolution, advantageously about ninety degrees, and is so constructed that when the said sheath is placed in vertical position or nearly so, the interior of the same will communicate with one of the partitioned-off spaces of the plate chamber, whereas, when the same is turned, as above mentioned, about ninety degrees, this communication will be shut off. The lid of the camera being arranged to slide in appropriate guide ways, I am enabled to successively remove the unexposed plates from the plate chamber by inverting or turning the camera topsy-turvy, so that the desired plate falls into the afore-named sheath, whereupon the said sheath is given about a quarter revolution on its axis, and the sliding lid closed, so that the slot beneath the sheath stands over the exposition chamber. The sheath is now again turned so as to stand erect, and thus allow the plate to fall into the exposition chamber of the camera. It is only necessary to reverse the order of the foregoing operations to remove the exposed plate and transfer the same back to the same partitioned space in the chamber from which it was taken.

It will be obvious from the foregoing that all the plates in the chamber can be exchanged by simply sliding the lid or cover, and placing the sheath in an erect or a laying position and inverting the camera.

In order to facilitate the afore-mentioned operations, the case of the camera is provided with a scale or index, along which a pointer attached to the lid glides so that any one of the plates can be removed from its partitioned space and returned to the same after having been exposed, &c. The camera is furthermore so arranged that each movement of the lid or cover will place the spring of the shutter to the object glass or lens under tension, and will also denote by a counting disc to which partition space the lid or cover is to be adjusted for taking a fresh plate.

Instead of full partitions, ledges can be used for dividing the chamber and preventing the plates from coming in contact with each other.

The claims are:—1. A photographic camera in which the exchange of the plates from the subdivided or partitioned-off plate chamber to the exposition chamber and back again to the plate chamber is so effected by means of the sliding lid or cover that the plates to be exchanged are fed into light-tight sheath attached to the said lid or cover, and arranged to be given a partial revolution, the shifting of which, when operating the sliding lid, enables the plates to be transferred from the plate chamber to the exposing chamber, and from the exposing chamber back again into the desired space of the partitioned or subdivided plate chamber, substantially as described. 2. In photographic cameras with sliding lids and transfer sheaths, spring under tension in operating the lids or cover by means of a rod, substantially as described. 3. In photographic cameras with sliding lids and transfer sheaths, the application of a scale to the case and a pointer to the lid of the camera for adjusting the parts, and a counter disc operated in moving the sliding lid, substantially as and for the purpose set forth in the foregoing specification. 4. In photographic cameras with sliding lids and transfer sheaths, the application of springs for securely holding the plate during exposure, the latter being released from the pressure of the springs by operating a sliding rod, substantially as specified. 5. The general construction and arrangement of the parts in my improved photographic camera, substantially as specified.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 28 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 30 ...	Burnley	Bank Chambers, Hargreaves-street
,, 30 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
October 1	Bolton Photographic Society ...	The Baths, Bridgman-street.
,, 1	Leeds	Leeds Mechanics' Institute.
,, 1	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
,, 1	Glasgow Photo. Association.....	Philosophical Rooms, 207, Bath-st.
,, 1	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 2	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 2	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

September 17.—In the unavoidable absence of Mr. J. Traill Taylor Mr. W. Bedford took the chair, and there was a large attendance.

Mr. Thomas Bedding was unanimously elected a member of the Association.

The last outing of the season was postponed from Saturday, the 26th inst. (that being the night of the *conversazione* of the Photographic Society of Great Britain), until the following Saturday, October 3, when the Association will be joined by the members of the Photographic Club.

Mr. A. L. Henderson's demonstration of a new method of gelatine emulsion making was fixed to take place on Thursday, October 1.

In reference to the merits of caramel and sienna as preventives of halation, Mr. Teape mentioned that he had backed a plate along one side with the first

named, and with sienna along another, leaving the centre untouched. He produced the negative, obtained with an exposure of eighteen minutes upon a large window. Between the results of the two backings there was no perceptible difference; the unbacked centre gave halation.

Mr. DEBENHAM declined to accept the experiment as conclusive, inasmuch as the test was insufficient.

Mr. TEAPE said that he had exposed almost to the point of reversal, but Mr. Haddon was of opinion that three or four seconds would have been sufficient for the purpose, and that consequently the plate had been exposed about three hundred and forty times too long, and still sienna had behaved better than he should have expected. He preferred caramel and gelatine to sienna and dextrine as a backing, inasmuch as the latter "ran" somewhat.

Mr. EVERITT remarked that this arose from using the sienna solution too thin.

Mr. G. W. Atkins exhibited prints from a stereoscopic negative. One-half of the plate had been backed with caramel, and the complete absence of halation from that portion of the picture was noticeable.

Mr. T. E. FRESHWATER then proceeded to give his demonstration of *The Lantern Microscope*. In first of all describing the instrument by the aid of a diagram, he said: Last winter it was proposed that we should go a little way out of photography at some of our meetings by having occasional lectures and demonstrations of a more or less scientific character, and this idea was successfully carried out. I was put down for a paper on the Oxyhydrogen Microscope. Unfortunately, I could not get a complete instrument together in time for the series, but now, through the kindness of Messrs. Newton, who have lent me one of Mr. Lewis Wright's last new instruments, I am here to redeem my promise, and will endeavour to do my best to explain from the diagram and demonstrate on the screen its various adaptations for lecture purposes. I shall not say anything about the light, as that is so well understood; but a few words on the construction of the microscope will not be out of place. The condenser is a triple combination. The first pair are plano-convex lenses of 5 inches in diameter, with their flat faces turned outwards; the third lens, that is the one nearest the light, is a rather deep meniscus of 4½ inches diameter. The lenses are mounted close together; the whole set then measure 2½ in. focus, thus enabling you to put the light in such a place as to take up an angle of 95°. This will bring the rays to a focus at about 6 inches in front of the front lens. In the convergent cone of rays from the condenser is placed a parallelising plano-concave lens, giving a parallel beam about 1½ in. diameter. Here is placed the alum trough; the concave lens is balsamed to the glass side of the trough, thus forming on this side a double plate of glass. The layer of balsam absorbs any special balsam heating rays which get through the alum solution. Without this tank of alum to absorb the heat, you would not be able to show any objects, as they would be burnt up almost directly. From the parallelising concave lens to the stage is about 5 inches, and in this parallel beam of light is placed the substage condenser, which focusses the rays on to object. This lens is about 2½ inches focus, and will brightly illuminate an object 1½ inch in diameter. Such a lens can be used for all low-power work, from a 3-inch objective to a four-tenth. The position of this condenser depends upon the objective used—the higher the power, the farther the condenser is racked back. For high-power work a double lens is necessary, and when immersion lenses are used a small very high-power lens is put on in front of the second lens, thus making a triple substage condenser, which enables you to get a very small spot of intense light on the object. Following on from the substage condenser to the objective, any objective will do; but those worked out on purpose for screen work give the best results: a flatter field, more light, and far better definition. Sometimes we want to increase the size of the image without changing the objective; this may be done with an amplifying lens. The image is amplified for ordinary objects by interposing a plano-concave lens between the objective and the screen somewhere about 4 inches in front of the objective. The effect of this lens is to increase the working distance between the object and the objective. For photographic purposes, the amplifier should be corrected, but for ordinary work a single lens is quite sufficient. In place of this lens may be inserted a microscope body tube with an eyepiece. The eye lens should be achromatic, and so made that it is adjustable to enable you to focus the stop of the eyepiece on the screen, and this arrangement gives very fine results. I have not said much about the objectives, but the most useful lenses range from a 3-inch down to four-tenths, which with an eyepiece may be worked up to 1500 diameters. This means a blow-fly's tongue fourteen feet long at twenty-five feet distance, but immersion lenses of one-eighth or one-twelfth may be readily used. It must not be forgotten that the projecting microscope produces its image under some conditions which interpose some peculiar difficulties. The first difficulty lies in the enormously greater amplification necessary; this does not produce a proportionate effect upon the spectator, owing to his greater distance from the image, but on the other hand any errors in the objective, with their consequent woolliness in the image, are magnified proportionately; 1200 diameters is considered high on the compound microscope in ordinary work, but a very moderate power for screen-work. The second difficulty is a consequent deficiency of light, which makes it difficult to exhibit images of transparent objects, such as diatoms. When we look at such a diatom as *arachnodiscus*, it can be easily magnified to a foot across, but a few feet away would not be seen. When this is amplified to three feet, the blacks are dilated into greys again. To get a critical image the photographer can stop off a great deal of this light. This he can well afford to do, because he can make up for the loss of light by longer exposure, which the demonstrator cannot do. Having described the instrument, I will say a few words on the different parts of the apparatus and class of objects that can be shown with it. I will first take the spot lens, or dark-ground illuminator. I will endeavour to show a few objects by this method of illumination, such as some of the spicules of sponges, synapta, and, if possible, a little stagnant water. The Lieberkuhn is a very beautiful addition to the instrument for showing opaque objects. This is a circular reflector, that fits over the objective, and worked to such a curve that all the rays of light that come from the condenser are received on to the reflecting surface, and thrown back upon the object, which is again reflected through the objective on to the screen, so that, the more brilliant, the brighter will the image be on the screen. The feather of the humming-bird, small shells, and beetle wings are very prettily shown in this way. I shall not say much about the polariscope, as we have already had two papers on the subject. The polariser is placed in the body of the instrument, so that the parallel beam travels along the whole length of the prism to the object, and the analyser is worked in front of the objective. I need not say anything about the objects, for I shall show you a few directly. The last part I have to say anything about is the convergent system of lenses, which consists of a set of three lenses of very deep curves, fitted in the place of the substage condenser, for showing the brushes and rings in highly convergent light. Then in front of this set of lenses is placed the crystal; in place of the objective is another set of lenses of smaller diameter, nearly bringing the rays to parallelism; then a lens in the rack tube to focus the image on the screen, the rays from which cross in the analyser. I will show you some very fine plates of mica and selenite, lent me by Mr. Lewis Wright, which have been made by him, and so ably figured and described in his book on "Light." They consist of elements made up of plates of mica and selenite laid over one another.

The lecturer then threw a large number of beautiful microscopic objects on the screen, including, among many others, earwigs, the male spider, the section of a human scalp, the scales of butterflies, diamond beetle's wing, "nuggets of gold;" while by plane polarised light he exhibited the claw of a wild cat, the toe of a white mouse, crystals of salycine, platinocyanide of strontium, plates of mica and selenite, brookite, and ferricyanide of potassium, &c. The display was accompanied by a technical description of the various slides and the peculiarities of the means employed for their projection, and concluded with a popular animalculæ series, the antics of the minute denizens of several varieties of water causing considerable amusement.

On the motion of the Chairman, a cordial vote of thanks was passed to Mr. Freshwater for the demonstration, which had evidently taken great trouble to prepare, and was thoroughly successful throughout.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 16,—Mr. Dunmore in the chair.

The CHAIRMAN showed several beautiful whole-plate pictures both of exteriors and interiors, taken with a lens made of two periscopic spectacle lenses placed close together, the concave sides to each other, and a small stop immediately in contact with the lenses in front. One of the pictures was the interior of a church with very tall columns, and there was not the slightest sign of curvature, whilst the picture was sharp right up to the edges. He said the fact was, this home-made lens would cover much more than a whole-plate. He had taken that size picture because his camera happened to be for whole-plate. He focussed with the open lens, and then inserted a one-sixteenth of an inch stop, and, although the aperture was so small, he found the exposure in an ordinary light with Ilford ordinary plates was about five seconds, and therefore, with extra rapid plates, and at the seaside, he had no doubt that instantaneous exposures could be made. It was possible by using shorter, focus lenses and a twenty-four inch focus lens in front, to get a wider angle. There was some advantage in using pebble lenses; the light, perhaps, goes through quicker, as not so much light is absorbed.

The pictures taken by Mr. Dunmore were all that could be desired.

The Chairman stated that the lenses could be purchased, either round or oval, for about threepence each; and, if oval, the outer edges could be easily cut down with a glazier's diamond, and then, if they were carefully centered, about which there was no trouble, and mounted even in a brown-paper mount, they would answer every purpose.

Mr. Dunmore also showed a new camera back, or substitute for dark slides, which he has patented, and which contains in itself focussing glass, focussing cloth, and very light carriers for plates. This back is so arranged that, when the outer lid is raised for the purpose of focussing, the focussing cloth is raised with it, and forms a complete shade for the glass. The plate carrier is then inserted, the lid closed down, and the same motion which raises the focussing screen also exposes the plate. There is no doubt that, when this back is made public, no camera will be considered perfect without it. It is a simple, handy piece of mechanism, doing away with the necessity for the cumbersome double dark slides of the present day.

The CHAIRMAN then called on Mr. Howson, of the Britannia Works Co., who gave a demonstration of printing and toning on the new Ilford printing-out paper.

RICHMOND CAMERA CLUB.

SEPTEMBER 18,—Mr. Lowry in the chair.

A proposal to admit ladies to membership on certain conditions was adopted, subject to the approval of the forthcoming annual meeting.

A circulating library was started, to which members were invited to contribute books upon photography and the cognate sciences. Mr. Ardaseer consented to act as Librarian, and sufficient books were promised by those present to form the nucleus of a library, which should prove of great use to the club.

The subject for discussion was *Defects in Gelatine Plates*, but time did not allow of its being thoroughly dealt with.

OXFORD PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society will be held on Tuesday, October 6, in its rooms at 136 High-street. Report of the Committee; election of officers.

MIDLAND CAMERA CLUB.

A PROVISIONAL Committee meeting was held on Friday night last; Dr. Hall Edwards occupied the chair. It was reported that the club rooms were being arranged for, as also the furniture and fittings. The draft rules were discussed and adopted. Mr. J. Trout and Rev. J. Henry were added to the Provisional Committee. A prospectus, stating the objects and advantages of the Club is to be drawn up and circulated throughout the district. The objects of the Club, according to the adopted rules, are as follows:—"The objects of the Club shall be the advancement of photography in all its branches, and the promotion of social intercourse amongst all photographers. First, by the holding

of periodical meetings for lectures, papers, discussions, and practical demonstrations; and by friendly competitions upon photographic subjects. Second, by the provision of convenient club rooms, with dark room, &c., for the use of members. Third, by the promotion of intercourse between this and other societies." The membership is to be quite open to both amateurs and professionals, ladies as well as gentlemen. The subscription has been fixed at 10*s.* per annum; youths under eighteen, who would benefit by the "Beginners' Section," 5*s.* per annum. General meetings are to be held on the first and third Fridays in each month, and the sectional meetings as arranged by each section, and where they choose. The first general meeting will be held on the third Friday in October (16th), at which the officers and Committee for the ensuing year will be elected, and it is hoped that all intending members will attend, that the officers and Committee shall be as representative as possible. Applications for membership and other details to be obtained from the provisional Hon. Secretary, 47, Hagley-road, Birmingham.

LEEDS PHOTOGRAPHIC SOCIETY.

On Monday evening, September 21, Mr. G. H. Rodwell gave the sixth of the series of elementary lectures, his subject being *Lantern Slide and Transparency Making.*

Mr. Rodwell stated at the outset that the increased popularity of the optical lantern as a means of instruction and amusement may be accounted for by the fact that the modern dry plate gives to the amateur facilities for making lantern slides not possessed some few years ago. For lantern-slide work the wet-collodion process was by many considered the finest. For fineness of deposit and transparency in the deepest shadows it was hard to beat, but this could only be said when in the hands of experienced workers; with the average amateur the extraordinary care necessary rendered it a difficult process to work. Fog, comets, spots, pinholes, and oyster-shell markings were technical names for some of the troubles which an ordinary worker of this process would have to encounter, and which would utterly spoil a plate for lantern purposes. The gelatino-bromide process was much more suitable, and with ordinary care exceedingly fine results could be obtained. Mr. Rodwell advocated a slow plate on which to make transparencies, and, as a rule, the slower the plate the warmer would be the tone of the resulting slide. Most commercial plates he considered too rapid; the plates he used were of his own preparation. Having explained the method of printing by contact, and also by reduction in the camera, Mr. Rodwell dealt with the various methods of development, and explained his method of obtaining warm tones. For this purpose pyrogallic acid development was the best, and the following was his formula:—

Liquid ammonia fort.	1 drachm.
Ammonia bromide	1 ,,
Water.....	20 ounces.

For developing, add one grain of dry pyrogallic acid to one ounce of the above just befor using. He did not advise any alteration in the developer, but rather alter the exposure to suit the developer. Should the slide not be of the required tone or density, it was almost useless to try and alter it, and it was far better to make another slide. Intensification was also unsatisfactory. It was, however, possible to reduce an over-dense slide by means of Howard Farmer's ferricyanide formula, and this was specially useful in clearing skies by local reduction, using a camel's-hair brush to wash the reducer over the sky.

At the conclusion of his remarks, Mr. Rodwell exhibited a number of fine slides, which were put through the lantern and greatly admired.

PRESTON CAMERA CLUB.

This Club is making satisfactory progress. Although it was only recently formed, there are already thirty members, and it is probable that the membership will be doubled in the course of a little time. The members made their "first appearance," so to speak, on Thursday evening, when there was a meeting in the Club chambers, and a large collection of photographs, which were much admired, and a series of lantern slides was shown on the screen. About 180 prize slides, lent for the occasion, were passed through the lantern, and were greatly admired.

Correspondence.

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

"THE GENESIS OF ALBUMENISED PAPER."

To the Editor.

Sir,—I have been interested in your article on the "Genesis of Albumenised Paper," wherein you note the difference in the manufacture a quarter of a century ago and the present time. As you point out, the papers in the fifties and early in the sixties had no smell of decomposed albumen, and, as a matter of fact, were prepared with fresh egg albumen strongly salted. The resulting prints were bluer before toning than those now seen, and probably from there being a larger body of chloride of silver formed in them, and less of the more uncertain and less stable albumenate of silver, well known to have a red hue, and which, as Hardwich points out, is the first silver compound in the print to change. Then, in the old days, a great many prints were toned in a simple bath of carbonate of soda and gold—by the "alkali toning," as it was then called—and thereby the risk of carrying an acid in the fixing bath (as now, I fear, often happens when the acetate of soda bath is so commonly used) did not exist. The toning operation usually—whatever may have been the cause—took longer than it now does; probably the free silver was more effectually removed from the prints, and the fixing solution was not weaker than four ounces of hypo to the pint of water. Another often remarked cause of permanency in the older prints may have been the more vigorously printed images due to the strong negatives of that time. It was not at all unusual to find a plate requiring some three hours in the shade, or a proportionate time in the sun, to make a print. Whatever may have been the cause, certain it is that the prints of the earlier period have kept best, as you and many other veterans in the art can testify, and I think no expenditure of thought, labour, and experiment could be better employed than in thorough sifting of the conditions of the most perfect permanency in albumenised prints. I think it is, on the other hand, a matter for sincere regret that any countenance should be given to such a confessedly dangerous method of producing prints as that involved in the use of the old combined toning and fixing bath, the revival of which is in many quarters allowed. The old student of Hardwich can quite imagine him turning in his grave even at the mention of such a revival. If it were found possible to prepare the print on the duller surface formerly used, with the former safeguards, and then to obtain, in a simple way—simpler than enamelling—the needful glaze and fineness of surface for small work, this would surely be a safer course than making the whole of the material the vehicle of the sensitive compound with the attendant risk. The one great advantage that silver printing seems to have over all others is that the precise point at which to stop the printing can be accurately seen and known, and for this reason, if for no other, the old and familiar process has, in my opinion, yet a long lease of life.—I am, yours, &c., Senex.

Penzance, September 19, 1891.

ALBUMENISED PAPER.

To the Editor.

Sir,—As some surprise is being expressed about albumenised paper being still so much used, allow me to give you the following reasons for it. Time is too much occupied to allow me to go into details of the same.

Good albumenised paper is more economical, very much easier to manipulate. The gelatine papers take half as long again to print, double the gold to tone, a more complicated and less stable bath, three or four times the care and attention to the prints in washing; they will curl up from first to last, rising out of the toning bath, &c. Lastly, they sometimes stick in small places to the glass or prepared plate, and when removed leave a patch behind; or, through not being perfectly squeegeed on, the print comes off with a dull-looking place here and there.

I thank Mr. Woodbury for his valuable paper upon the subject.—I am, yours, &c., Wm. Girling.

Stradbroke, Suffolk, September 22, 1891.

DISCOUNTS.

To the Editor.

Sir,—In your issue of September 11 a "Professional" writes that he gets dry plates from the Civil Service Co-operative Stores at twelve and a half per cent. below the price he has been giving a dealer, paying cash in both cases.

If that is the case, he has been paying more than the makers' list prices, as the discount given by the Stores is less than five per cent. I take Ilford ordinary plates as an example, Ilford plates being the only plates given in the list of the Stores named:—

Ilford ordinary List Price.

¼	½	1	10×8	12×10.
1*s.* 0*d.*	2*s.* 3*s.*	4*s.* 3*d.*	7*s.* 3.	10*s.* 6*d.*

Stores' Prices.

¼	½	1	10×8	12×10.
11½*d.*	2*s.* 1½*d.*	4*s.* 0½*d.*	6*s.* 11*d.*	10*s.* 6*d.*

Both stores give the same prices, but the Bedford-street Stores keep nearly all the principal makers' plates, but the discount is the same, so far as I have worked out the prices. If "Professional" will carefully work the above prices out, he will find the discount is less than five per cent. for every size plate but half-plate, and that is just over five per cent.—I am, yours, &c., Chips.

St. Martin's-lane, W.C., September 22, 1891.

THE INVENTOR OF THE GELATINE PROCESS.

To the Editor.

Sir,—Having read in your Journal, of September 18, that the gelatino process of photography, discovered by Dr. R. L. Maddox, is now approaching its twenty-first birthday, it has struck me that that would be a fitting time for the nation to show its appreciation of Dr. Maddox's gift in some substantial form. Much attention has lately been drawn to this process, particularly in the opening address of the President of the British Association at Cardiff, but it is not generally known that the veteran discoverer has never received any pecuniary advantage from this valuable discovery, and surely the many who have derived benefit from the knowledge of this process should now come forward and testify to the same. In your Journal for November 4, 1887, W. Jerome Harrison, F.G.S., writes: "Photography proper now rests entirely on the labours of three great Englishmen—Fox Talbot, calotype process, 1841; Scott Archer, collodion process, 1851; and Dr. R. L. Maddox, gelatino-bromide, 1871. . . . . It is our duty to publicly honour the men to whom we owe so great a debt, and of whom, as our countrymen, we ought to be so proud."

In the same paper for July 25, 1884, there is an article by Dr. Maddox giving the history of his discovery, to which I refer you.—I am, yours, &c.,
September 22, 1891. C. G.

THE DAWN OF PHOTOGRAPHY.

To the EDITOR.

SIR,—Does not Mr. J. A. Forrest antedate the history of the Daguerreotype a couple of years when he tells us that "photography came with the first year of the reign of our beloved Queen?" I was a diligent reader of your volume for 1889, when the photo-historians deluged us with those jubilee histories of photography, which all bore such a strong resemblance one to another, and I have got it on my mind that 1839, and not 1837, is the year which saw the introduction of sun pictures. Surely Daguerre did not keep his process a secret two years? Perhaps Mr. Forrest, whose knowledge of these things is one that reaches a long, long way back, will kindly explain.

By the way, the members of the Birkenhead Society must have abnormally big fingers. Mr. Forrest told them that Daguerre's silver plate was "about the size of your thumb-nail"—that is, $2\frac{1}{2} \times 2$! What digits!—I am, yours, &c., HISTORICUS.

Battersea-park-road, S.W., September 22, 1891.

NEW CLUB AT LEYTONSTONE.

To the EDITOR.

SIR,—You will see by enclosed circular that a Photographic Club has been formed at Leytonstone. I feel sure that there are any number of your readers in the neighbourhood who would be glad to join us if they only knew of our existence.

Our rooms, which include an excellent dark room, are only a few minutes' walk from Leytonstone Station, and trams from Forest Gate, Stratford, &c., stop opposite our doors.

Meetings take place once a week, and are distinguished by special demonstrations, lantern evenings, &c.

Thanking you in advance for inserting this,—I am, yours, &c.,
HERBERT H. SUMMERS, *Curator.*

Chalcot, Leytonstone, September 21, 1891.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR,' 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:

J. T. Barker, Stourbridge.—*Two Photographs of Adamshill, Clent.*
Herbert Bell, Ambleside.—*Photograph of "Evening on Windermere."*

S. E. KELF.—Many thanks; but all arrangements have already been made.

ARCHER & SONS.—It has evidently miscarried. Kindly send us another copy.

W. NELSON.—Melt together paraffin and beeswax, and coat the dish, applying heat to cause absorption.

WM. DUFF & CO. (Cannon-street).—The agents for eikonogen are Messrs. Marion & Co., Soho-square, W.C.

C. C. WRIGHT.—Take equivalent proportions of the respective salts, dissolve, mix, and crystallise in the usual manner.

F. W.—You are correct. The pictures are obtained by pointing the camera towards the sun and giving a very short exposure.

IRON.—Add a little sulphuric acid to the solution and well agitate it, and if it does not clear you may assume that there is no gold present.

MELVEN BROTHERS.—You will find all necessary information respecting photolithography in Hardwich's *Chemistry*, published by Churchill, of Burlington-street.

G. STOKES.—Communicate with Mr. Spurge, care of Mr. Clarkson, Bartlett's-buildings, Holborn. He will probably be able to supply you with one of his sensitometers.

YORK.—We are not aware that any albumenised paper is sold than can be successfully employed when sensitised on a twenty-grain bath. Therefore cannot supply the name.

E. H. J.—A cement that is said to resist either fire or water is composed of two parts of very fine iron filings (unoxidised) mixed with one part of dry loam, acetic acid being added just before being used.

JAMES R. asks: "Which of the alkaline carbonates gives the greatest density to the image when employed in the developer?"—Answer: Without speaking of any other relative properties, the greatest density is obtained from potash, the least from soda.

HYDRO.—Books have been reprinted in *facsimile* by the agency of photolithography several years earlier than the date you give. Among the earliest of these reprints is Whitney's *Choice of Emblems*, which was produced in 1866 by Mr. Alfred Brothers, of Manchester.

J. B. B.—Supposing the negative to have been properly packed, and the injury arose from the case being smashed by the carriers, they certainly are responsible for its value. As the carrying firm is a respectable one, we imagine they will make no demur to a reasonable compensation.

MR. W. GIRLING, of Stradbroke, Suffolk, writes: "I have sent a pattern of black Silesia and Casban for your correspondent 'Hussar' in your last issue; it is sold by most drapers in the eastern counties, and is used for the backs of vests and coat pockets; price, sevenpence to ninepence the yard.'

D. THOMASON.—No matter what the focus or make of lens be, if both work at *f*-8 aperture the results will necessarily be similar as regards exposure, subject to the one of the lenses being possibly discoloured, which may be ascertained by unscrewing them and comparing side by side on a sheet of white paper.

ALVA.—Rochelle salt is a double tartrate of sodium and potassium, and may be obtained by neutralising a warm solution of cream of tartar with carbonate of sodium, and crystallising in the usual manner. To prepare cream of tartar, add tartaric acid in excess to a strong solution of potassium carbonate.

B. A. asks where Whatman's paper, recommended by "naturalistic" photographers, can be obtained unprepared? It is kept by all artists' colourmen, who will supply it in single sheets if desired. If large quantities are required, it may be obtained from the wholesale stationers. We understand that it is not supplied direct from the mills to consumers.

E. TODD says, in making up a sensitising bath with nitrate of silver and distilled water, there was a considerable turbidity, and, on exposing the solution to the light, it turned black, and a dark deposit settled down. He asks the cause, and if the bath is of any good?—The cause was impure water; but, if the bath be now filtered, it will probably work all right.

R. B. asks if a certain photograph, taken by ———, Brighton, in 1889, is copyright or not; and, if we cannot supply the information, where he can obtain it?—We certainly cannot say if the photograph is copyright, or if it is not. The only way to ascertain is to search the register at Stationers' Hall. Perhaps a polite letter to the photographer might elicit the desired information.

P. H. O. T. O.—You are quite right in your surmise. A great deal of the success in working either the Woodburytype or the Stannotype process depends upon the paper, which requires expensive appliances and great care in its manufacture. So far as our knowledge goes, it is not supplied as an article of commerce in this country. The most likely place for you to try here would be Waterlow & Sons. If they do not supply it, Liesegang, Düsseldorf does.

W. COX wishes to know by what process photographs can be produced on canvas so that they can be painted upon with oil colours? Such pictures can be produced by the powder process by coating the canvas with gelatino-bromide emulsion, or by the carbon process. The last two processes are those most in vogue at the present time. Of course, by either method there will be an intervening film between the canvas and the paint. This, in the case of the powder process, will be thinner than in either of the others, while with the carbon process—if a suitable tissue be employed—it will, though thicker, be of a more porous character. Hence the colour will penetrate it, and thus bond itself with the grounding of the canvas.

COMMENCING with Thursday evening, October 1, Mr. C. W. Gamble starts a course of lectures on *Technical and Practical Instruction in Photography* at the People's Palace Technical Schools, Mile-end-road, E.

IN our report of the Council meeting of the National Association of Professional Photographers last week we gave the name of Mr. Roxby as Treasurer. Mr. Roxby is an ordinary member of the Council, the Treasurer being Mr. John Crosby, of Rotherham.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, September 30, *Mounting and Framing.* October 7, *The Influence of Development on the Colour of the Deposit.* Last outing of the season, Saturday, October 3, Hampstead. Tea at the "Bull and Bush" at six.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—October 1, *A Perfect Emulsion* by a new method demonstrated by Mr. A. L. Henderson; visitors invited. October 3, final outing of the season to Hampstead, in place of September 26. Tea at the "Bull and Bush" at thirty minutes past six.

MESSRS. MORISON BROS., of Glasgow, send us a small book of pictures descriptive of the adventures of *The Ubiquitous and his Portable Dark Tent*, by W. Ralston. There is a formula for a laugh given on the front page, which we can heartily recommend from a practical trial of it. Mr. Ralston's are extremely clever and amusing.

IN addition to the bronze medal for excellence in workmanship in cameras awarded to them at the Glasgow Exhibition, Messrs. W. Watson & Sons have also received two diplomas of honour from the Antwerp Society, and a gold medal from Buda-Pesth. The diploma of honour ranks higher in value than a gold medal. We congratulate Messrs. Watson on their successes, to which the high qualities of their productions well entitle them.

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TONING BROMIDE PRINTS.

The suggestion to change the normal tone of developed bromide prints by means of an adaptation of the mercurial intensification process, which was recently made in the course of an article by one of our contributors, has brought us several letters on the subject, from which we gather that there is a growing desire, among professionals as well as amateurs, to have at their command the power of toning such prints. To what extent mercury bichloride would answer for the purpose it is difficult, for obvious reasons, to tell off-hand; and therefore we shall withhold any recommendation or endorsement of the plan suggested until we are in possession of some definite information as to the behaviour of prints so treated.

In the meantime, however, we may profitably glance at some points in connexion with the idea, as well as one or two features of some other toning methods, particularly as the subject is one which just now appears to be forcing itself forward for consideration. In another part of our present number there is a letter from a correspondent who has tried toning with mercury, but who finds that the finished print does not retain the sepia colour which the toning or, rather, intensifying operation imparts, but retakes the selfsame black hue which he seeks to change. Our correspondent does not give any particulars of his plan of working, and, therefore, we are at a loss to suggest any explanation of the change; but a little consideration will show that, notwithstanding the apparent simplicity of the operation, there is room for several modifications of it.

In the first place, we should hardly fancy that a picture developed by means of ferrous oxalate would form the most suitable basis for any toning action, seeing that the difficulty of toning an image of the normal colour which this form of development yields must be great, if not insuperable, and therefore we think it essential that this developer should be abandoned in favour of one capable of producing an initial tone that would be more amenable to taking a permanent sepia colour from the combination of the reduced silver with the intensifying agent. Such a tone would possibly be produced by giving a very full exposure, and employing a highly dilute hydroquinone developer.

It is at this stage that choice must be made of one of the two methods of applying the toning solution which present themselves. The picture may be toned, either before or after fixing. If the first plan is selected, the mercury solution will, of course, not be applied to the picture until the latter has been thoroughly washed and cleared. After the image is bleached, the hypo bath, besides dissolving out the unaltered bromide salt, will also "blacken" the bleached image. By this means sepia tones of a more or less pleasing and regular nature have been obtained. It is true that doubts have been cast upon the permanency of these pictures; but, if toning before fixing be adopted, and the washing between all the operations be conducted thoroughly and well, it seems to us that the chief elements of fugacity are entirely removed, and that the causes of the alleged lack of permanence must be sought in other directions. We say "alleged" advisedly, because, after all, the point has not yet, to our knowledge, formed the subject of any experimental investigations.

Toning *after* fixing, however, if not less likely to conduce to agreeableness of results than the foregoing method, undoubtedly menaces their permanency if the smallest trace of hypo be left in the picture; and, in the case of any carelessness in this respect, signs of fading in the toned prints may be looked for at a very early date, and, indeed, considerably earlier than in the case of negatives similarly treated. But this plan gives a choice of several reagents for "blackening" the bleached image, a dilute solution of ammonia being possibly preferable to sulphite of sodium for imparting a sepia tone. To conduce to regularity of results, however, the volatile alkali should be used at a fixed strength, otherwise variations in the colours produced must be looked for.

We drew attention to Mr. J. Weir Brown's toning process with uranium some months ago, and a reference to it at the last meeting of the London and Provincial Association prompts us now to remark, that for pleasing and artistic results it would so far be difficult to hit upon a more suitable and more reliable plan. One of Mr. A. R. Dresser's enlarged pictures in the current Exhibition has a most agreeable warm tone produced, we believe, by uranium; another of the pictures is also mercury toned, an almost opposite kind of result, namely, a sepia colour, being, of course, produced. Sepia tones are also producible by uranium toning, the principle of both forms of toning consisting in the solubility of the deposit in water, which allows of a considerable range from the warmest red-browns down to cold sepia. It may, we believe, be taken as established that the amount of detail visible in the toned uranium picture proceeds in the inverse ratio of the quantity of deposit left to change the original tone.

Writing on the same subject a few weeks ago, a correspondent, Mr. S. F. Blyton, mentions some interesting experiments in connexion therewith. The yellowish-brown image produced by development with hydroquinone and carbonate of soda takes a deep blue-black tone in a sulpho-cyanide bath, while by redeveloping a bleached image in hydroquinone-soda a brick-red colour appeared, which in turn changed to a chocolate-purple in the sulpho-cyanide bath.

Our correspondent's experiments contain the germ of an idea which we should like to see translated into an actuality. To be able by the one operation of development to control the colour of the resultant prints seems to us to be an ideal toning process, and we are disposed to consider that it is not alto-

gether impossible of achievement. We hear, indeed, that such a bromide paper is shortly to be placed on the market. The tone, we presume, would be controlled by the length of exposure as in an analogous process of printing by development.

It appears to us, from the foregoing synopsis of experimental work in the direction of altering the normal tones of developed bromide prints, that there are a number of means for achieving the most excellent and, at the same time, a great variety of results, which only require a little practical trial; and we hope to hear of further efforts to gain the desired end.

LINE SUBJECTS ON GELATINE PLATES.—II.

Now, the camera, whatever its interior be composed of, should be newly and perfectly backed with some dead material that is also really black. In addition to this, a mask or screen, with an aperture in the centre, should be fixed between the lenses and the plate, at such a distance from the former that only those rays forming the picture pass through the opening; in this manner, the rays that would be otherwise reflected from the sides of the camera are arrested and confined in a chamber of their own. But even the sensitive surface itself acts as a reflector, throwing off some of the light that strikes it on to the sides of the camera and on to the lens, which again assists in reflecting and diffusing this not only useless but injurious light. To counteract this as much as possible—for to altogether prevent it is impracticable—it is a good plan to insert a blackened cone inside the camera, the smaller open end being just the size of the plate, while the sides slope away from the sensitive surface, at such an angle as will reflect the smallest amount of light on to the surface of the lens. Without these precautions it is surprising how large a quantity of diffused light finds its way into the camera and on to the plate; and, though in the case of half-tone subjects the veil may be harmless, in the case of line subjects it has the effect we have mentioned, of filling up what should be the clear lines, and altogether preventing vigour and density. The simple precaution of the central diaphragm and inverted cone, which may be of blackened cardboard, will, on first trial, sufficiently convince the most sceptical of the truth of our remarks.

Just one other point of a partly mechanical nature may be referred to before we pass on to the chemical side. We have already alluded to the employment of a rapid rectilinear lens at full aperture as being detrimental to the best results. With a full aperture it, of course, admits a far larger proportion of light, and a still larger proportion or disproportion of that admitted light becomes reflected and diffused than would be the case if a smaller stop were employed. But this is not all. Not even the best of rapid lenses will cover anything like the size of plate they are intended for with equal definition at the edges and centre where the full aperture is used; consequently, the definition falls off towards the edges of the engraving, and each line becomes more or less "vignetted," or "fuzzy." In other words, it spreads beyond the bounds it ought to occupy, trenching upon the clear lines, which thus become partly filled up, narrowed, and veiled, if not altogether obliterated—a result which is, in most cases, blamed on to the poor gelatine plate.

As rapidity of exposure in such work as that under discussion is a matter of little or no moment, a sufficiently small stop should always be used to gain, at any rate, fair definition and clearness at the edges of the plate. But, even at the risk of still further extending the exposure, we would counsel the use always of the smallest stop available, as under such conditions the proportion of injurious to useful light in the camera is very greatly diminished, and the quality of result in consequence enhanced.

Turning from what may be called mechanical to chemical precautions, we may point out first of all the necessity for selecting a plate that is entirely free from fog, either chemical or otherwise. By chemical fog we mean that which is caused by overcooking in the manufacture of the emulsion, and is usually to be found in, or it may be said is seldom absent from, plates that claim a high degree of sensitiveness. In testing for it, it is not sufficient to pass a plate through the developer for the ordinary time without exposure, and then to wash and fix. The only fair way is to leave the plate in the developing solution for at least half an hour, completely covered up from light, and if, after well washing and fixing, it is free from fog, generally of a very granular kind, the plate may be passed as safe.

Light fog, as its name implies, is caused by the impact of light upon the films at some stage of their existence, and differs from the other in being more marked generally, though of a less granular character, and it has the advantage of being easily removable by proper means. Let a plate be tested from the batch to be used, and if, after half an hour's developing, it show signs of fog, place it for five minutes in the following solution:—

Bichromate of potassium	20 grains.
Bromide of potassium	5 „
Water	1 ounce.

After soaking for five minutes it should be drained, rinsed under the tap, and then placed to soak in water until, when tested with ammonio-nitrate of silver solution, it shows no further trace of chromates.

At this stage it is perfectly free from fog, at least such as is caused by light, though what has been called chemical fog usually fails to give way to this treatment. Two courses are open: either the plate may be exposed and developed while still wet; or, if there be a large number, it will be more convenient to dry them. In that case they may be reared against the sides of a large box, or on the shelves of a dry cupboard, resting on two or three thicknesses of blotting-paper. A safer plan is to first remove the surface moisture by "dabbing" the films with a perfectly clean, soft linen rag, free from "fluff." This prevents their drying unevenly.

If images of considerable density be required, the plates may be immersed for five minutes in a bath composed of a drachm of gallic acid in a quart of water previous to drying, the same precautions being observed to prevent unevenness of drying.

If good, slow commercial plates be selected in the first instance, there will be no necessity for this treatment.

PHOTOGRAPHERS often complain, and with good reason, too, of the piracy of their pictures by some of the illustrated periodicals, and imagine they have no redress. This is a mistake, as they have one, and a very substantial one as well, if they choose to put the law in force. There appears to be a disinclination on the part of photographers to take legal proceedings against this class of pirates, though, if they did, they would often recover heavy damages. Many of the illustrated papers pay large sums for the privilege of copying a painting; why should not a photographer receive something for permission to reproduce his pictures? A few prosecutions would

uickly put a stop to this kind of piracy. That photographers have remedy, the following case proves.

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t will be remembered that a few weeks back an injunction was pplied for in the Court of Chancery to restrain the issue of any urther copies of the *Daily Graphic* for the 31st ult., containing a opy of the plaintiff's photograph. The facts are these: The picture n question accompanied a letter from Lord Randolph Churchill, and epresented a coach being upset in South Africa. When the plaintiff, ir. Broad, saw the cut, he recognised it as being taken from his hotograph, and at once put himself in communication with the efendants, and applied to the Court for an injunction to restrain hem from issuing any further copies of that particular number of he paper. Since then, negotiations have gone on between the parties, nd it was announced in the Chancery Court one day last week that he following terms had been agreed upon: the defendants to pay he plaintiff agreed damages and costs as between solicitor and client, o further copies of the issue of the paper of the 31st of August to e printed.

Photographers, as we have just said, appear to be slow in putting he law in motion, possibly through fear of the expense. This does ot appear to be the case with painters, hence their rights are better espected than those of photographers. This subject should receive he attention of the National Association of Professional Photo-raphers. One of the objects of this Society, if we remember rightly, s the prevention of the piracy of photographs.

Notwithstanding the vast strides made in photography during the ast few years, the printing processes in every-day use stand just where hey did twenty or more years ago, so far as sensitiveness is concerned. With regard to silver printing, there is little inconvenience beyond he time occupied. If a print is not finished one day, it can be the ext, and that without serious deterioration. Not so, however, with ome other processes, in which hygroscopic conditions are a factor, as n the carbon and the platinotype processes. With each of these a rolonged exposure, particularly in damp weather, usually means arred, if not spoilt, prints. This not only causes delay, but neces-arily increases the cost of production—a serious item when large izes are concerned, and it is for these that both methods are so largely mployed. It is somewhat a matter of surprise that no attempt ppears to have been made to shorten the exposure in our ordinary nethods of printing. If it could only be reduced by, say, one-half, what a boon it would be during the coming winter months! Experi-nentalists would do well to give attention to the subject.

Anent the leader last week on the "Stability of Old Silver Prints," a correspondent calls attention to the fact that they were mounted on very different cards from those now supplied, and adds: "If these old pictures had been put upon some of the enamelled boards now used, there is little question, I think, that they would not have lived so long." He further says these pernicious mounts should not be made. We are quite in accord with our correspondent with regard to the first portion of his communication, though not in the last. Some tints in enamel boards cannot be obtained without the use of more or less injurious matter, and this is tolerably well known. Photographers demand these mounts; and manufacturers, of course, supply them. Who is to blame?

Our readers will remember the correspondence which took place in our columns last spring in connexion with Mr. F. H. Varley's alleged discovery of an extraordinarily sensitive compound, which, in its action under light and ferrous oxalate, exhibited characteristics strongly resembling a silver salt. We understood at the time that the com-pound did not contain silver, but the contrary now appears to be the case. We this week print a letter from Mr. Varley himself on the subject, which will, we are sure, be read with very great interest.

Some of the newspaper critics seem, even at this advanced date, unable to make up their minds what photography really is—whether it is a department of applied mechanics, a mere handicraft, or a printing process, only one remove from typography. To these it is still neither fish, flesh, fowl, nor good red herring. One of the writers, whose review appears elsewhere, says it is "nearly a science." "Nearly" means nothing. Either a thing is, or is not, in such a connexion at any rate. But the writer is sufficiently answered by another critic, who allows that photography "is a science of infinitely varied utility and application." True; and we are surprised that any enlightened newspaper man should be ignorant of the fact.

The *Times* and the *Standard*, in their notices of the Exhibition, are evidently under the impression that the same photographs may be shown at Pall Mall for a series of years. Some of the exhibitors this year, they say, received medals last year; *ergo*, they are now passed over by the Judges. Who can have been gulling our worthy contemporaries in this manner? Surely not a disappointed exhibitor!

Then the *Morning Advertiser*, besides unwarrantably investing the worthy President with the title of "Professor," goes on to complain that a certain gentleman's pictures are not hung, and that another, whose pictures *are* on the walls, does not receive a medal. It appears to us that this is travelling beyond the *rôle* of the critic. It is a censure of Judges and Hanging Committee, which, for the credit of our contemporary, we decline to regard as spontaneous or necessary. The *Daily Chronicle*, in a paragraph about the *soirée*, informs us that the Paget Company's highly ingenious plate-cutting machine was in operation on Saturday night. Was it? We can guarantee that between the hours of eight and ten the machine never moved an inch. Really, some of the utterances of the daily press on the Exhibition are as diverting as the *vivâ-voce* remarks of many of the uninitiated visitors thereto.

THE NEW METHYLATED SPIRIT AND PHOTOGRAPHY.

Methylated spirit seems to be a constant bone of contention between the Excise and consumers, and it would appear as if those in authority in that branch of the Inland Revenue begrudged the slight concessions made by a more generous legislature in the interests of the industrial arts. It may be true that there are beings with a taste depraved enough to use methylated spirit as a substitute for whisky. I was told seriously by a friend some years ago that in some parts of the north of Ireland it was *preferred* to whisky; but because one class of people brew, or rather distil such a diabolical "potheen" that raphtha is preferable to it, it is scarcely a valid reason for punishing honest folks by rendering an article of every-day consumption practically useless to them.

No possible complaint could be made when, five-and-twenty years or so ago, the Excise promptly "sat upon" Eschwege's patent for depriving methylic alcohol of its odour, for that was a direct interference with the law, inasmuch as it completely frustrated the purpose for which the methyl was added. But there was scarcely as much reason in the action which, a few years later, rendered it highly difficult, if not altogether impossible, to obtain for chemical or photographic purposes a sample of methylated alcohol of respectable strength or purity.

Up to that time, under the name of "methylated alcohol," it had been possible to obtain commercially, at the price of two shillings or half-a-crown a pound, a mixture of alcohol and methyl, which, while it often "graded" as high as s.g. 805, was pure enough to bear boiling with silver nitrate without producing much discolouration. However, for some reason or other, the Excise stepped in and forbade the sale of such combinations. The reason is not very clear, as the price alone was sufficient to condemn them as a *cheap* substitute for even indifferent potable spirits; but since that period photographers have been reduced to the necessity for using the commonest "burning spirit," with, of course, the alternatives of paying the price for *pure* alcohol, or else breaking the law by redistilling or otherwise purifying the vile preparations forced upon them. I have seen many a gallon of "methylated" "drawn over" by thrifty amateurs in the old collodion days, snowy weather being selected as the most convenient for

thus laying in a stock of pure spirit for summer use. I cannot say that I ever felt a very strong inclination to turn Queen's evidence.

Now we are threatened with a still further degradation of a fluid that has already, one would think, become vile enough. In your leader of a few weeks back, in announcing the new "regulations," you make comparatively light of the proposed alteration; and if, as you there state, the use of methylated spirit in photography were now "principally confined to varnish-making," the trouble would not be great, though, if I were inclined to "split straws," I might show that even for that purpose the addition of mineral naphtha is anything but a desirable one. But Mr. Warnerke has pointed out one important use which had apparently escaped your recollection, and for which the added mineral naphtha, small though the proportion be, totally unfits the spirit. It may be argued that plate-makers can afford to use pure spirit to make their emulsions flow, and certainly, working on an amateur scale, the annual addition to the cost of the emulsion would not be great. But turn to the professional, who, in the course of a year, uses up, perhaps, thousands of gallons of emulsion, containing from five to ten per cent. of alcohol, and calculate the difference in cost to him of methylated alcohol and pure. Taking the lower proportion mentioned above, and calculating on the average market prices of the two articles, the extra cost of pure spirit would be, at the very least, 50*l.* per 1000 gallons of emulsion; and, in these days of "cutting" prices and highest discounts, few plate-makers, I imagine, would view the change with equanimity.

The proposed addition—three-eighths of one per cent. by volume—does not appear very large; it represents the addition of three fluid drachms of the mineral naphtha to a large (100 ounce) Winchester of spirit, a quantity which might seem to be altogether "lost." But the sample of mineral naphtha has to be "approved" by the Board of Inland Revenue, and it may be safely assumed that they will not err on the side of too great purity in the samples they pass. Rather may we expect them to choose those which, from the pronouncedness of their character, have been rejected for every other purpose.

When we stop to consider what *can* be purchased under the far-spreading title of mineral naphtha, we begin to have an idea of what the new addition may mean. Taking highly rectified benzole as the type of the purest class of the article, there need be little ground for complaint, except on the score of difference in chemical composition and properties from the alcohol to which it is added. The "wood naphtha" so called, hitherto solely employed for "flavouring" methylated spirit, is itself an alcohol, and possesses almost identical properties with those of pure or ethyl-alcohol, and therefore, if itself fairly pure, can exercise no injurious effect by its admixture. Not so mineral naphtha, which is a hydrocarbon, and essentially distinct in almost every point from the liquid to which it is to be added.

However, "the Board" is not likely to pass or approve "benzole rect.," nor are methylators likely to select it for the purpose, on account of its cost. The far greater probability is that some of the crude sorts of paraffin oil or of the heavier petroleums will be selected, not only on account of their cheapness, but chiefly for their overpowering odour. I have no idea what the taste is like, but I have been in the hold of a petroleum vessel when she was unloading, and if the taste comes within the one-millionth of the pungency of the odour, I am prepared to admit that "the Board" has made a good move in the direction of stopping the use of methylated spirit as a beverage. But the very properties that render petroleum valuable for their purpose are those that most unfit it for photographic use. The samples of wood naphtha used in methylating are sometimes bad enough to render the spirit wholly useless for chemical purposes, but the capabilities of mineral naphtha in that direction are infinitely greater.

But, in addition to the impurity thus introduced into the spirit, there is the additional disadvantage of the uncertainty as to the nature of the impurity. I have purchased, from five different commercial sources, samples of "mineral naphtha," each of which has its own distinctive odour, varying from the "gassy" smell of the products obtained by the distillation of coal, to the indescribable *stench* of the natural petroleums. One sample is in no way distinguishable from common benzoline, while another possesses a faint aromatic odour similar to that of purified benzole. It is needless to say that each particular smell arises from a different impurity or series of impurities, so it is plainly to be seen that the purification or doctoring of a sam of methylated spirit of the future will not be an easy matter.

In the employment of such a compound for the purpose referred by Mr. Warnerke, the chief difficulties would arise from the fact mineral naphtha not being miscible with water, and the consequence adding it to an aqueous gelatinous emulsion can be studied by dipp a piece of bread and butter into a cup of hot tea. In one case minute globules of hydrocarbon, in the other of grease, will float the surface, and the character of picture obtainable upon a pl coated with such an emulsion can be better imagined than describ As regards chemical action of the impurities in such a case, there d not appear to be much fear, since the addition would only be m after the emulsion was complete and only insoluble silver brom present.

But let us turn from gelatine to collodion emulsion, in which alco is even a greater necessity. Of late years there has been considera trouble experienced in the obtaining of sufficiently pure samples the purpose; but, at least, those that were not perfectly suitable w purified with comparative ease. Here the difficulty is chiefly one *chemical* impurity, since the spirit must necessarily be subjected to action of free silver in the process of sensitising, while a portion o has to be actually boiled with the silver. Whether the impuri that are likely to react with the silver under such circumstances removable by the comparatively simple means already describe these columns, of "sunning" or boiling the spirit in the presence silver and alkali, or by means of potassium permanganate, I cannot say; but one thing is pretty certain, namely, that even redistillat will not get rid of the naphtha, which in its commercial form mixture of many different compounds having different boiling po and different specific gravities. Some boil much below the boil point of alcohol, while others have a boiling point higher than that water, so that short of fractional distillation, it would be impossible altogether eliminate them.

But another important point is the effect the addition will h upon the solubility of the pyroxyline, and, through that, on texture of the film. It is well known that the addition of a cert quantity of benzole to ordinary negative varnish causes it to "matt;" and I know from past experience that a very slight trac benzole in collodion suffices with some kinds of pyroxyline to prod an exactly similar result, besides introducing other physical troul resembling those in gelatine.

I have been unable, from pressure of other matters, to test effect of the new spirit, but I hope to take an early opportunity doing so, when, either in these pages or in the ALMANAC, I will rep the results.

W. B. BOLTON

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—I.

THE usual *soirée* of this Society was held at the Gallery, 5A, Pall M East, on Saturday evening, when the President (Mr. James Glais F.R.S.) received the visitors and members.

The primary thought which arises from the first impression of year's display of work is that of an advance in the direction greater skill in the production of artistic and pictorial effects, e cially by those exhibitors who have so unremittingly year after y shown the best results of their study in pictorial subjects. I singular that the tendency of the pictures is to become much sma than formerly.

The oldest outcome of photography is the portrait work, which c trasts very favourably with that of former years; there is evidenc a higher appreciation of treatment, which is not so violent as forme while possibly some more attention has been given to the study of painter's work in this direction. There is also a tendency to uti more dark backgrounds than formerly, the result being that attention is not distracted by secondary matters.

There are also many pictorial studies which show a desire produce figure combinations. These evince some skill in the hig work to which photography can be adapted, and include some s cessful illustrations of interesting subjects, but they do not sh that fresh workers have arisen. These studies involve good mod which require considerable skill in arrangement; but the fact t

some good work has been done shows that photography can entertain such subjects, and this year's exhibition gives evidence of the fact.

The landscape work is in many cases weak in choice of view and selection of studies; they too often form bits of scenes, rather than well-chosen and carefully studied effective work for photographic reproduction. At the same time the Exhibition contains some interesting work, which will, upon careful investigation, show that pictorial photography is steadily advancing.

We have on previous occasions adverted to the character of the frames, which this year do not *quite* so much destroy the pictures as formerly; at the same time there are still to be seen some glaring examples of incongruities in the colour of the photographs and the colours of the frames.

The tones of the photographs are warmer than they have been for many years. This not only gives a pleasant variety to the general effect, but assists each individual work. The general use of tinted mounts is very prevalent, and just avoids the harsh effects which formerly prevailed.

There are very few enlargements, but they are of a good quality, and not any of those portraits of immense size, which not only killed the smaller work, but did not enjoy too much artistic reputation.

We will now review the pictures, and those will be first noticed which have received medals.

No. 49, F. P. Cembrano, jun., *Sunset—Winter.*—This is a small sepia-toned print upon rough paper; but why, when the negative appears to possess very good detail, should it be printed upon a rough surface? The clouds do not harmonise in form with the outline of the distance. It may be strictly and absolutely correct that at sunset clouds are not always found which the artistic requirements of the composition demand, but then they need not be taken. The clouds in photographic work require great attention, as they sometimes appear much too dark, and come forward when they ought to retire.

No. 255, Mrs. Main, *A Frosty Morning—St. Moritz.*—There are four pictures in this frame, and, as they contain the right elements, viz., white and comparatively dark, for photographic reproduction, it only remains for us to notice the selection from the art point of view. They most certainly possess a good contrast for black and white, and are exceedingly well manipulated. The results merit the distinction which they have received, while the clearness of the detail deserves recognition.

No. 340, R. W. Robinson, *A Primrose by the River-brim.*—There are many other pictures similar to this one. The subject consists of a country scene, with three figures, all arranged with good design, but with one disturbing element, and that is the indistinctness of the distant stems and other parts of the trees. This arises from the lens not doing its work beyond the plane where the figures are fixed, so that the outline is confused; the result is a disturbance of the vision. It need not of necessity be sharp, but it would be better if it were not too fuzzy. The frames of the medal picture and several others of this series are about four inches in width and perfectly flat, and on certain portions some flowers and stems in a brown tone, all being in good relief. The powerful contrast these leaves show lowers the effect and realism which the figures and other parts should undoubtedly possess, and when six of such frames hang next to each other the effect is the reverse of artistic.

No. 453, W. M. Warneuke, *Miss L. Johnson as Desdemona.*—This picture merits praise for the softness of the flesh tones. It is a direct photograph, 24 × 10; but, although this undoubted good quality deserves attention, it scarcely realises Shakespeare's Desdemona, so that the scientific aspect gains the ascendency. The above-mentioned four pictures are all the photographs to which medals have been awarded.

No. 3, Gambier Bolton, F.Z.S., *A Captive Unconquered.*—This is a good study of a tiger, where the pose has been well chosen, resulting in a most realistic photograph, evincing great skill in the manipulation, which is very effective.

No. 27, W. R. Cassels.—There are two other studies of figure-subjects, where the prevailing arrangement is that of very light and clear definition. The treatment is well adapted for securing a bright picture. The title of this picture is *Dolly's Tea-party*, a homely subject, where three figures are guests of Dolly. The subject is treated very nicely, and is full of detail, but at the same time plenty of effect. Subjects like these, when good models can be utilised, seem to be almost the best adapted for excellent results.

No. 69, H. P. Robinson, *Through the Butter-bur.*—A very simple arrangement of nature, being a field with large leaves in the foreground, well defined and full of light, and a middle group of trees, showing a better definition than is usually to be seen. There is a lesson in the management of the highest lights, which come into the immediate foreground, and also contain some well-defined detail, whilst the whole selection and treatment evince an admirably well-carried-out artistic design.

No. 75, Lyddell Sawyer, *A Disciple of Diana.*—This is a bold attempt at a departure from this exhibitor's usual work. It is a partially nude figure of a man, whose attitude is exceedingly good, holding a spear above his head. The lighting is very effective, but just one matter must be noticed. Why should he pose in an attitude as if about to launch his weapon at some animal whilst in a room, where the usual curtain does duty? Otherwise, the position is very good, but the surroundings should have been more appropriate. No. 83 is another semi-nude figure, entitled *Vanity.* Here, also, the pose is good. The figure is seated on some studio property, and holding in one hand a round looking-glass, whilst the other hand is arranging the hair at the back of the head. These two pictures show that the exhibitor has ambitious notions of what photography can attempt, but much praise must be awarded to a classical design where the end can only be secured by good models and a good taste in carrying out the conception of the idea. So far, then, these examples justify the ambition of the exhibitor, and deserve some reward.

No. 88, J. P. Gibson, *The Road to the Mill.*—A pretty bit of scenery where some rising ground breaks the straight middle of the outline and the trees are not the same size: a very effective choice of natural arrangement. A most careful bit is a shadow of a large tree which goes right across the lower foreground, and helps the middle rather strong foliage to retire; one matter is not satisfactory, that is, the clouds, which do not harmonise with a pathway at the lower part of the scene. This turns downwards, and the clouds alluded to occupy the reverse position; this constitutes an artistic discord, which demands to be resolved into harmony. Some children have been placed in the right spot for giving powerful points of light. The picture is, excepting the clouds, exceedingly good in choice and treatment.

The Apparatus.—I.

The display of apparatus is much smaller this year than usual. So many novelties have been introduced since last year's exhibition that we felt justified in expecting to have seen some of them, but for some unknown reason or other, exhibitors in this department have proved exceedingly shy.

In lenses there are two well-stocked cases, respectively by Ross & Co. and James Swift & Son, but both these are locked up so as to preclude examination by the public. When, therefore, we say that the mounts are in brass and aluminium, that many sizes and various forms are represented, and that the finish appears all that one can reasonably desire, we have really said all that is deducible from the glass-covered exhibits.

In lanterns, one only is to be found—Archer's "Ideal." It is happily one of great excellence, seemingly well deserving of its name. The method of changing the slides is simple and effective; a lever handle is moved from side to side with the result that an opalescent wing covers the lens for a moment, during which a new slide is made to take the place of the one previously exhibited. This, of course, has been done before, but not in precisely the same way as in the "Ideal" lantern.

Mr. W. R. Baker's exhibits comprise his Tourists' Developing Tent, his Pocket Changing Bag, and his Parallel Trimmer. The last two have been very recently described in these pages. The first is a red-covered chamber formed of pliable textile fabric, having sleeves for the hands, and a mask for the face, through which the interior can be plainly seen.

There are only two cameras (other than hand ones) on exhibition. These are by Messrs. Morley & Cooper. They are of the Kinnear class, and are fine examples of the best London work.

The number of hand cameras is considerable, the majority being by W. Griffiths & Co., Birmingham, who show their half-guinea, guinea, two-guinea, and two-and-a-half-guinea instruments.

Of the various hand cameras exhibited it must, we think, be unhesitatingly admitted that for general utility and convenience the "Twin" Artists' Hand Camera of the London Stereoscopic Company is the best. It has two lenses, alike in every respect; one of these depicts the scene on a focussing screen of the same dimensions as the sensitive plate, so that the artist, looking down upon the ground glass, sees thereon exactly what is subsequently to be impressed on the plate, and on the same scale. Both lenses being operated by the same rack and pinion, focussing can be effected up to the last moment. This Company also exhibit two other hand cameras, and "The Photoscript," which consists of a small case of rubber-faced types and suitable holders, by which the title of a subject can be printed in opaque letters at the bottom of the negative.

The useful and popular "Perfection" and "Holiday" candle lamps of Messrs. Benham & Froud are among the exhibits. From an advertisement in Adams' *Photographers' Indispensable Monthly* we learn that the "Holiday" lamp has now become the property of Messrs. Adams & Co. The "Aerial Graphoscope" of Mr. E. S. Bruce consists of two arms, or laths, capable of being rotated with great velocity; but we are entirely at a loss as to its *raison-d'être*. If it be intended to form a gauzelike screen on which to project a lantern image, then, assuming the image to be focussed at that plane, what of the large volume of light that is transmitted through it and falls on the wall or background behind, necessarily out of focus?

When noticing the "Nameit" of Mr. A. Gray a few months ago we spoke of the services capable of being rendered by his movable types in printing names upon negatives. His latest improvements in this are now to be seen on the table in the exhibition.

PHOTOGRAPHIC CHEMISTRY.*

The action of light on the salts of copper forms a convenient introduction to the photo-chemistry of the silver salts. Thus, cuprous chloride darkens, on exposure to light, with as great a rapidity as silver chloride. It may be pointed out that the nature of the decomposition in this case is not completely understood. Wöhler conjectured that the product might be an oxychloride, and this view receives support from the circumstance that cuprous chloride does not darken under hydrocarbon oils or other liquids which do not contain oxygen. A. Vogel assigns a formula $-CuCl_2$, 3 CuO; but the subject requires further investigation.†

A general discussion of the subject of photo-chemical decomposition, as illustrated by the foregoing and other examples, will enable the student of photographic chemistry to grasp the broad idea that modern photographic processes represent only the special applications of wider principles, and that photography with silver compounds may be but a passing phase in the history of the art. In the present state of knowledge, no rigorous classification of the cases of photo-chemical decomposition is possible, and it is only necessary to point out, and to illustrate by an appeal to some of the many known instances, how difficult it is to draw a hard-and-fast line between photo-chemical decomposition and photo-chemical combination, or between decomposition and dissociation under the influence of light. Many of the supposed cases of dissociation may be dependent on the presence of another substance capable of combining with one or the other of the liberated products, and thus playing the part of a sensitiser in relation to the present subject. From such considerations as these, it will follow that in all modern photographic processes we have to deal with a mixture of chemical compounds capable of passing into a more stable system under the influence of light as a source of external energy. If the new products formed in this way are so acted upon by reagents subsequently applied that a visible and striking colour difference is produced, or if the new product differs in colour from the original substance or mixture of substances, we have all the essentials for a photographic method.

When discussing photo-chemical decomposition it should be pointed out that indirect results are often obtained by using a mixture of substances of which one of the constituents is not directly affected by light, but is altered by contact with the product resulting from the photo-chemical decomposition of the other constituent of the mixture. For example, paper, coated with ferric chloride and exposed to light, gives a surface of ferrous chloride by photo-chemical reduction, the size or cellulose of the paper acting as the sensitiser (chlorine absorbent); but, if the surface is coated with a mixture of ferric chloride and cupric chloride, the ferrous chloride which is formed reduces the cupric salt with which it is in contact:—

$$2\,FeCl_2 + 2\,CuCl_2 = Cu_2Cl_2 + 2\,FeCl_3.$$

The picture is thus formed in cuprous chloride, instead of in ferrous chloride, and, by treatment with potassium thiocyanate, cuprous thiocyanate is formed, which, on subsequent treatment with potassium ferricyanide, leads to the development of a brown print. This method of utilising a mixture of ferric and cupric salts is the basis of Obernetter's process.

There can be no doubt that this principle of indirect decomposition is destined to play a very important part in the photography of the future. It has already come into prominence in the well-known platinotype process of Willis, in which a surface is coated with a mixture of ferric oxalate and potassium chloroplatinite. On exposure to light, ferrous oxalate is formed, while the chloroplatinite is not directly reduced. On treatment with a hot solution of potassium oxalate the ferrous oxalate is dissolved out, and, at the moment of solution, reduces the chloroplatinite to finely divided platinum *in situ*. In the direct-printing platinotype process we have a surface of potassium chloroplatinite, sodium oxalate, and sodio-ferric oxalate. In this case the reduction of the ferric salt by light is accompanied by the indirect reduction of the chloroplatinite by means of the ferrous salt thus formed. In the cold platinotype of Willis the operations are separated, the ferric surface being first exposed in the usual way, and then development being effected by immersion in a cold solution of potassium chloroplatinite containing potassium oxalate and phosphate.

The discussion and illustration of indirect methods of decomposition, as illustrated by the platinotype processes, may advantageously occupy the student's attention at this stage of his work. The chemistry is comparatively simple, and many experimental illustrations will obviously suggest themselves to the teacher. R. Meldola, F.R.S.

—*Journal of the Society of Arts.*

ELECTRO-CHEMICAL REVERSALS WITH THIO-CARBAMIDES.

At the meeting of the Society in August last, I exhibited some specimens of a curious reversal of the photographic image produced by adding small quantities of thio-carbamides or sulpho-ureas to the ordinary eikonogen developer, and showed that, although reversal of the image was by no means uncommon, it was usually caused by over-exposure, or some other abnormal action of light, whereas to produce these new reversals even less than the ordinary exposure was sufficient, and they appeared to be entirely due to some peculiar action of the thio-carbamide added in very minute quantities to an alkaline eikonogen developer.

At that time I was quite unable to offer any opinion as to the probable cause of these reversals, or as to how they were produced, beyond stating the probability that, although there were many points of difference, they would be found to be in accordance with the generally accepted theory worked out by Capt. Abney, and were due more or less to oxidation or rehalogenisation of the exposed parts of the film, and that, owing to the peculiar reducing action of the alkaline thio-carbamides, the film during development was practically in the same state as if it were over-exposed. It seemed also probable that sulphur was the active agent in producing the reversals.

Further work with these curious salts, and especially with a compound salt of thio-carbamide and ammonium bromide, discovered by Professor J. E. Reynolds, in 1868, and called by him tetrathiocarbamid-ammonium bromide, which was found to be exceedingly active in producing perfect reversals of the image with very short exposures, led me to the belief that this complete change of deposit from the lights to the shadows of the photographic image must be more or less due to electro-chemical action. The subject of electro-chemistry is one of which I have little knowledge, but I have been able to make some simple experiments from which, though not conclusive, it seems probable that my surmise is correct, and, so far as they go, they seem to establish that not only, as former observations by Lermontoff, Eder, and Abney had shown to be probable, is the ordinary process of photographic development of sensitive surfaces containing silver haloids, accompanied by electrical action, but that the addition of these minute quantities of thio-carbamides to the developer greatly increases the intensity of the electrical action and produces a reversal of the current which should also account for the reversal of deposit.

With the aid of a very sensitive galvanometer, which has been kindly lent me by the Rev. Fr. Lafont, S.J., who also assisted me in the experiment, it was found that when a pair of pure silver plates, coated with finely precipitated silver bromide, one of which had been exposed to light and the other not, were connected to the galvanometer so as to form a galvanic couple, and immersed in the ordinary eikonogen developer, the exposed plate formed the negative pole, and the needle was deflected to

* Continued from page 620.

† See Dingler's *Poly. Journ.*, vol. cxxxvi., p. 238; also Carlemann, in *Journ. für Prac. Chem.*, vol. lxiii., p. 475.

ne left; whilst, in the developer containing a little thio-sinamine, the xposed plate formed the positive pole, and the needle was deflected to ne right.

This experiment has been successfully repeated several times with ilver plates prepared in the same way and with other thio-carbamides, lso with silver plates, bromised by dipping them in bromide water; and o far the occurrence of the reversal is well established. I propose to epeat the experiment before you, though I cannot be certain of success. *The reversal was successfully shown with bromised plates, the image of the eedle and scale being projected on the wall.)*

I have also tried the same experiment with ordinary dry plates, endered conductive in various ways, the best of which appears to be old leaf, applied either on the face of the film or behind it. Gelatine ffers very great resistance to the current, and, though I have obtained istinct evidence of currents in both directions, they are not always bservable, nor is it yet quite certain that they are caused by electrolytic ction within the gelatine film, and further investigation as to this is ecessary.

I have also found that the reversals of the reduction products, somehat similar to those obtained by photographic methods, may be obained entirely without the agency of light by passing a current from a ingle bichromate cell through a pair of silver plates coated with silver romide and immersed in eikonogen developers prepared with or without hio-carbamides. In this case the plate attached to the carbon pole in he plain developer showed only a very little black deposit, whilst the late attached to the zinc pole showed a very strong dark deposit all ver. A pair of similar plates immersed in some of the same developer, o which a few drops of a solution of thio-sinamine had been added, howed quite different results, the plate attached to the carbon pole howing a strong black deposit, while the plate attached to the zinc pole vas almost clear on the face and free from deposit, showing only a slight arnish, caused by sulphur. I have some plates of this kind here, though he reversed effect is not quite so strong as it was on my first plates. I ave found it difficult to obtain such marked reversals again, though I uite believe they are obtainable, and the best conditions for securing uccessful results have yet to be ascertained.

Some similar effects were produced on Eastman's bromide paper and n ordinary dry-plate films attached to the silver plates.

Although results obtained with silver bromide on silver plates are not uite comparable with those obtained with ordinary gelatine plates, these xperiments show that, under favourable circumstances, the action of leveloping solutions on silver bromide is accompanied by distinct electric ction, and that these thio-carbamide reversals may be produced by lectrical methods, and are attended by a reversal of current. How this eversal of current is brought about is not yet quite clear, but seems to e explained by some observations on metallic sulphides, by W. Skey, ecorded in vol. xxiii. of the *Chemical News*. He found that sulphides which have the power of conducting can also generate electricity, and hat silver sulphide is positive to metallic silver. In a battery consisting f a sulphide and a metal in acidulated water, the gas liberated is ulphuretted hydrogen, the nascent hydrogen exerting a desulphurising ction upon the metallic sulphide, the ultimate effect of which is in some ases to completely reduce the mineral to the metallic state. He shows, lso, that these sulphides are capable of performing the functions of the egative element of a galvanic couple.

It seems probable, therefore, if electrolytic action does take place in elatine films during the process of photographic development, that, ccording to the laws of electrolysis, with the ordinary developers the xposed parts of the plate form the negative pole, and attract the metallic lements and hydrogen, while the bromine, or other halogen and acid adicals, with the hydroxyl, go to the unexposed parts forming the positive pole.

On the other hand, with the alkaline thio-carbamide developers, at the ame time that silver is reduced on the exposed parts, silver sulphide is ormed on the unexposed parts, which then become the negative pole and ttract the sulphur, the hydrogen, and some of the silver from the exposed arts, while the halogen and hydroxyl pass to the positive pole, and ransform part of the remaining silver into silver haloid, which is dissolved in the fixing bath.

Although this theory, as stated in a rough way, seems to agree fairly ell with the facts, and, from the experiments I have made, seems probably the correct explanation of the reversals, I do not feel myself yet ble to put it forward authoritatively, and a great deal of further investigation is required. The subject is a very difficult one, beset with uncertainties, and requires more time and close attention than I have been ble to give for working it out fully.

The theory that photographic action is accompanied by electrical phenomena is no new one. Becquerel found that, if silver plates coated with silver bromide or other haloid silver salts were electrically connected and immersed in dilute acid, and light was allowed to fall upon one plate while the other was screened, the effect of the light was marked by distinct electrical action capable of deflecting the needle of a galvanometer. Professor Minchin has recently found that the same effect is produced on silver plates coated with silver haloids in emulsions of gelatine or collodion, and immersed in very dilute solutions of alkaline bromides, iodides, or chlorides. He has also found that, if silver plates coated with a silver bromide emulsion in gelatine are attached to the poles of a battery, and half immersed in a weak solution of potassium bromide, the film attached to the carbon pole was visibly blackened on its immersed part, while no visible effect was produced on the other; but, on developing this plate with pyrogallic acid and ammonia, its immersed part also became dark, exactly as if it had been exposed to light for a few seconds.

There is a good deal of other more or less direct evidence that an electrolytic action takes place during development, although, so far as I can ascertain, no observations of the currents with a galvanometer are recorded. Comparatively little attention has, however, been given to the question, and electrical or electro-chemical action has never been looked upon as a principal factor in the production of the photographic image. From these new results it would appear that, at any rate as regards the silver haloids, the formation and development of the photographic image is, to a very great extent, influenced by electrical action, if not actually caused by it. It has lately been found that electro-chemical reactions have explained many obscure points in ordinary chemistry, and it seems likely therefore that further investigation of photographic action by the light of the most recent electro-chemical theories would also throw light on much that is now obscure and uncertain as regards the formation and development of the invisible photographic image. Professor Meldola, in his *Chemistry of Photography*, notes these micro-electrical phenomena in photography as subjects for further investigation, and I hope these experiments may prove a useful contribution to the investigation.

COLONEL J. WATERHOUSE.

—*Proceedings of the Asiatic Society of Bengal.*

Colonel Waterhouse sends us the following addendum to the above:—

"In some recent experiments I have obtained indications of an electrical current with an E. M. F. amounting to ·09 volt during the development, in ferrous oxalate, of an ordinary celluloid dry-plate film (Thomas's thickly coated landscape) exposed in the ordinary way upon a landscape with sky and trees, the sky (−) end being attached to one pole of the galvanometer and the tree (+) end to the other. The film was previously moistened with a five per cent. solution of potassium bromide, and the ends were held between silver clips attached to the conducting wires, but not allowed to touch the developing solution."

THE DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

[*Daily Chronicle.*]

THE private view yesterday of the annual exhibition in connexion with the Photographic Society of Great Britain, at the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, was largely patronised. The exhibition will be opened to the public on Monday next, and will remain open until November 12. Four evenings a week the admirable collection may be inspected till ten o'clock, so that every class of society will have an opportunity of witnessing the latest developments of the photographic art. Photography of late years has almost become a science, and the marvellous improvements now perfected render a display of camera results not only highly interesting, but vastly instructive. Absolute novelties, perhaps, become numerically less every year, but still solid advance is perceptible, and this is due in a large measure to the fostering care during the last thirty years of the Photographic Society of Great Britain and kindred institutions. The exhibition under notice is not quite so strong as compared with the total of entries and exhibitors last year, but the walls are decorated with work of equal merit, if not in some cases of decidedly better quality. There are 200 exhibitors, with upwards of 700 entries catalogued, and many of these show enviable efficiency. The judges are Messrs. J. E. Austin, F. Hollyer, P. H. Newman, F. M. Sutcliffe, and J. B. B. Wellington, and the fact that they have awarded only four medals this year, instead of ten or twelve, as usual, for purely artistic work, irrespective of the process employed, is proof merely that they have resolved to do all they can to still further raise the standard of present excellence. This action will, doubtless, be much criticised; but, if it has the effect desired, the Society and exhibitors alike will have reason to congratulate themselves. No distinction is made by the Committee between amateur and professional work, so that any preference over the trade must be considered highly complimentary to the

successful amateur. Nearly all the studies consist of platinotypes, and the whole of the prints show a tendency towards warmer tones, the old silver tints having already gradually given way to black plates. Altogether, eight medallists have been selected. One of these coveted awards falls to Mr. F. P. Cembrano, jun., for his artistic production of a winter sunset. *A Frosty Morning—St. Moritz*, sent by Mrs. E. Main, widow of Colonel Burnaby, has gained distinction by the exquisite rendering of the snow; while Mr. R. W. Robinson takes another medal with *A Primrose by the River-brim*, one of a series of thirteen choice photographs, rather spoilt by a novelty in the way of frames. Mr. W. M. Warneuke also comes into the honours list with a direct photograph of Miss Laura Johnson as Desdemona, perhaps the finest thing in enlarged pictures in the room. Hermann Vezin as Othello and Hamlet are sister exhibits of superior quality by the same artist. *Outward Bound*, an autogravure from a painting by F. Brangwyn, in the Royal Academy last year, is shown by Mr. Walter L. Colls, and carries off a medal for the clever process by which it is reproduced. A series of six very clear transparencies, or lantern slides, representing the *Sons of Neptune*, credit Messrs. G. West & Son with the medal offered for that particular branch of work, and similar distinction is awarded to the Paget Prize Plate Company for an ingenious glass-cutting machine for cutting photographic dry plates. It is capable of producing per hour 400 dozen quarter-plates and 200 dozen half-plates. Among the general exhibits attracting attention is a series of beautiful studies by Mr. Lyddell Sawyer. One of Mr. J. Pattison Gibson's fine pictures has been medalled all over the country, but somehow the Judges here passed it over. Mr. A. Horsley Hinton exhibits great promise, and technically his pictures are very good. Mr. J. Gale has some lovely things, the most noticeable being *In the Orkneys after Sunset*. The Judges lingered over Mr. A. Burchett's charming productions, but reluctantly had to pass on to something a trifle better. A number of views of the Manchester Ship Canal works by Mr. T. Birtles possess the merit of artistic beauty and a permanent record of a practical kind. Mr. J. Collier, Birmingham, has also some most useful subjects, and other artists deserving mention are Messrs. F. d'Arcis, A. R. Dresser, F. Hollyer, senior and junior, C. H. Cooke, H. Baker, S. N. Bhedwar, J. Stuart (interiors by magnesium flashlight), H. Flather (pretty "dry point" or needle-finished carbon enlargements), E. Sanger Shepherd (negatives taken on colour-sensitive plates), C. B. Moore (negro subjects), while Mr. W. W. Winter, of Derby, shows a great advance on most things done in portraiture. One of the most interesting exhibits is that explanatory of Dr. Jeserich's method of detecting forgery and other crimes by means of photography, thus showing the practical use to which the art may be applied. Excellent portraits are contributed by the London Stereoscopic Company, Messrs. Van der Weyde, Window & Grove, W. J. Byrne (Richmond), and enlargements by the Woodbury Company, Autotype Company, Messrs. Elliott & Son, and others in the trade. There is also a collection of photographic apparatus, though containing nothing very new.

[*Daily Telegraph.*]

If the ever-growing interest taken by amateurs in the practice of photography both as an art and a pastime be remembered, there are many points of general attractiveness in the exhibition about to be opened at the Gallery of the Royal Society of Painters in Water Colours, under the auspices of the Photographic Society of Great Britain. Notwithstanding the disadvantage a display of this sort labours under—for with a variety of specimens and types it is impossible to attain the warmth and glow associated with a collection of paintings—there are many features to please not only those concerned in the fuller development of mechanical processes, but also a larger body ready to acknowledge and appreciate artistic productions in a finished state. An intimation is given that the pictures, except in a few specified instances, are in platinum or albumen, and the range of subjects extends from portraits of a high class to idealistic scenes, many of them exhibiting great skill in conception and execution. We are shown photo-micrographs of blood, and illustrations of the detection of forgery by photographic media. The *At Home* portraits include many well-known personages in royal, political, and theatrical circles. Sea, sky, and water pieces abound, although in pure numerical strength the resources of the exhibition are not quite so strong as they were last year. A medal is awarded F. P. Cembrano, jun., for a sunset view in winter, and Mrs. E. Main receives one for a picture of *A Frosty Morning at St. Moritz*. R. W. Robinson is similarly honoured for *A Primrose by the River-brim*, and W. M. Warneuke obtains his medal for a life-like presentation of Miss Laura Johnson as Desdemona. Others are earned by the Autotype Company for an autogravure of *Outward Bound*, the picture shown at the Academy twelve months ago; by F. L. Colls, for six copperplate photo-etchings; by G. West & Son for lantern slides; and by the Paget Prize Plate Company for machinery for cutting photographic dry plates, to work by hand or power. The exhibitors number 240, and their works are judged by Messrs. J. E. Austin, F. Hollyer, P. H. Newman, F. M. Sutcliffe, and J. B. B. Wellington. All parts of the kingdom are represented in the exhibition, where a disposition towards warmer tones than have generally prevailed may readily be recognised.

[*Daily Graphic.*]

The annual exhibition of the Photographic Society of Great Britain, which will be opened on Monday, at the Galleries of the Society of Water Colours, 5A, Pall Mall East, will be found to be an interesting display, as it marks a certain advance in photographic art, and indeed, in son respects, is decidedly better than that of last year. The landscapes a numerous, and many are admirable in their simple delicate effects, whi the picture studies have very materially improved. These facts are n to be measured by the short list of only seven medals which have bee awarded this year, for many photographs which, two years ago, wou have received prizes almost at sight have, in the present display, bee left undistinguished after careful scrutiny by the Judges. To this offi the members of the Society elected Messrs. J. E. Austin, F. Hollyer, P. H Newman, F. M. Sutcliffe, and J. B. B. Wellington, and their aim seem to have been to discourage the practice of "retouching." This, indee was one of the chief standards of their decisions, and there is no doul that it will commend itself to true photographic artists, to whose eyes plate of original merit is infinitely more precious than one indifferent the outset, but afterwards turned into something showy and superficiall striking by technical *tours de force*, not necessarily branches of legitimat photography at all. There is obviously a reaction against the colo pale grey, which in the earliest stages of the platinotype process wa looked upon as its chief beauty, and the richer warmth of the deep sepi shades, derived from gold or albumen tonings, is certainly coming back t favour.

To come, however, to individual pictures, Mr. F. P. Cembrano secure one of the Society's medals with a beautiful little study of a winter sur set, printed upon a coarse-textured yellow paper, and which has the quali ties of a fine etching. Bold and broad are the scenes upon the Esse marshes done by Mr. A. Horsley Hinton, who used a "pin-hole" instea of the lens, and another pleasing series of scenes in the Orkneys is sen by Mr. J. Gale. Mrs. E. Main won another of the medals for her fram containing four studies of *A Frosty Morning at St. Moritz*, in which th difficulties of photographing snow well are most satisfactorily overcome and no one can fail to appreciate the reasons which obtained a medal fo Mr. R. W. Robinson's figure and landscape study called, *A Primrose b the River-brim*. The delicate distinctness of the former, and the sof distances of the latter, were mainly the qualities for which the distinctio was bestowed. The choice for the medal to be allotted for the portrai section lay between a charming group by Mr. Van der Weyde of th Countess de Grey, Lady Helen Vincent, and the Hon. Mrs. White i *poudré* costumes, and a strong and life-like portrait of Miss Laura John son as Desdemona, by Mr. W. M. Warneuke. Ultimately it was awarde to the latter, as Mr. Van der Weyde's picture had been exhibited i London, and was, therefore, not entitled to enter into competition. Ver noteworthy, too, were a set of studies of interiors made by Mr. J. Stuar which owed a large share of their clear breadth of outline and rich almost Rembrandtesque, shadow to the use of a very much larger mag nesium flashlight than is usually employed. Especial mention als should be made of Mr. Lyd. Sawyer's admirable artistic figure studies the strong and picturesque effects of which have evidently been obtaine by the skilful use of the magnesium flashlight.

Mr. A. R. Dresser's series of bromide studies, made with a hand camer and enlarged from the quarter-plate, formed a good pictorial group, an some pictures of the works upon the Manchester Ship Canal were suffi ciently detailed to be of practical engineering value. Two medals wer awarded for process work, one of which went to the Autotype Company' autogravure reproduction of Mr. F. Brangwin's picture, *Outward Bound* and the other to six copperplate photo-etchings from negatives fro nature by Mr. F. L. Colls. That for transparencies for lantern slide fell to Messrs. G. West & Son, whose illustrations of man-of-war lif bore the lantern enlargement most satisfactorily.

Of photographic curiosities are one or two of interest to be noted. Th catalogue does not, unfortunately, as yet contain explanations of Dr. P Jeserich's remarkable series, showing how photography may be mad available for the detection of forgery; but it is understood that he employ plates sufficiently sensitive to record differences in ink absolutely invisibl to the human eye. Prints may be made from these showing the altera tions made in dates, for instance, in red upon the brown over whic it has been fraudulently written. Mr. Flathers' carbon enlargements o "dry points" are most truthful reproductions of a stippled background and there are two examples of F. Haufstaengel's colour-plates.

[*Morning Advertiser.*]

The annual exhibition of the Photographic Society of Great Britain which opens its doors to the public this morning, was formally inaugurate by the customary *soirée* on Saturday evening, when the President of th Society, Professor Glaisher, F.R.S., and the Council received their friend at the Society's rooms, 5A, Pall Mall East.

Last year's exhibition was specially interesting on account of the nev printing processes employed by many of the exhibitors. This year ther is no further progress in this direction to record, but evidences are no wanting that there is a tendency to somewhat warmer tones in the print than the delicate steely grey-black of the platinotype, and that sepia an warm crowns are growing in popularity, while many of the best and mos artistic photographers are using very rough-surfaced papers on which t present their work, while the old albumen process, with its familiar purpl tone and high glaze, has been almost entirely abandoned in favour of it more artistic matt-surfaced rivals.

Glancing first at the pictures to which the Society's medal, the "Blu Ribbon of Photography," has been awarded, we are led to the conclusio

that the Judges, Messrs. Austin, Hollyer, Newman, and Wellington, have sternly set their faces against working on the print by paint or otherwise, as there are many admirable pictures which a year or two ago would have certainly been medalled, but have this time been passed over without recognition.

Mr. F. P. Cembrano well deserves the medal for his exhibit. It is most artistic, as is all the work of this talented amateur, but we should have preferred to see the award go to No. 47, *A Sussex Farm*, rather than to the picture to which the judges have assigned it.

Mrs. Main's frame, *A Frosty Morning—St. Moritz*, has presumably been medalled for the clever rendering of a difficult subject, a mountain snow scene. Mr. R. W. Robinson, who receives an award for No. 340, has very greatly damaged the general effect of an otherwise fine exhibit by the gaudily decorated frames in which his pictures are placed.

The Autotype Company and Mr. Colls both receive awards for their examples of photo-engraving processes. These processes have been much improved of late years, and will no doubt become very popular, but the difficulties of working prevent any extensive use of them by amateurs. The lantern-slide medal goes to Messrs. West & Son for a series representing men-of-war and marine subjects.

The plate-cutting machine of the Paget Dry Plate Company is worthy of the medal assigned to it. It is a masterpiece of mechanical ingenuity well adapted for the purpose for which it was designed. The medal for portraiture is awarded to Mr. Warneuke for a fine portrait of Miss Laura Johnson as Desdemona. Amongst the pictures which have not received recognition at the hands of the Judges, but are worthy of careful examination, are to be found a very fine set by Mr. Ennis, some clever figure studies by Mr. Cassells, Mr. A. R. Dresser's series of enlargements from hand-camera negatives, and the magnificent specimens of portraiture by Messrs. Winter of Derby, Byrne of Richmond, and the large direct portraits of the London Stereoscopic Company. Mr. Horsley Hinton has a series of very bold and artistic representations of the scenery of the Broads. Why he has not received a medal we are at a loss to know. Mr. J. Gale sends a series of his charming figure subjects and some sea and sky effects from the Orkneys. Mr. H. P. Robinson is represented by three pictures, of which we like *The Fisherman* the best. Mr. B. G. Wilkinson's *Bookworm* is well thought out and cleverly executed, and although a departure from his usual style is worthy of the exhibitor. The Duke of Newcastle has four exhibits. His Grace is much more successful with landscape than animal work. Mr. M. J. Harding sends a very charming series of tiny views taken with a pocket camera. Mr. Lyd. Sawyer's flashlight groups are admirable in every way, and Mr. Maskell, whose pictures are not for competition, shows us what artistic work can be done with a pinhole instead of a lens. There are many other exhibits which are worthy of more than passing recognition, but which we have no space to mention individually. Mr. George Davison has seven pictures in the catalogue, but they are not to be found on the walls. This is disappointing as Mr. Davison stands in the very first rank of artistic photographers, and the annual exhibition of his pictures is always looked forward to with the greatest interest. Dr. Jeserich sends some very interesting illustrations of the detection of forgery by photography, and Colonel Waterhouse some interesting examples of the reversal of the image by his newly discovered thio-carbamide process.

The exhibition, although hardly up to the Society's usual high standard, is well worthy of a visit from all interested in photography, and who nowadays is not? The ease and simplicity of modern photographic operations have caused a large influx of "men with cameras" into the ranks of amateur photographers. There are, unfortunately, many examples of their work in the exhibition—many photographs which have no special merit, either technical or artistic, and to which the Hanging Committee might have refused wall space, to the very great benefit of the exhibition as a whole; but, on the other hand, there are to be found some real pictures, bold, and, we are bound to add, successful attempts to answer in the affirmative the much debated question, Is photography worthy to be considered a fine art? Fortunate it is for photography that so many able men have chosen the camera and lens rather than the brush or the etching needle with which to convey to us their artistic impressions, but at the same time the very excellence of their work throws into higher relief the lack of artistic training and feeling of the ordinary photographer, and teaches us that the highest success in photography depends not on having the very latest pattern of camera and shutter, but on the trained intelligence, the artistic perception, and the technical skill of the users of those instruments.

[*Times.*]

The exhibition of the Photographic Society of Great Britain, which opens to the public this morning in the rooms of the Royal Water Colour Society, in Pall Mall East, is of great interest, both from the artistic and the scientific point of view. As each year goes by, we see new improvements, arising from increased chemical and physical knowledge, and new efforts to attain, by means of the camera, the effects which have been thought to belong exclusively to the palette and the brush. Amateurs and professionals compete in both of these fields, and it is difficult to say which class obtains the greater measure of success. Perhaps, as is natural, the scientific advance is most conspicuous in the case of certain men of science who have taken photography as part of their province—such men as Colonel Waterhouse, the Assistant Surveyor-General of India, and Dr. P. Jeserich, a German who has devoted his attention to the development of photography as a means of assisting the administration of the law. The screen which contains Dr. Jeserich's plates (618) is one of the chief curiosities of the exhibition. He has shown, by enlarging photographs taken upon sensitised plates, that it is possible to detect certain kinds of forgery in the most unimpeachable way; for example, where a figure or a word has been altered—and this is one of the commonest kinds of forgery—the different inks employed appear in the plate in quite different colours. Similarly, where a name has first been written in pencil and then traced over in ink, however carefully the pencil marks have been erased, some faint traces of the plumbago are sure to remain in the interstices of the paper, and these are revealed in the magnified photograph. Dr. Jeserich's photographs of hair, and of pure and impure blood, before and after treatment with reducing agents, are also most curious, and several stories are told of the use that has been made of them in murder trials in Germany. Colonel Waterhouse's services to science are known to all photographers, and the autotype enlargements of his photographs of Egypt and of the Botanical Gardens in Calcutta will be looked upon with interest. Other objects of scientific importance are the very ingenious invention of Mr. Eric Stuart Bruce, which he calls an Aerial Graphoscope, and the Paget Prize Plate Company's newly invented machine for cutting photographic dry plates. The business done in photographic plates is already something enormous; their annual value, in this country alone, is said to amount to more than a quarter of a million sterling, so that it seems worth while to introduce labour-saving machinery into this as into other industries.

Very few medals have been given this year, and a good many of the best photographs have been passed over by reason of the exhibitors having received medals in former years. But no one can doubt the claim of Mrs. Main's *A Frosty Morning—St. Moritz* (255) to the honour which it has obtained, for this little group of snow scenes is one of the most exquisite examples of artistic photography that has ever been exhibited. Another well-deserved medal is gained by Messrs. G. West & Son for a delightful series of lantern slides illustrating yachts in motion and groups of men-of-war's men (643); and another by the extremely successful autogravure made by the Autotype Company after Mr. Frank Brangwyn's picture, *Outward Bound*. It is satisfactory to see an English company achieving quite as great success in photo-engraving as has been reached by any of the plates of the Goupil Company in Paris. The artistic efforts and experiments of which we have spoken are most apparent in the studies of land and sea, where the artist has tried to avoid sharp focussing, and to soften the harshness that was the vice of the older photographic methods. In work of this sort many successes have been attained through the simple device of printing on rough paper, such as Mr. A. R. Dresser's admirable view of the *Caskett Rocks* (303), which is, in many ways, hardly to be distinguished from a fine sepia drawing. It is impossible to mention all the other exhibitors who have made successes in landscape, but we may name Mr. F. P. Cembrano, jun., who has gained a medal, Mr. R. W. Robinson, who has had the same good fortune, the Duke of Newcastle, and Mr. H. Stevens, who also sends one most remarkable *Flower Study* (291)—perhaps, on the whole, the most perfect thing in the exhibition. In the figure photographs the professionals come more decidedly to the front, though many of the best known do not exhibit. It would be hard to surpass the screen shown by Mr. Van der Weyde, and especially the group composed after Sir Joshua's *Three Ladies Waldegrave*. But as the sitters who have dressed for the part are Lady de Grey, Lady Helen Vincent, and Mrs. Henry White, the success of the photographer is not, perhaps, surprising. Another very fine photograph of quite a different type is the portrait of Miss Lily Hanbury shown by the Stereoscopic Company (180), a triumph of "direct" photography on an almost life-size scale. Mr. W. J. Byrne, of Richmond, comes to the front, as usual, with his numerous studies of children (144, 433), and Mr. Thurston, of Luton, has a charming group of a similar kind (566). The fancy groups are numerous, and several of the photographers, especially Mr. Lyddell Sawyer (78–81), make ambitious and more or less successful attempts with the reflected magnesium light. On the whole, the exhibition reveals an extraordinary amount of activity on the part of this young handmaid of the arts, and it suggests many reflections and speculations as to the part which the camera will play in the future in the work of the painters and sculptors. It is certain that it already plays a very much larger part than the innocent outsider suspects, and that the photographed plate is becoming a dangerous competitor to the living model.

[*Daily News.*]

The Photographic Society of Great Britain holds its private view and *soirée* to-day, at 5A, Pall Mall East, and the exhibition will be open to the public on Monday. In many respects the collection is more interesting than usual, artistic portraiture now occupying but a fair share of the walls. Figure pieces are, perhaps, less artificially arranged, but landscape is both better selected and better treated, its season and climatic conditions being well rendered, while light and shade are less violently opposed than has often been the case. Photography is appreciably benefited by the dull surface now adopted for the prints. There are several instances of coarse-grained paper being used to good purpose, more especially when the scene is one without sharp outlines, as in the poplar-margined mere, *Sunset—Winter*, which justly gained a medal for Mr. F. P. Cembrano, jun. Mr. A. Horsley Hinton also uses rough paper for some capital landscapes, two of the best of which are *The Ebbing Tide*

and *An Essex Marsh*. There are few animal life studies, but *Lionesses*, by the Duke of Newcastle, are particularly well taken and well printed. The duties of the Judges have been simplified by all the medals being of equal value and open to amateurs and professionals alike. Messrs. G. West & Son receive a medal for some marvellously clear pictures of sailors and mimic war at the Naval Exhibition as lantern slides; Mr. F. L. Colls has an award for a frame of fine copperplate photo-etchings, the negatives of which were taken from nature. An autogravure which reproduces not only the matter, but the manner, of his brushwork, in Mr. F. Brangwyn's Academy picture *Outward Bound*, wins a prize for the Autotype Company; Mr. R. W. Robinson, who has an extremely fine show altogether, might well have had a medal for *Dying Day* if the still more pictorial and subtly graded landscape of reedy river bank and rustic figures, *A Primrose by the River-brim*, had not done so; and Mrs. Main (who was the widow of Colonel Burnaby) is very properly rewarded for her frame of good snow views at St. Moritz. The collection is varied in subject, as well as by process of production. The bulk of the work is platinum, but celerotype, bromide, silver, and silver-toned platinum, Obernetter's gelatino-chloride, Blanchard's platinum toning, albumen, and carbon, are some of the best. The most delicate of deceased French etchers could not better have represented such still life as the *Japanese Treasury*, by Mr. E. A. Stern; and, to further instance what a wide field photography can now cover, we may mention the exquisite photo-etchings of the Survey Department of India, the needle finished dry points by Mr. H. Flather; Mr. Corke's successful photographs of old masters' paintings; and Professor P. Jeserich's photographs of human hair, blood, and a series of forgeries. His is indeed a detective camera, for it is devoted to the exposure of crime. The magnesium flashlight has been used with great success for some interiors by Mr. J. Stuart. The same process was probably also employed by Mr. Lyd. Sawyer for his clever pictures with forcible reflected lights—*The Toper* and others. Mr. C. Moore shows exceptional aptitude in posing and grouping, as well as execution, in many photographs of negro figures, for the complexions must have tried his skill. Mr. Gale, Mr. Brownrigg, Mr. J. C. Douglas (whose prints have almost the quality of mezzotint), Mr. J. B. B. Wellington, the Woodbury Company, Mr. Byrne (with children's portraits), Mr. A. R. Dresser, and Messrs. J. Russell & Sons (with good adult portraiture) are among the foremost of the exhibitors.

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

V.

HAND-CAMERA work. Classes Nos. 21 and 22, taken all over, go to prove that very excellent work and artistic pictures can be obtained by the hand camera. Twenty-one section, seaside and marine. Wade, silver medal, 539.—This set of pictures is printed on Obernetter's paper; the cloud effects in them are marvellously fine. The twelve prints by Watson, 542, yacht pictures very cleverly caught and carefully manipulated; but in this class there is a set of pictures by J. M. Nicholson, 536, which we think as fine, if not finer, than any other set in all the hand shot pictures. Every photograph is a study and a picture, and they are filled with atmosphere. If there is a fault in these pictures at all, it is in printing the skies a little too grey. Fine cloud effects are to be seen in 540. 537, Oliver. The little wading water babies are capital studies, they look so filled with their own importance. Faud's, 543, too black and chalky, seemingly under-exposed. 544, *Seaside Studies*, by Morison, full of life and action. No. 547, Ferguson, something has gone wrong with the toning of these prints; they are good pictures, but they have all gone down a dull red-brown colour, till not a vestige of light is left in them.

In hand-camera work other than seaside a bronze medal was gained by W. S. Anderson, 553, horses and other objects stirring pictures clearly rendered. The mounting of these pictures in a neutral-tinted drab mount suits the tone of the pictures well.

The other bronze medal was awarded to 554, R. H. Elder, two sets of Swiss and Italian lakes.—These pictures are mounted on opaline squares on a velvet backing; something new. They are marvellously equal in tone, and technically fine productions.

No. 556, clear and pretty pictures, but the dark brown mounts detract from the tone of the prints. No. 570, good work, but most of the pictures lost by too dark printing.

In stereoscopic transparencies all show a considerable advance in this interesting class of work. The award slides are fairly selected, but those produced on half-plate glass, the work of Mr. Robb, are as fine a set of slides as is to be found in the whole section.

In the *genre*, Class 24, H. P. Robinson takes the silver medal with 589, *Primrose Time*, and the bronze medal went to R. Terras Markinch for his 617, *Preparing Dinner*. This picture is unusual in finish; it is printed very darkly in a dark rich brown, so dark that it takes some little study to pick out the details. It is a very careful composition, and the old woman's figure and pose, with the shawl over her head, is extremely life-like; and the arrangement of the furniture and accessories is skilfully managed, not over-done, as is so often the case in such compositions. Winter's, 585, *Does Granny like Butter?* is as fine a picture as any in the section, both technically and artistically. No. 587, Butterflies.—This print looks faded.

593 and 594, Countess Loredana da Porto.—Quite up to her usual work, but the subjects are not so taking as those exhibited in the big room; of these two, 593 is best.

598, Austin, *She would not go to School*.—A good picture spoiled—so faintly printed that all effect is lost.

607, D. R. Clark, *Aye Work Awa'*.—The grouping of this picture is very cleverly managed, especially the easy, lazy-looking lounger; it is really the woman that has to aye work awa', smoking evidently being the man's only occupation.

611 and 612, *A Duet* and *The Empty Cradle*.—The Duet, a boy playing a pipe, and a bird piping a lay; a fascinating little study; the background, however, is too much out of focus. The Cradle picture. The subject is much too cramped into a corner.

623, *Group*, by Pratt.—Would have been much more effective, printed in a colder tone.

632, *A Sculptor's Workshop*.—The shop itself is too dark all over, rendering the whites of the busts, &c., too patchy and obtrusive.

636, *The Gavotte*, by Lafayette.—"From life by electric light," so states the notice in the catalogue; but, had it said produced three-quarters by pencil, it would have been as near the mark. The picture is evidently worked up, probably from some faint image taken by electric light; but the work shown in this frame is more the work of hand than electric light.

25.—The Scientific Section is more a class for those specially interested; as pictures, they do not appeal to the general visitor; as a question of interest, it may be well to see a set of pictures taken from a balloon, but they are far from pretty pictorially.

644, Kidson, silver medal.—Photo-micrographs are sharp, well-defined subjects.

642, W. L. Howie, bronze medal.—With his study of pillar of old red conglomerate.

640, Andrew Pringle's *Bacteria* are beautifully printed, nicely mounted, and look well.

646 to 648.—Shows three sets of photographs embracing from the stone pillars in the Giants' Causeway to a series of wild birds' nests and eggs. These three sets are very interesting, and have some pretensions to be pictorial.

In the Champion Class most of the pictures are well known, and have on former occasions been under review.

There are in this class a set of three pictures by Miss C. Weed Barnes—693, 694, and 695—which we could not help noting for their very theatrical and unreal grouping of the subjects. No. 693 is certainly the worst in this respect, looking all pasteboard and make-up. The knight's figure in this picture is perfectly grotesque in its ungainliness. The other two pictures are better, but none of them show any artistic conception; the one figure subject is the only one that has any approach to it.

The "Enoch Arden" pictures—674, by Geo. H. Hastings—are very cleverly managed. There is, however, too much studio "map and accessory" sort of thing in the picture where Enoch Arden is lying full length; the foreground, so palpably made up, detracts from the study of the figure.

In the Champion Class the gold medal was awarded to W. Crooke, Edinburgh, for his series of "Judge" pictures, which we first noticed in the Edinburgh Exhibition; as we then felt, we now repeat, that they are the most perfect things of the kind we have ever seen. He also shows here the charming picture of *Paderewski*.

In the Lady Amateurs' Competition, set 807 took the silver medal—Mrs. B. G. Benetto. These pictures are the most like studio productions of any in the class. They are very soft and carefully printed; a few more high lights would have improved them.

Mrs. J. N. Hignett (810) took the bronze medal with the best set of compositions in the class, either from an artistic or manipulative point of view. The *News from the Village* is a very excellent study.

In this class there is a fair show of average good work.

The Trade Exhibits fill up a considerable part of the wall-space, and are in most cases both pictorial and ornamental.

Lafayette's show is well arranged, and the work shown is charming. Of course, in a trade exhibit one may show pictures as much surface-finished as he likes. These pictures are all carefully and artistically worked up; but, for the buyer to get such pictures so finished, a very high price would have to be paid for them, for it is really art with a photographic basis, and far too highly finished, if meant to represent commercial work.

G. Comrie Smith in his space shows good, vigorous work. A strikingly good picture is the group of boy and girl.

Mr. John Stuart shows, besides many examples of his flashlight work, some fine "engine" pictures—a branch of business he makes a special feature of.

A. Ayton, jun., Edinburgh, shows a group in his collection that we wonder he did not send into the enlargement competition. We think it would have met with some award, it is so good. The three pictures underneath it are also fine work.

Photo-mechanical work is fully represented, and is of a highly interesting nature. Some coloured pictures, called Goupilgravures,

arrest the people as they pass. They are finished like the finest water-colour sketches, and look as well. The producers say that the colours are worked into the plate by hand, but what astonishes the investigator is the total want of any trace of photographic application. They number from 1029 to 1034, and are very charming.

There are photogravures in many grades of perfection, all showing the immense strides that the art-science is making.

There are here sample pictures produced by a new patent process, chromo-typography, which are printed on the letterpress, and at the rate of eight thousand a day.

In the photo-mechanical section the Autotype Company have a large exhibit. Oeffelein & Co. show a variety of burnt-in photographic transparencies on glass, which look as if they would do well for indestructible lantern slides, or for pictures for stained-glass windows. They are produced in various colourings.

There is a large show of photographic apparatus of all kinds, the local dealers being well represented.

George Mason & Co. make the largest show, receiving a medal for general excellence. They show cameras from twenty-four inches square down to quarter-plate. Every requisite in use in the profession is displayed at this stall; amongst other novelties, the tripod securer, which we noticed on its introduction at Bath; their automatic and lever stands for studio work; also many forms of portable cameras and snap-shot apparatus.

Ross & Co. have a large glass case, fitted with a series of their well-known lenses, and some samples of fine cabinet work, their own manufacture.

Taylor, Taylor, & Hobson also make a good show of lenses, finders, &c., their own special forms and manufacture.

Carl Zeiss's lenses are also on view, with samples of work done by them. Their effects shown in the wide-angle series of pictures are wonderful.

Lizars makes a good show of general apparatus. He was awarded a medal for a new developing lamp. The advantage claimed for it is a reflector in front of the chimney which throws back the light, rendering a nonactinic colour, as all the interior is painted deep orange. He shows a simple, well-made photo-micrograph camera.

Watson and Son exhibit some finely finished camera work—one camera was specially remarkable, in which all the fittings are aluminium. A medal for excellent workmanship in cameras was awarded them.

More & Co. make a good general show—photographic and optical. They show a new show-case for photographers, that moves by clockwork, and goes for six hours. It is very ingenious.

A medal was awarded them for a new stereo hand camera.

Mr. Middleman shows Barr & Stroud's patent lantern slide-making apparatus, of which he is the manufacturer; also a new form of scientific lantern. A medal was awarded for the lantern-slide making apparatus.

McGhie & Co., amongst a display of general photographic apparatus, show a studio stand, that has the advantage of going lower than any other stand we have seen. This is of considerable advantage where children are being photographed.

Smith & Son have a large glass case filled with table albums, highly ornamented with gold and silver; as artistic and chaste in design as we have ever seen.

Edwards, The Albion Co., Trotter, Bolton, &c., furnish good general exhibits, and all the stands meet with an equal amount of interest from the visitors, for the photographer, be he young or old, dearly loves to handle apparatus, and is ever on the pathway of "finding out."

Our Editorial Table.

Christmas and New Year's Mounts.

Marion & Co., Soho-square.

Taking time by the forelock, Messrs. Marion & Co. are already in the field with their new styles of mounts for the festive season. The variety of these is very great, and the designs are chaste and elegant. They are in various sizes, ranging from the carte midget up to whole plate, each being impressed with a suitable motto in gold. Photographers who desire to give a healthy fillip to business would act prudently in making a display in their show-cases or windows of mounts of this class, filled with attractive specimens of portraiture, as it would prove irresistible to such as desire to send a seasonable and acceptable gift to their friends and relatives at Christmas.

A Lantern-slide Printing Frame.

By A. R. Wormald, Sutton, Surrey.

Mr. Wormald's Lantern-slide Printing Frame is intended for utilising any selected portion of the negative, which is adjusted in front of a three-and-a-quarter-inch square aperture, and its position then rigidly maintained afterwards. The sensitive plate is accurately superposed upon the part of the negative selected, and the printing is then effected in the usual way. The various parts are well designed to fulfil their requirements, and, from a trial we have made, we find that they do so. The frame will prove useful, and, as such, can be recommended.

Mr. Wormald also sends us sample packets of matts with which to mount stereoscopic transparencies.

From Messrs. Adams & Co., of Charing Cross-road, we have received the first number of the *Photographer's Indispensable Monthly*. The advertisement columns contain particulars of the firm's specialities. The literary matter, edited by "Woll," is mainly devoted to personalities, sometimes amusing, but not always in good taste.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,963.—"A Photo-mechanical Process of Reproducing by Chemical Action Pictures in Half-tones, and set in Prussian Blue and other Dyes." E. J. Browne.—*Dated September* 21, 1891.

No. 15,973.—"Photographic Camera." Complete specification. D. J. Tapley.—*Dated September* 21, 1891.

No. 15,978.—"Improvements in Means for Mounting and Supporting Theodolites, Cameras, and other Instruments and Appliances requiring Exact Adjustment." E. S. Padmore.—*Dated September* 21, 1891.

No. 16,016.—"Improvements in Hand or other Cameras." W. Beyer.—*Dated September* 21, 1891.

No. 16,022.—"Improvements in or relating to Photographic Cameras." J. R. C. Gale.—*Dated September* 21, 1891.

No. 16,072.—"An Improved Photographic Process and Apparatus therefor." R. Bird.—*Dated September* 22, 1891.

No. 16,094.—"A New or Improved Process for Producing Photographic Pictures, having Colours resembling those of the Objects from which they are obtained." Complete specification. V. Mathieu.—*Dated September* 22, 1891.

No. 16,125.—"Enlarging Photographic Gelatine Films by the aid of Chemical Means and without the aid of Enlarging Apparatus." A. Hill.—*Dated September* 23, 1891.

No. 16,369.—"Improvements in and appertaining to Cameras and Sensitive Plates for Photographic Purposes." R. Fowler.—*Dated September* 26, 1891.

PATENTS COMPLETED.

An Improved Method of Transferring Woodburytype Prints.

No. 2211. William George Burrows, Henrietta Villa, Boston-road, Hanwell, Middlesex.—*September* 5, 1891.

This invention relates to the method of Woodburytype printing by transfer wherein the print produced in the first instance upon a temporary support is transferred thence directly to a final support upon which the print is thus produced, without the intervention of a permanent intermediate support between the print and its mount, as usual in the ordinary process of Woodburytype printing, and the invention consists in an improvement whereby the operation of thus transferring the Woodburytype print from the temporary to the final support is rendered possible without the use of any solvent for the waterproof coating of the temporary support, the use of such a solvent having hitherto always been necessary in this particular process in order to enable the print to be detached from its temporary support. By my improvement, the operation of transferring is greatly facilitated, and the production of a clean print with white margin directly upon the final support is rendered easy.

This is accomplished by the employment as the temporary support of paper prepared by coating with wax paraffin, spermaceti, stearine, or other analogous fatty matter, either separately or in combination applied to the paper as hereafter described, before it is waterproofed by coating with the shellac preparation usually employed to form the ground on which to print from the Woodburytype block. The wax, or other fatty matter, thus intervenes between the shellac coating and the paper, and by closing the pores of the latter prevents the shellac from adhering so strongly as to necessitate the use of a solvent for the shellac to enable the print to be detached from the temporary support in the operation of transferring to the final support.

The paper employed for the temporary support must be of a fine uniform quality, such as Rive or Saxe paper of the kind used for photographic purposes. It is prepared by coating it with a solution of the fatty matter, the material it is preferred to employ being beeswax dissolved in naphtha in the proportion of one ounce of wax to eighty ounces of naphtha. These proportions are found to answer best in practice, and the same solvent may be used for any other of the fatty matters named, but for stearine and spermaceti I prefer benzine or turpentine. As the paper requires to receive a merely superficial coating of the wax, the solution should be applied uniformly, lightly, and rapidly, preferably by means of a flannel pad. When dry, the prepared surface of the paper then receives a coating of shellac dissolved in water, after which it is to be rolled between polished steel plates.

Upon the paper thus prepared as a temporary support, the print is produced from the Woodburytype block in the manner usually practised, and, the print having been dried on this temporary support, the operation of transferring the print to its final support is as follows:—

The print is to be thoroughly washed with naphtha or benzine (to get rid of any deposit of grease from the mould which was oiled as usual), and the print and temporary support having been trimmed to the required size, the print is to be applied face downwards upon the final support, to which a weak mounting solution has previously been applied. The print and support are then

allowed to remain a few minutes under pressure and then dried, after which the temporary support on which the print was originally printed can be easily stripped off, leaving the print transferred and firmly adherent to the final support of whatever material (*e.g.*, paper, silk, glass, or wood) it may be composed. In thus stripping off the temporary support, the latter is detached from the shellac ground which accompanies the print. The shellac ground thus remains superposed upon the print, to which it imparts a matt effect, and as no solvent for the shellac has been used, the result is a perfectly clean print with a matt surface and white margin. The prints, being thus produced direct upon their final support, are eminently suited for book illustrations.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The herein-described improvement in Woodburytype transfer printing, which consists in coating the paper used as the intermediate support first with wax, or other fatty matter specified, and then with the usual waterproof preparation, substantially as and for the purpose specified. 2. The herein-described improvement in Woodburytype transfer printing, which consists in coating the paper used as the intermediate support with wax, or other fatty matter specified, applied in the form of a solution in the manner described before the usual waterproof preparation is applied, substantially as and for the purpose specified.

Improved Apparatus for Use in Photographic Printing.

No. 18,967. Louis Joseph Sellier, Corunna, Spain.—*September* 5, 1891.

In order to obtain portraits vignetted upon a white ground by the aid of the vignetting glasses at present in use, it is necessary to give to the photographic printing frame a half or quarter turn in the shade every five or ten minutes, in order to obtain a uniform and regular shading, as the light always comes with more intensity from one side or the other.

This process, or, rather, this manner of working, requires sustained attention on the part of the photographic copyist, and, in spite of all his care, there are always some copies badly printed that have to be destroyed.

Besides this, the attention required is difficult, when the same copyist has to look after ten, fifteen, or twenty frames at the same time, and if one of the negatives happens to be cracked, an accident which frequently happens, a still greater attention will be required, or the crack will infallibly be reproduced on the paper; therefore, in this case the frame containing the cracked negative must be specially watched, to the neglect of all the others.

The object of the present invention is to remedy these inconveniences, and it consists in displacing automatically and regularly the printing frames, so that the negatives which they carry are uniformly submitted to the action of the light in all directions.

In carrying out this invention, a mechanical rotary apparatus is employed. The apparatus is composed of a number of plates, each provided with a two-grooved pulley, in the centre of which is inserted the stem, fixed firmly to a foot. This foot is secured to a plate of suitable length, and at one of the ends of this plate is placed a clockwork, operated by a spring or weight, and serving to drive the apparatus.

The last wheel of this clockwork carries a grooved pulley, which is connected to the nearest plate pulley by an endless cord. Similar endless cords connect the other plate pulleys in pairs, so that all the plates will simultaneously receive rotary motion from the clockwork, which motion may be regulated as desired.

The presses or printing frames are simply laid on the plates, or they may be fixed in any convenient manner, and will thus partake of this rotary movement, whereby the negatives will be submitted regularly to the action of the light, which will produce a perfect shading of the prints, without the operator concerning himself about anything but the requisite period of exposure.

In this way, I not only obtain a more perfect result, but I can economise the work of the copyist by giving him a larger number of frames to attend to.

It is obvious that I may make use of any suitable motor; that which I have described above is given as an example only; the mode of transmitting the power may also be varied at will, as well as the mode of mounting the rotary plates. These may be fixed to the stems, the driving pulleys being also fixed on the stems.

Improvements in Means for Washing Photographic Negatives and Prints.

No. 20,199. Albert Palmer, 36, Briar-street, Nottingham, Nottinghamshire.—*September* 5, 1891.

My improvements are for the purpose of giving greater and more economical facilities in washing various size negative plates, for giving a more perfect renewal of the washing water, and for a vessel suitable either for washing negatives in perpendicular or horizontal position, or for washing prints.

My improvements are as follows:—I construct an oblong or suitable-shaped box or vessel of a convenient length, width, and depth, and at each inside end I construct, fix, or place racks having a series of projections along their lengths, the spaces between which serve for stacking negative plates perpendicularly for washing, and the projections of which serve as rests for negative plates stacked horizontally for the same purpose. In one corner of the said vessel I construct or fix a funnel-like attachment flush, or nearly flush, with the top of the vessel, and to the lower extremity of this funnel I attach a pipe long enough to run nearly the whole length of the vessel, and so arranged that its terminal is near the bottom of the vessel at the end opposite to the one where the funnel is. This funnel is for the purpose of feeding the vessel with fresh water and ensuring that the water shall reach the bottom of the vessel. Near the top of the vessel, preferably in the end against which the funnel is placed, and near the opposite corner to the funnel, I arrange an overflow outlet, which thus placed would be at the point furthest removed from that at which the inflowing water enters the vessel, so that the water may be effectually renewed throughout its bulk.

For the purpose of accommodating various size negative plates for washing in either horizontal or perpendicular position, I attach or construct on the inside sides of the vessel slides or slide bars of suitable form and at a suitable distance from the top of the vessel, and to work on these slide bars I use bars of a length to reach across the vessel from slide bar to slide bar, having racks or projections to agree with those on the inside ends of the vessel. Any suitable means may be arranged to hold these to any desired position on the slide bars, but a simple means would be to have a series of notches along the slide bars and projections on the cross racks to engage into these notches, thus giving the power of adjusting the distances between the racks to suit any size negative plates.

If the vessel is required for washing photographic prints, the adjustable racks are readily withdrawable, leaving the vessel very suitable for the purpose.

At a suitable point near the bottom of the vessel, preferably at the end opposite the inflow, I arrange an outflow to empty the vessel when desired.

The renewal of the water may be effected by bringing a continuous flow of water by pipe or otherwise to the funnel, or by periodical charges of water poured into the funnel, the overflow being caught in a vessel, or conducted to any desired place.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 6	North London	Wellington Hall, Islington, N.
,, 6	Holmfirth	
,, 6	Sutton	Sutton Scientific Society's Rooms.
,, 6	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	Coventry and Midland	The Dispensary, Coventry.
,, 7	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 7	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8	Birkenhead	Association Rooms, Price-street.
,, 8	Cheltenham	
,, 8	Manchester Photo. Society	36, George-street, Manchester.
,, 8	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 9	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

September 29.—Technical Meeting.—Mr. Thomas Bolas in the chair.

Owing, doubtless, to the fact that it came so soon after the opening of the exhibition, as well as to the circumstance that the subject for the evening had been somewhat hastily arranged, there was but a small attendance.

Colonel Waterhouse gave a discourse on *Electrical Currents in Development*, and said:—"In my papers on *Electro-chemical Reversals with Thiocarbamides* it was shown that the peculiar reversals of the photographic image produced by the addition of very minute quantities of a thio-carbamide to the eikonogen developer were, in some cases, accompanied by a reversal of the electric current, which seemed to make it highly probable that the reversal was brought about by electro-chemical action, and the experiments generally, with plain and thio-carbamide developers, pointed to the conclusion that photographic action—at any rate as regards the haloid salts of silver—is influenced by electricity to a very much larger extent than has usually been recognised, not only in the action of light upon the the silver haloid film; but, also, in the development of the invisible image so produced. In carrying out my experiments with gelatine dry-plate films in Calcutta, I was unable to obtain any very decided indications of electric currents generated during ordinary development, though I did observe signs of their presence. I have, however, lately obtained very much more certain results with a more delicate galvanometer, and I find that not only do these currents exist, but that they are very much stronger than could have been anticipated, in some cases reaching as much as one-tenth volt. They are, however, most uncertain in their action, and having been more or less on the move during my short stay in Europe, and away from the conveniences of a laboratory, I have not had an opportunity of investigating the causes of these uncertainties, nor of ascertaining to what extent the currents observed influence the developing action. My bringing the subject before you this evening is, therefore, somewhat premature, but, as the results are in any case curious and interesting, and I shall not have another opportunity of showing them to you, and eliciting a discussion about them, I trust you will excuse my putting them before you in so imperfect a manner. One of the principal difficulties I had when I first began my experiments in Calcutta was to make the gelatine dry-plate films conductive, and I found that the best results were obtained by facing the films with gold leaf. This, however, was always open to the objection of causing currents by electrical action between the gold and the plain or sulphuretted silver deposits caused by the developer. I have now, I think, found a way of avoiding this difficulty, and reducing the polarisation of the the terminal conductors to a minimum by moistening the film in a five-per-cent. solution of potassium bromide, and then placing it between clips made by doubling a piece of thin pure silver plate, which can be attached to the conducting wires without difficulty. I have found ordinary celluloid dry-plate films very convenient for these experiments, as they can easily be cut up into slips, and the ends placed in the silver terminals without exposing the latter to the action of the developer. I find usually that there is very little electrical action between the silver terminals and the moistened film before exposing it to the developer, and also, after the development is ended, if the terminals are dipped into the developer, the current is very slight, so that the stronger currents which are observed would appear to be entirely due to the action of the developer on the partly exposed film. As a rule, the exposed part of the film is negative, and the current goes towards it; but it has also been observed, in developing with ferrous-oxalate developer, that, although the development was perfectly normal, the current was in the opposite direction. At other times, when developing with ferrous-oxalate developer, the current has been towards the exposed side. I have not yet been able to discover the

cause of this contradictory action. Hydroquinone also seems to favour reversed currents. It may be noted also that, as a rule, it takes some time before the needle moves after the film has been placed in the developer, though sometimes there is an immediate move; but there is not such a gradual increase of current as might be expected. It is curious, too, that there is an increase of current after exposure to the air, and that lowering the exposed side of the film, so as to expose new surface to the developer, generally causes a marked increase of current towards the negative pole, while by lowering the opposite side of the film the current moves back towards the positive pole. My later experiments have been carried out with a galvanometer made by Dr. Edelmann, of Munich, which is fairly sensitive, and has the advantage of being very portable and easy to read in the dark room. Moreover, it is graduated in volts and milliampères, so that the actual strength of the current can be ascertained at once. Not being a reflecting galvanometer, I cannot show you the currents with it; but Mr. Addenbrooke has very kindly placed a reflecting galvanometer at my disposal, and I will now show you a few experiments with different developers upon films exposed in the ordinary way, and others partly exposed and partly unexposed. I hoped also to have been able to show you the reversal brought about by the thio-carbamides, but the time has been too short for me to prepare the bromised silver plates with which these reversals are best observed. I should like to state that I bring forward no new theory. The existence of electrical currents during development has already been shown to be most probable by the experiments of Lermontoff, Abney and Eder, and Professor Meldola has gone into the question in his *Chemistry of Photography*. Professor Minchin has also obtained some very interesting and important results in showing the influence of electrical currents on photographic films. All I do at present is to show you these currents by means of the galvanometer; but the further investigation of the question will require a great deal of close and patient work, on account of its delicacy and the many causes of complication that arise when dealing with small electrical currents of this kind." Colonel Waterhouse then read details of a number of experiments he had made, confirming the existence of these electrical phenomena in development, and subsequently, by the aid of a reflecting galvanometer, showed the curious deflections of the needle which a variety of plates and developers set up.

A discursive conversation took place upon several suggestive, but highly speculative points involved in Colonel Waterhouse's experiments, in which the Chairman, Mr. G. L. Addenbrooke, Mr. H. Chapman Jones, and Mr. W. E. Debenham took part, and the meeting adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 24,—Mr. W. E. Debenham in the chair.

Mr. F. H. Evans was elected a member of the Association.

Mr. Teape, in redemption of a promise given at a former meeting, produced prints in platinum and silver of a negative of the club group taken at Greenwich, in order that a comparison of the relative gradation afforded by the two processes might be instituted.

The CHAIRMAN remarked that it had been said, if platinum paper were glazed, the same detail given by albumen paper could be got. The silver print before them certainly gave a better separation in the shadows.

Mr. TEAPE expressed an idea that the colour of the silver print had much to do with its gradation-giving properties. It seemed to him that it was more difficult to detect fine gradation in platinum prints than in silver.

Mr. EVERITT mentioned some recently published experiments of Captain Abney which bore on the point.

Mr. E. W. PARFITT produced three negatives having small transparent spots in them. He recently noticed that the twelfth plate in his hand camera had the defect on several occasions, the other plates being comparatively free from the holes.

The CHAIRMAN thought the effect might be due to shearing stress or pressure, but several members pointed out that this would produce opaque spots.

Mr. COWAN believed the holes to be caused by bubbles in development, and offered to show some of the same kind. He that day produced one at least a quarter of an inch in diameter. He said that, contrary to what was generally supposed, bubbles were not removed by washing. They should be moved with a brush. With a carbonate and an acid in the developer, gas bubbles were invariably formed. The brush might be slightly greasy, and thus help to form bubbles, as it tends to set up a repellent action. They generally appear if the developer has been used several times, as it then becomes frothy.

Mr. EVERITT, using sulphurous acid as a preservative, had had the same kind of bubbles.

Mr. BECKETT said the worst case of pin-holes in his experience came after using a dish that had had a mercury intensifying solution in it. The plate was completely riddled with the same sort of spots as Mr. Parfitt was now exhibiting.

The CHAIRMAN remembered, in the old collodion days, meeting with the same kind of circular spots, which had been traced to a like cause.

Mr. TEAPE introduced the subject of backing plates, and referred to the objections made to the results exhibited last week, that light was reflected from the bars of the window, and that there was no chance of getting clear glass. He had since made a screen, and backed a plate one side with caramel, the other with sienna. Exposure was made through diamond-shaped openings in opaque paper. There were six cuttings, and three were covered so as to expose the one three for a great length of time, and the other three for a short time. The long exposure was given by burning twenty inches of magnesium at twelve inches' distance, the short exposure being one inch at the same distance. Thus three squares had twenty times more exposure than the other three. Thomas's hydroquinone developer was used, and development occupied two minutes, with an Ilford ordinary plate. If there was any difference in the respective results, sienna had it. The long exposure had completely reversed the image.

The CHAIRMAN remarked that an experiment of this kind required to be carried out with scientific accuracy; and as Mr. Teape said that the backing was not dry when the exposure was made, and black paper was in contact with it, this experiment was useless, inasmuch as caramel takes longer to dry than sienna. He referred to the paper which he read before the Association on the subject some time ago.

A question from the box, "How can the effect of halation be removed?" was answered by Mr. BECKETT, who recommended the use of methylated spirit with the addition of a small quantity of water, and also suggested the vignetting of the print.

Mr. BRIDGE said, if spirit would not do, turpentine would remove the defect.

A second question was, "Has any member tried Mr. J. Weir Brown's uranium toning process?"

Mr. DRAGE had done so, and had succeeded better with the addition of acetic acid than without it.

In reference to the permanency of the uranium-toned image, Mr. WEIR BROWN mentioned that he had had a picture exposed to light since the commencement of the year, and no alteration had taken place in it. He traversed a recent allegation of Mr. Thomas Bedding's that the process was not so simple as he claimed. He (Mr. Brown) thought it was extremely simple. He inquired if the pictures he handed over to the Association for the purpose had yet been exposed to light to test their permanency.

Upon the understanding that this was to be done, the meeting adjourned.

CAMERA CLUB.

NOTICES.—Monday, October 5, eight p.m., opening of seventh one-man exhibition Pictures by Mr. Ralph W. Robinson. Half-past eight p.m., smoking concert.—Thursday, October 8, half-past eight p.m., Captain Abney; subject of paper will be announced later.—Monday, October 12, half-past eight p.m., lantern evening. Members are requested to send or bring slides, or to introduce friends who have interesting work they are willing to show.—Thursday, October 15, half-past eight p.m., Mr. Andrew Pringle, *Bacteria Photographed.*—Monday, October 19, half-past eight p.m., first of the series of elementary lessons, *Lenses, I.*, by Mr. Lyonel Clark.—Thursday, October 22, half-past eight p.m., Mr. Henry Sutton, *Demonstrations and Illustrations of Reversal.*—Monday, October 26, half-past eight p.m., lantern evening. Members requested to bring or send slides, or to introduce friends who are willing to show interesting work.—Thursday, October 29, half-past eight p.m., Dr. C. S. Patterson, *Animal Photography with a Hand Camera.*—Monday, November 2, half-past eight p.m., smoking concert. Offers of assistance will be welcome.—Thursday, November 5, half-past eight p.m., Dr. J. J. Acworth, *The Action of Light and Heat on the Haloid Silver Salts*, —Monday, November 9, half-past eight p.m., elementary lecture, No. 2, *Lenses, II.*, Mr. Lyonel Clark.—Thursday, November 12, half-past eight p.m., Mr. G. S. Addenbrooke, *Aluminium and its Application to Photography.*

HACKNEY PHOTOGRAPHIC SOCIETY.

SEPTEMBER 24,—The President in the chair.

Messrs. W. P. Dando and Augustus W. Wilson were nominated for membership.

Being an evening set apart for the exhibition of members' lantern slides, a number of ladies were present.

The following members handed in slides, which were put through the lantern by the Hon. Secretary:—Messrs. Sodean, Gosling, Dean, Carpenter, Dando, Poulson, Herbert Smith, Grant, Barton, and the Hon. Secretary.

RICHMOND CAMERA CLUB.

SEPTEMBER 25,—Mr. Davis in the chair.

The subject discussed was the Eikonogen and Hydroquinone Developer. All present who had used the combined developer testified to its merits in case of snap-shops and under-exposed plates.

Heavy rain spoilt the outing to Perivale on the 19th, only one member, whose enthusiasm nothing can damp, putting in an appearance.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

SEPTEMBER 28,—Mr. C. Beadle in the chair.

Mr. Zimer and his assistants of the Americo-European Trading Co. demonstrated the process of producing photographs in printing ink by means of the "Photo-autocopyist." In working the process it is necessary first to take a print from a negative upon a sheet of vegetable parchment, coated with gelatine, and sensitised with ammonia bichromate. The image is visible, and can be examined as in the case of an ordinary paper print. When sufficiently printed, the bichromate is washed out, the sheet dried and stretched on the printing apparatus.

It is then moistened with glycerine and ammonia, and inked with a greasy ink of a suitable tint. The image is masked to keep the margin clear, and, a piece of paper being laid on top, a print is taken in a copying-press, and the latter portion of the process repeated as often as desired. The prepared sheets may be stored away, and prints taken from it in the same or different colours at any future time. A number of prints were made and distributed among the members. The negative from which the sheet was prepared was shown, and it was seen that the prints did fair justice to it, and showed none of the loss of crispness frequently observed in collotype prints. They resembled closely prints by the Autotype process.

A vote of thanks was given to Mr. Zimer, his assistants, and the company.

A letter was then read from a member communicating a formula for a rapid printing paper by the blue process which he had worked out. Prints were shown from dense and thin negatives, from which it appeared that the new

paper was suitable for soft negatives. The formula was then made up and paper coated by it for members to test with the ordinary paper.

Prints on various home sensitised papers, &c., were then passed round and criticised.

Mr. J. C. S. Mummery was elected chairman for the meeting on October 12, when Mr. Roland Whiting will address the Society on the intensification and reduction of negatives, and demonstrate the various processes.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THURSDAY, September 24,—The President (Mr. Paul Lange) in the chair.

The occasion was regarded as one of special interest, as being the inauguration of the winter season; the hall was crowded by an audience of some seven hundred persons, and there were a considerable number of ladies present.

At the conclusion of business, Mr. George E. Thompson, President of the Birkenhead Photographic Society, delivered a lecture on *The Stone Age of the Passion Play at the Italian Lakes*. In an introduction to his lecture (given for the first time), Mr. Thompson said that near the extreme north-west confines of Italy, and almost under the snows of Monte Rosa, lay the romantic little town of Varallo. Its sacred mountain, visited annually by thousands of devout Italians, reared its head 500 feet above the old houses of the town, and there, among the fine chestnut-trees, were forty chapels, containing numerous groups of terra-cotta figures, many of which were said to equal in artistic merit the finest sculpture of Italy. The figures were of life-size, and represented Biblical subjects, most illustrating the life of Christ. Many of these had stood there for over three centuries, and they well deserved the notice of Englishmen, both as works of art and in being, as it were, a reproduction in stone of the Passion Play. The lecturer proceeded to show by lime-light a series of magnificent photographic views taken by himself at Varallo, which he visited during the spring of the present year. The terra-cotta groups were illustrated, and, starting from this point, he took his hearers on a tour of the six great Italian lakes—Orta, Maggiore, Lugano, Como, Iseo, and Garda—which he showed from numerous points of view, with striking pictures of sunset and moonlight, and mountain and woodland scenery. He then traversed the plain of Lombardy, illustrating its objects and places of historical and artistic interest, and, arriving at Venice, gave a view of that city as seen by a flash of lightning at two o'clock in the morning. The last scene was a photographic triumph, and was loudly applauded. At the conclusion Mr. Thompson received a cordial vote of thanks.

It was announced that another lantern evening would be held on Thursday, October 29, at the new City Hall, Eberle-street.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

SEPTEMBER 24,—Mr. W. J. Harrison, F.G.S., in the chair.

Mr. S. H. FRY, of London, gave an interesting demonstration in lantern-slide making. He compared collodion with gelatine, and, in the course of his remarks, stated that detail was more marked with gelatine, the collodion tending to hardness. With gelatine various tones could easily be produced by increasing the exposure, and using carbonate of ammonia with the restrainer much increased in the developer. On reviewing the various developers, he considered hydroquinone by far the best for lantern plates. Mr. Fry then proceeded to make slides by reduction in the camera with the aid of the oxy-hydrogen lantern, which was manipulated by Mr. Jaques, and so good a light was produced that one minute was found sufficient to produce a fully exposed plate. Afterwards, two other plates were exposed for seven minutes each under the same conditions, and by altering the constituents of the developer, and adding carbonate of ammonia, slides of different tones were made. The slides were afterwards put on the screen, and also some of Norway and Switzerland, and were much appreciated.

The programme for next session includes six lantern nights, when slides of Japan, Borneo, Norway, &c., will be shown by Messrs. J. B. Stone, J.P., A. W. Wills, J.P., and E. H. Jaques, from negatives taken in their travels. Members have the privilege of introducing ladies on lantern nights.

SHEFFIELD CAMERA CLUB.

SEPTEMBER 30,—Mr. G. T. W. Newsholme (President) in the chair.

A lecture on *Photogravure and Photo-mechanical Processes Practically Illustrated* was given by Dr. MANTON. The lecturer stated that the bulk of the processes now so much in vogue for the production of celebrated pictures, replicas of works of art, &c., depended on the actinisation of bitumen and chromated colloid compounds. After a brief description of the Woodburytype process, full detailed demonstrations were given of the working of collotype, photo-lithography, and zincography, specimens of each process being produced and distributed among the audience. The somewhat complicated process of photogravure was lucidly explained and illustrated by sketches on the blackboard and experiments. The walls were covered with a very large number of beautiful engravings and photo-etchings untouched by hand from beginning to end. Another process, briefly explained by the lecturer, was chromo-collotype, for the production of pictures in colours, and a very beautiful specimen was exhibited.

BOURNEMOUTH SOCIETY OF NATURAL SCIENCE (PHOTOGRAPHIC SECTION).

ON Saturday afternoon about a dozen members of the above Section had a photographic excursion to Wimborne, where, notwithstanding the somewhat unfavourable state of the weather, some very fair negatives were secured. By kind permission of Lord Wimborne, the party were able to take photographs in the grounds of Canford Manor, plates of different makes and sizes being exposed. Other scenes in the neighbourhood were also photographed, not for getting the picturesque model village of Canford, which charming little place induced some of the party to go on and secure views of it for themselves.

Correspondence.

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

NEW IRON SALT.

To the EDITOR.

SIR,—In reply to the several inquiries respecting this compound, I desire to give the following facts:—From a very protracted attack of rheumatism I have not been able to follow up the experiments so thoroughly as I could desire; but, nevertheless, I have made some experiments in preparing this compound for sensitising paper. Although I have followed out the formulæ and instructions of Mr. Friese Greene, I have not obtained a paper sufficiently sensitive for any practical work. Neither have I been able to get from Mr. Friese Greene any fresh samples of prepared paper. None of my results at all equal the paper prepared by Mr. Friese Greene, a piece of which I exhibited at the end of Professor Meldola's second Cantor lecture at the Society of Arts. A portion of the remainder of this has been analysed and found to contain silver bromide in addition to the iron compound. I give this statement, keeping simply to the facts of the case. I cannot offer any explanation why the silver was present, but must leave it to the reader to draw his own conclusions. My apologies are due to Professor Meldola, and I can only say that I received the prepared paper, and exhibited it at the time in good faith, nothing doubting.—I am, yours, &c., FREDERICK H. VARLEY.

82, *Newington Green-road, Islington, N., September* 25, 1891.

IDENTIFYING PLATES IN THE DARK ROOM.

To the EDITOR.

SIR,—Your first article in last week's JOURNAL is interesting, and would be rendered more valuable if professional plate-makers would take your advice, thus enabling us to "identify plates in the dark room." I go further, and say, Why not back every plate with that adhesive black paper which is now in the market, and then attach a label, as you suggest, on the back? Plates thus backed are valuable in two ways: halation is thus reduced to a minimum, and to a certain extent, in changing plates, the chances of accidentally fogging them is much lessened. I never think of taking a landscape without using this material, and then marking each plate in pencil, which can be easily read by reflected light. Do try to persuade every maker to oblige us, amateurs and professionals, in a matter so small yet of such convenience.—I am, yours, &c.,

Tottenham, September 28, 1891. W. H. PLAISH, M.R.C.S.

SEPIA TONES ON BROMIDE PRINTS.

To the EDITOR.

SIR,—I saw in your JOURNAL a few weeks back a formula by Mr. Thomas Bedding for developing sepiatypes on bromide paper. I have tried this (by using chloride of mercury), with a splendid result, which, however, only lasted till the print became dry, when it was a pure black colour. I would be very much obliged if you could inform me if they can be made permanent. I fix a quarter of an hour, and develop with the ferrous oxalate.—I am, yours, &c., HARRY S. CURRY.

43, *Percy-gardens, Tynemouth, September* 24, 1891.

THE DISCOVERER OF THE GELATINO-BROMIDE PROCESS.

To the EDITOR.

SIR,—I am delighted to see, by a letter in your JOURNAL of September 25, that at last some one is taking up the cause of the Discoverer of the Gelatino-bromide Process. I cordially endorse all the writer says as to the importance of the discovery. Now is the time to set on foot some scheme by which Dr. Maddox should be recognised by the whole nation, or rather the whole world.

Now for an idea that has struck me. Will you, Mr. Editor, give your sanction and support to it, and open your columns to a list of names of photographers, and others who have benefited by this discovery, who would give a small subscription of, say 1s., towards a testimonial in the form of a well-filled purse, to present to Dr. Maddox on the occasion of the twenty-first birthday of his discovery, which event will take place in the year 1892?

Should this scheme fail and not meet with approval generally, let me

beg that others may suggest their views; *only do not let the matter drop*, as it has hitherto done.

Apologising for the length of this letter,—I am, yours, &c.,

September 25, 1891. A WARM PARTISAN IN DR. MADDOX'S CAUSE.

PLATINOTYPE PAPER IN HOT CLIMATES.

To the EDITOR.

SIR,—It may interest those of your readers who wish to practice photography in the tropics to hear the result of an experiment which has been made by our American house, for keeping platinotype paper in good condition during the very trying season of a New York summer.

The paper was packed in tins and shipped in the ordinary manner, but on its arrival the tubes containing the paper were immediately transferred to a cold storage chamber, similar to those which are used for keeping Australian and other frozen meat.

After nine months the paper was taken out, and found to be in perfect condition; in fact, as good as the day it was made. Of course, nine months is not a long time for paper to keep in good condition in this country; but those who have known a New York summer, especially such an one as that which has been experienced in America this year, will appreciate the success of this trial.

Most of the large ocean-going steamers are now fitted with refrigerating chambers; it therefore becomes quite easy to ship the paper to any part of the world, and to ensure its keeping in good condition even in the most trying climates.—I am, yours, &c.,

(Signed) ERNEST J. HUMPHERY.

The Platinotype Company, 29, *Southampton-row, High Holborn, W.C., September* 29, 1891.

THE PHOTOGRAPHIC EXHIBITION—A QUEER STATE OF THINGS.

To the EDITOR.

SIR,—No one more sincerely congratulates Mr. Walter Colls on his well-deserved success at the Pall-mall Exhibition than I do; but the making this award has led to such strange anomalies, with regard to the Society's rule that "photographs already publicly exhibited within the London postal district will not be admitted," that perhaps it may be as well to get the matter settled once and for all.

Twelve months ago Mr. Van der Weyde was awarded a medal at this Exhibition; but, on it becoming known that he had shown the photograph at the Crystal Palace and in his shop-window, the medal was at once taken away, under the above-mentioned rule. Now, in Mr. Walter Colls' frame there are at least two, if not more, photographs which have been sold all over the country, including London, for the past three years, added to which *they were taken by one of the very Judges who awarded the medal.* Surely here we have an anomaly without parallel in the annals of photographic exhibitions.

One of the Judges is reported to have said that mechanically produced photographs did not come under this rule, adding that he was perfectly at liberty to send a copy of the same photograph to the Exhibition each year for ten successive years if he produced it by ten different processes; and this he might easily do, as the name of these processes is legion, and we should then be treated to the sight of a Judge, year after year, adjudicating on his own work, produced from start to finish by his own hands, if he were selected to make the awards by the votes of the members of the Society.

We know, many of us to our cost, that a coach-and-six may be driven through almost any Act of Parliament, but surely the rules of the premier photographic exhibition of this country were never intended to be stretched in this extraordinary manner, and I trust that some member who has the welfare of the Society at heart may bring the matter before the next Council meeting, and once and for all have this queer state of things settled.—I am, yours, &c., FAIR PLAY.

London, September 28, 1891.

DISCOUNTS.

To the EDITOR.

SIR,—Referring to 'Chips'' letter on the above subject in this week's JOURNAL, I can only repeat the information given to me by an amateur, who stated he bought Thomas's quarter-plates at the Stores in Victoria-street, Westminster, at 10½*d.* per dozen; possibly he may have made a mistake. Having a stock of plates in at the time, I did not test the accuracy of the statement. The gentleman is away now, but I will make inquiries in the matter.—I am, yours, &c., PROFESSIONAL.

Kingston-on-Thames, September 29, 1891.

"HOW OUR LEADERS WORK."

To the EDITOR.

SIR,—It has often been said that the world knows nothing of its greatest men, and it may, with equal truth, be observed that, were it not for our photographic journals, the photographic world would know little of its leaders and leaderesses. The idea of letting us know something of the method of the great workers in our art science in a series of articles was not bad, but of some of the individuals selected for notice one is really tempted to ask, "Who made these lambs in lions' skins our leaders, and whom do they lead?"

The pages of photographic journals (even if they only appear once a month) must be filled, but when anything of this kind is attempted only those people should be chosen whose biographies are worth handing down to posterity, and whose examples are worthy of being followed. Have we used up all the giants? I don't mean those great men "whose work we often hear about, but very seldom see," of whose experiments we often read, but whose actual work would escape notice at a village exhibition—I mean good practical photographers. When we have exhausted these, it will be quite time enough to begin on the dwarfs. I cannot help thinking some of those so-called "leaders" must have been greatly surprised when they "woke to find themselves famous," unless, of course, it was a question of arrangement. As for us who read these eulogistic articles, it is only when we see the illustrations which accompany them, and which are supposed to shed lustre on the fame of the previously unknown "leaders," that we cease to wonder why we have not heard of them before.—I am, yours, &c., X. Y. Z.

London, September 28, 1891.

CAMERA CLUB "ONE-MAN" EXHIBITIONS.

To the EDITOR.

SIR,—Would you kindly note that the seventh of the series of One-man Photographic Exhibitions at the Camera Club will be open for private and press view on Monday, October 5, at six p.m., and on and after Tuesday, October 6, it will be open to visitors from ten a.m. to four p.m., on presentation of cards, which can be obtained from members or from the Hon. Secretary.

The exhibition will consist of photographs by Mr. Ralph W. Robinson, by whose kind co-operation we are able to exhibit a fully representative collection, including a complete set of his valuable series of portraits of Academicians. The pictures will be on view for about two months.—I am, yours, &c., G. DAVISON, *Hon. Secretary.*

Camera Club, Charing Cross-road, W.C., Sept. 28, 1891.

Exchange Column.

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

Ross' lens, No. 3, list price, 17*l.* 10*s.*; will exchange for a whole-plate outfit.—Address, GARRAD, 7, Hillsboro-terrace, Landells-road, East Dulwich, S.E.

Will exchange Dallmeyer's quarter-plate portrait lens for a good hand camera.—Address, W. THOMPSON, 8, Guy's-terrace, Blue Bell Hill, Nottingham.

Pair of Dallmeyer's stereoscopic lenses in excellent condition; exchange for hand-camera lens by good maker.—Address, 14½, Herbert's Factory, Radford, Nottingham.

James's magnesium flash lamp, Watson's shutter, slides, and enlarging lantern; will exchange for background, gas bag, mixing jet.—Address, T. C. CHAPLIN, 36, Rother-street, Stratford-on-Avon.

Concert flute, cocoa-wood, eight silver keys, perfect, by Metzler, or silver-plated cornet, by Hayes, for whole-plate tourist camera, with double backs.—Address, G. T. TEAR, 21, Foxley-road, S.W.

I will exchange a quarter-plate bellows-body camera, two double dark slides, tripod, lens and instantaneous shutter, also a good hand camera with three double backs, for a half-plate bellows-body camera (must be good).—Address, FRED. C. D. HURD, Shepton Mallet.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

H. A. P.—We know of no method by which the damaged manuscript, in pencil, can be restored.

J. R. G.—Consult the tables of equivalents in our ALMANAC, which will probably assist you in your calculations.

INQUIRER.—Apply to Messrs. Grosvenor, Chater, & Co., Cannon-street, E.C. They supply the India tinted paper, but, we believe, only to the trade. Any retail stationer will obtain it from them for you.

F. INGLIS.—If you doubt the possibility of the method, as given by the writer, why not satisfy yourself on the point by making a series of experiments, and letting us know the results? For our own part, we do not see why the process should not be practicable.

S. W.—If the negative be vigorous, and the paper strongly sensitised, rich tones may be obtained by almost any toning bath. In obtaining rich purple tones, as we have over and over again pointed out, the composition of the toning solution is but a minor factor in the case.

G. Denney (Ilfracombe) asks: "Kindly say when Pall Mall Photographic Exhibition opens, and last day for sending in exhibits."—Mr. Denney will see by our report that his inquiries are somewhat belated. However, we hope his pictures will do for next year's exhibition.

R. S. F.—There are so many different brands of plates now on the market, all of which are good and pretty equal as to rapidity, therefore it would be invidious to recommend any particular make. Indeed, it is against our rule, in any case, to recommend a particular manufacturer.

W. Bowen desires to know if the electric light can be used for printing on albumenised paper, and what kind of "burner" should be used.—Prints can be made on albumen paper by the electric light if an arc light be used, but the exposure will be so long that the method would naturally become very costly.

C. B. (Rome).—1. The defects in the negative received appear to be due to something being splashed or spilt upon it prior to or during the development. One portion of it clearly shows a thumb or finger mark, *i.e.*, contact with moist skin while the film was dry. 2. We have not met with pinholes on these films. Are you sure they are not due to dust?

W. Davies.—By registering a photograph you can proceed against any one for infringing your copyright, but you cannot prevent copies of the same subject being sold, provided that they are not copies of your pictures. Photographs may be registered at Stationers' Hall. The copyright is *ipso facto* the property of the producer of the photograph.

Xeno says he has invented a new instantaneous and time shutter, and asks, if he sends drawings of it, or the shutter itself, will we tell him if he can obtain a legal patent for it?—There are so many shutters in the market, most of which are patented, that we must decline to give an opinion on the subject. This is a question for a patent agent, who will ascertain what has been done before.

Private says: "I have a half-plate single lens, seven and a half inches focus At times I require a longer one. Can I lengthen this seven and a half inches focus by placing behind it a simple concave lens? If so, I am at a loss about the stop. As the lens is now, the stop is in front of the lens; but with the additional lens, has its position to be altered, or has another stop to be used? If so, how or where am I to place it?"—Place the concave lens between the stop and the primary lens.

A correspondent, who dates from Wallingford, under the familiar name of "A Constant Reader," reminds us that in our leading article on *The Stability of Old Silver Prints* last week, we elevated Mr. Pollock to the judicial bench, instead of simply translating him to a mastership of the High Court of Justice. In the interests of accuracy we are pleased to make the correction. Constant readers, however, need not be offensive, as well as anonymous, correspondents, although they generally are both.

Cambs wishes to know why his toning bath refused to tone. He says he made up a stock solution of acetate of soda and chloride of gold, to be diluted with ten parts of water for use. Upon trying it three days after preparation it would not tone at all, even when the prints were left in for an hour. On looking at the stock solution it was discoloured, and had a dark sediment at the bottom of the bottle.—It is clear that, from some cause or other, the gold has been precipitated, probably from the solution being put in a dirty bottle or compounded with impure materials.

Novice says: "I have seen it stated that in carbon printing, with a very weak negative, a weakly sensitised tissue should be used, and, with a hard one, that the tissue should be strongly sensitised. As this appears to me to be quite opposed to the conditions of silver printing, I write to ask you if it is correct."—Yes, it is quite correct. To get the best result from a hard negative, the tissue should be highly sensitised, and not used too fresh. On the other hand, if the negative be feeble, then a tissue that is but weakly sensitised will give the most satisfactory prints.

X. Y. Z. says: "I saw a writer stating the other day that 'composition pictures used to be made up from two or more negatives, but since introduction of gelatine plates this tedious operation is practically abolished.' Is this the case? I always understood that a great many made up a negative of, say, the background, one or two for the models, and another for foreground."—Composition pictures from several negatives are still made, as the different exhibitions prove. So many negatives as used to be necessary in the wet-collodion days may not be required now to obtain the same end, but some pictures are still composed from several.

R. Mather writes: "Will you kindly give me a formula for making a paste or mountant for mounting silver prints that have received a burnished surface from being squeegeed upon plate glass—one that will not affect the permanency of the prints? I use starch or arrowroot for ordinary mounting, but owing to the presence of moisture they are not suitable for burnished prints."—Starch or arrowroot will answer the purpose, but the mount must be attached to the print before it is taken from the glass. There is no mountant that can be used which will retain the full gloss, if the mounting be done after the print is stripped from the glass.

Francis Bryant says: "I have a picture to copy which has a scratch right across the face. I dare not interfere with the picture itself, as it does not belong to me, and as I am enlarging the above, the scratch in question altogether disfigures the negative. I have used the usual remedies, such as paints, printing under tissue, &c., but still the fault remains."—Our correspondent does not say whether the scratch shows as dark or light in the negative. If the former, then the defect can be touched out in the print. But if many copies are required, it may be advisable to make a transparency from the negative and work out the scratch in that, and then make a second negative from it. If the defect shows light in the negative, simply stop it out by retouching with a lead pencil.

Lux asks: "What is the best method of rendering bromide enlargements non-absorbent? The proper size to apply before laying on the colours in oil colouring?"—The paper may be rendered non-absorbent by giving it a coating of a thin solution of gelatine, such as Nelson's No. 1 photographic. By using the glazed bromide paper, no sizing will be required for the application of oil colour.

J. H. G. writes: "As you so kindly assisted me with your advice in my last photographic difficulty, I venture to trespass upon your good nature and kindness a second time. I may say I have made, previous to troubling you, all inquiries possible from my various friends in the matter, but have failed to solve the difficulty. I send you by post two half-plate negatives *badly fogged* (through leak in changing lamp) while on tour). The question is, what causes the white line round three parts of the plate, absent in one case at the top, and in the other case at the bottom? You will observe first the rebate, then a seeming line of black (obviously pointing to light leakage), and then the broad line of semi-transparency, completely spoiling the plate. Every plate suffers more or less from this defect; sometimes the mark is on three sides, and sometimes only on two, and occasionally strongly marked only on one side. I have tried many times to discover if the cause of defect lies in the bellows partially cutting off light from the plate, but fail to find it in the slightest degree, the image being absolutely clearly defined on the ground glass right up to the edges. My best negatives this season, which are quite unfogged, suffer equally, and in most cases the results, as pictures, are completely spoilt, as far as composition and balance are concerned, by having to trim off more than an inch of the paper. I must own, although I do not like to be beaten in such a trivial matter, that I am completely at sea as to the cause, and if you can solve the difficulty for me I shall be greatly obliged."—Answer: We have carefully examined the negatives, and are of opinion that the plates are at fault. If our correspondent has any of the same batch of plates left, he might place one or more of them in a developer without exposing them, in order to confirm our opinion.

Hackney Photographic Society's Exhibition, October 21 and 22.—The last day for sending in entry forms is October 7.

The article on *Lighting in Portraiture* by Mr. Xanthus Smith which appeared in our number for the 11th ult., should have been credited to the *American Journal of Photography*.

Photographic Society of Great Britain.—On Monday next, at seven o'clock, Mr. H. Little will give a lecture. On Wednesday next, at seven o'clock, Mr. Brownrigg on *Paris, May*, 1891.

Croydon Microscopical and Natural History Club (Photographic Section).—October 2, ordinary meeting, *Gelatino-chloride Papers*, by E. Mariott. October 16, first lantern night of season, members' work.

Photographic Club.—Subject for discussion, Wednesday, October 7, *The Influence of Development on the Colour of the Image*. Outing next Saturday, October 3, Hampstead Heath; meet at the Flagstaff at two. Tea at the "Bull and Bush" at six.

London and Provincial Photographic Association.—October 8, *The New Ilford Printing-out Gelatino-chloride Paper*, demonstrated by Mr. J. Howson. October 15, first lantern night of the season. October 3, Hampstead outing. Tea at the "Bull and Bush" at six.

Mr. Arthur Brown, F.G.S., of Newcastle-on-Tyne, has recently issued a small *brochure* entitled, *The Camera: the Substance and the Shadow*. Quoting from its sub-title, it embodies "A causative exposition on the difference and variableness of expression so often visible in the living face and its photographic presentment." It contains some excellent advice by an old photographic hand.

Messrs. Inglis & Co., of Chicago, send us several bromide prints which possess a most charming sepia tone, produced by a special formula. It will be seen that we elsewhere deal with this very subject. We are forced to own that in this regard the English manufacturers have something to learn from their American brethren. In all probability Messrs. Inglis's paper will shortly be placed on this market.

*** Our Forthcoming Almanac.—*The Editor will feel obliged to those friends who intend contributing from their practical experience, research, or experiments to the* Almanac, *and, through it, to their brethren all over the world, if they would kindly send their articles or hints, no matter how brief, as early as possible, as it is the intention of the publishers to go to press towards the close of the present month.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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SHOULD THE OLD SYSTEM OF PRINTING BE REVIVED?

Since the article on *The Stability of Old Silver Prints* appeared in our issue of a fortnight back, we have been consulted by several photographers, both professional and amateur, whose experience has been confined to a decade or so, as to the advisability or otherwise of going back to the old methods of printing and toning with the view to obtaining more permanent pictures. It is an incontestable fact that some photographs made thirty years ago and upwards are still good; therefore it may well be assumed, if the modern prints were made under analogous conditions, coupled with the present knowledge of the chemistry of the subject, that they would be equally as permanent as those of old.

Permanence in photographs is certainly a great desideratum, therefore let us consider the probabilities and the practicability of the old system being reverted to either by professional or amateur photographers. One of the first things to be considered is that the old method would prove more costly than the modern one in more ways than one. The silver bath would have to be about three times the strength of that now in use. This would be an important item with those who work at the extremely low prices that rule in some parts. The negatives, in order to get prints of the same character as those of old, would have to be far more vigorous than those now made, and there might be some little difficulty in obtaining them with several brands of gelatine plates now on the market without having recourse to intensification—an additional trouble. The negatives would take very much longer to print, particularly when it is considered that the printing must be carried to a much greater depth than is the case at present to withstand the prolonged toning and fixing of the prints. These operations would also be a question of hours instead of minutes, therefore considerably more time would be consumed in the production of the pictures. Again, taste in the popular photograph of to-day is for extreme gloss, which, of course, prints by the old system would not possess. Hence such pictures would not be accepted by the general public, notwithstanding the promise of greater permanence.

The prints just referred to would, from a business point of view, certainly militate against a reversion to the ancient method of working by those who cater for the lower and middle-class public. With them it is tolerably well known, judging by their show-cases, stability is but a secondary consideration. Amongst the higher-class photographers, there are many who look upon the permanence of their work as of paramount importance; but their number is really less than might generally be imagined.

In a recent conversation with the principal in a firm of one of the largest manufacturers of cardboard in London, we asked if the firm would guarantee their boards to exert no influence upon photographs. He at once replied in the negative. We then inquired if it would not be wise to put a guaranteed board upon the market at an enhanced price, as many would prefer to pay extra for a reliable article. The reply was again in the negative, with the remark that the number of photographers who would pay it would be too small to make the thing remunerative. On mentioning this to different portraitists, amongst whom were some of our leading men, with the view of eliciting their ideas on the subject, they were unanimously of the opinion that the public cared far less for permanence than we had surmised. People, it was said, had become so familiar with faded and fading photographs, that they seemed to look upon evanescence as a natural sequence of things photographic. If the photograph lasted only for a few years, that seemed satisfactory, and complaints were rarely made unless the pictures began to fade or became spotty within a few months. As a matter of fact, old portraits, with the fashion of the period, except in the case of dear departed friends, are treated more as caricatures than anything else.

As a proof of the indifference of the public on the subject, we learnt that it was seldom that people would pay even a little extra to secure undoubtedly stable pictures, unless they were enlargements of deceased friends, fugitive portraits being considered "good enough to give away." When platinotype or carbon pictures were chosen, it is more, so it is said, on account of their tones than their stability.

One of our correspondents says, that as the taste amongst the more refined is for black tones on a matt surface, such as those that used to be obtained by the old system, why not go back to it for pictures of that class if for no other? The answer is simple. The same ends can be obtained by other processes—platinotype or carbon to wit—that give results which are not only practically, but theoretically permanent.

From what has been said it will be seen that there is very little probability, even if it were desirable, of the old system of printing being revived. It has always been a reproach to photography that the majority of its productions are fugitive. But we imagine that little change will be made amongst the profession if the public are really so indifferent on the subject as is alleged.

THE ACID FIXING BATH.

This term perhaps needs expansion if we are to write with chemical correction. A liquid that, for example, turns blue litmus red is said to have an acid reaction, though it contains no free acid, and in such light is the term "acid bath" to be read. The subject is by no means new to our readers, or rather to those who are students of every fresh phase of

photographic progress. We make this exception, as, from inquiries we have made, this very useful bath is little known generally, and still less used. Many years ago it was pointed out in these columns that a fixing bath for negatives could be rendered acid to litmus paper without injury, and with some advantage to negative. Later there was some discussion in regard to patent rights, until we conclusively showed the prior publication in this journal. It will be well to note that it is the fixing bath for negatives only, and not for albumenised paper prints, that these remarks alone refer to; for the latter work it possesses no advantages.

The advantages, then, of such a bath for negatives are by no means single.

Many practical photographers are aware that, when a negative is placed to wash after development, it continues to develop or to increase in density for several minutes, so much so, that if two plates of exactly equal depth, when removed from the developer, are fixed after washing for different lengths of time, a notable difference of density in the finished negatives may be perceived. Now, in the course of developing a set of plates, it is exceedingly probable that the systematic developing, washing, and fixing will not proceed with such regularity as to insure equality of washing, and there will, in consequence, be introduced a factor of uncertainty when, as we have always endeavoured to show, the leading aim of the operating part of the work should be to make every stage methodical, regular, and certain. Of course, if one negative only be in hand at a time, and another not proceeded with till the first is in the final washing water, this uncertainty would not exist; but, when a series are brought home from a photographic expedition, we apprehend, greater despatch than this would be required. If now a negative be washed for a very brief time, it may be safely placed in the kind of bath we are discussing without any danger at all. True, this may be done in the ordinary bath, but the result would be that after a few days it would be too discoloured for use. With the acid bath, repeated immersions of slightly washed negatives fail to produce discolouration. The acid condition of the bath thus performs the double function of neutralising the alkali of the developer, and preventing that quantity which dialyses out into the fixing producing the usual dark colour.

But there is a positive advantage. Every one is familiar with the deep yellow that a pyro-developed negative exhibits when it has taken an unusual time to develop, and has then been fixed in the usual manner. The acid bath in most cases obviates this evil, as we decidedly term it, though some photographers are to be found who express approval of the yellow tone. This yellowing is not so pronounced when fresh hypo is used; but the average photographer does not use fresh hypo, and the difference in appearance between a negative fixed in ordinary hypo and in acid hypo is so pronounced, that few who have once seen it would adhere to the old plan. This is the conspicuous property of the new hypo as it may be termed.

As to working details, they are simple, and consist simply in adding to the hypo about twenty per cent. of the acid sulphite of soda, to which has been added a small quantity of ordinary sulphite, to insure the acidity not being too pronounced, as this might result in decomposing the hypo. We take it that one reason why the new bath has not made much headway is the objection to adding to the number of chemicals in use—a poor reason, but an actual one. To obviate it, the following plan may be adopted, and will answer every purpose. Dissolve ordinary sulphite of soda in water, and divide the solution into two portions in the proportion of one to three; or, to use concrete quantities, take one pound of sulphite, and dissolve it in half a gallon of water. Take three pints of this solution, and add citric, tartaric, sulphuric, or any acid convenient to hand and continue to add the acid till a permanent odour of sulphurous acid is evolved. Then add the unaltered pint, and put the whole in a Winchester labelled "Acid sulphite."

Presuming the hypo to be usually mixed in about this strength (one in five), mix with a pint of hypo solution five ounces of acid sulphite, and it is at once ready for use. It will be acid to litmus paper, but will not interfere with the permanency of the negatives; it will be a long time before it becomes discoloured, and negatives fixed in it will be free from yellowness. If, however, the plates be very thickly coated, the colour will not be entirely eradicated unless the development has been rapid. In conclusion, we may say that we think every one giving the plan a fair trial will be more than satisfied.

LINE SUBJECTS ON GELATINE PLATES.—III.

Having given the necessary preliminary directions, it now only remains to speak of exposure and development, two portions of the process which, in their way, are of at least equal importance with those already dealt with.

With regard to exposure, an idea seems to exist that this should be as short as possible, in order to give the necessary contrast; but we think we shall be able to show that this is an entirely erroneous impression. Setting on one side the circumstances of light, lens, and plate that may tend to influence the actual duration of the exposure, and looking at it in the broadest light possible, we are firmly of the opinion that, when all necessary precautions have been taken, as directed, the longer the exposure that can be conveniently given the better will be the result obtained.

Suppose now, for instance, what is considered a minimum exposure has been given in the belief that, as the subject is pure black and white, the development may be forced until the necessary density of the white lines is obtained, without any chance of the black lines producing any deposit. If we could start with an absolutely faultless plate—*i.e.*, one entirely free from inherent fog—and an absolutely perfect arrangement of camera and lens that neither dispersed nor reflected light on to the sensitive surface, backed up by a really "safe" light by which to develop, then possibly we might count upon the short exposure sufficing, in some instances, at least, as in the case of an engraving pretty even in tone throughout. Then we might go on piling up the density to almost any extent without filling up the clear lines. But suppose our engraving happen to include very heavy shadows as well as fine, delicate high lights, a not by any means uncommon combination, the case will be quite different. The scarcely perceptible touches of white (or degraded white) in the shadows of the original will require all the forcing that can be given in order to render them even visible, without thinking of density, during which period the half-tints are proceeding evenly and well enough. But the fine, delicate lines or stipple forming the highest lights will be hopelessly lost, not from fog in the plate, not from reflected light, but simply through the spread of chemical action through excessive development in those parts.

But throwing in the natural conditions that prevail practically when every possible precaution has been observed—the slight chance of fog it is almost impossible to thoroughly eliminate from the plates and the small amount of reflected

ght in the camera that is inevitable—the chances of a successful result become still further remote, and the giver of short posures will soon relinquish his task in disgust.

On the other hand, if a tolerably good exposure is given, the tural contrast of the subject throws the inherent difficulties ogether into the background. The plate become amply pressed by the light thrown off from the white lines of the cture, while, still supposing every necessary precaution to ve been taken, the effect that reflected from the black lines practically *nil*, and development proceeds comfortably and sweetly." There is no necessity to force up density, it comes turally and as a result, even if there should be a slight susion of fog on the plate, or of diffused light in the camera, it s not time to make its influence felt before the image is comete. In this case, too, the delicate high lights will remain ear, since the fine white lines will have received no more posure than the coarser ones, and, in the absence of forcing, ere will be no tendency to thicken, or spread and fill up; the aviest shadows will, at the same time, have a chance of rening what little detail they may contain. For all reasons, erefore, we contend that a full exposure should be given.

A few words may be said upon the lighting of the object. the case of rough engravings, and especially those on coarse per, a side or top light will cast such heavy shadows, both of e texture of the paper and the lines of the picture, as to ruin erything. It is usually recommended to work with a "front" ht, and very good advice it is when it can be managed; but better plan, and easier to work, while it practically amounts the same thing, is to use two separate lights, falling upon e object from different directions, and at the same angle. In is manner the shadows cast by each individual light on the equalities of the paper are neutralised, and if the lights be ranged in such positions that the rays reflected from the surce of the object pass beyond the field of the lens, the black d white of the engraving will reach the sensitive plate without practical change.

Passing to development, little need be said beyond laying wn the principles to be chiefly observed. As already casually nted, it is a mistake to suppose that, for ordinary purposes, eat density is necessary in line negatives; it may be, and is, sirable in the case of some of the photo-mechanical printing ocesses, but for any of the methods likely to be adopted by ateurs, or ordinary professionals who may undertake a job this kind, a negative of moderate density and perfect clearss is the best. As the density increases, so does the difficulty printing through the finer portions, however clear they may . Strange though it may seem, it is easily proved that if o lines be scratched upon a piece of smoked glass or a suitle collodion film, the one extremely fine, the other comparely coarse, the former will require a much longer time to ss an impression on to silvered paper than the latter, even ough both are represented by perfectly clear glass. The me rule holds good in the case of a line negative, and the sparity increases with the thickness of the deposit forming e image.

Of the different developers, hydroquinone appears to recomend itself to many on account of the clearness of its results; t, in our opinion, it is not to be trusted except under cumstances where every condition can be almost mathematilly calculated. With some plates, for instance, its partiality "irregular" development, or development in patches, where e high lights gallop away from the shadows and half-tones, uld alone render it the worst possible agent for our present purpose. Eikonogen runs on all fours with hydroquinone for cleanness, and is quite free from its defects of irregularity and hardness; but it perhaps errs on the side of giving images of too great delicacy. This failing is, however, very easily remedied as soon as recognised, and especially by the means to be presently noted.

Pyro, after all, the servant of many years, still seems to remain our sheet-anchor, not only for this, but for most other purposes. It possesses no peculiarities (except that of staining) like its newer rivals, but will give an image dense or delicate as may be required. Nothing seems to excel the old mixture of pyro, sulphite, and ammonium, with, of course, bromide, for plates of ordinary or fairly good quality.

But, if the films have a tendency to thinness, or in cases where special density is required, the addition of gallic acid will effect what is required, and keep the development clear while almost any degree of density is being obtained, and the same modification may be made with the eikonogen developer with equally beneficial results. This developer has been described previously in these columns, and consists briefly in the addition of from one to three grains of gallic acid to each ounce of developing solution. Or the plate may be soaked before development in a saturated solution of gallic acid, the effect in either case being to considerably lengthen the period occupied in developing, and to preserve the clearness of the shadows to such an extent that the action may be continued until almost any degree of density is gained.

The report which we give this week of Mr. Henderson's demonstration on *Gelatine Emulsion Making*, before the members of the London and Provincial Association last Thursday evening, is necessarily brief, but it embodies all the salient points of the lecturer's address. We must confess to a feeling of disappointment at the smallness of the discussion which ensued. There were several plate-makers present, but they kept their ideas to themselves. They, we suppose, had come to learn, and not to instruct. If so, we hope they did not go empty away.

The *Chronicle* says:—"A new departure is announced for the next number of the *Magazine of Art;* it is the production of a coloured plate after the picture by H. E. Detmold, entitled *A Breezy Day*, which was exhibited at the last Burlington House show. The editor and publishers have come to the conclusion that chromotypogravure —the rose smells sweet under any name—has of late made such progress that it is fit to rank with the etchings, steel engravings, and photogravures that have hitherto adorned the pages of the magazine." May we ask the *Chronicle* if it adheres in this instance to its recent condemnation of process work for magazine illustration?

Mr. Weir Brown's communication on *Warm Tones on Bromide Points* to the Croydon Society, which will be found on page 648, is an interesting addendum to his already published views on the subject of uranium toning. The energy with which experiments in charging the tones of developed prints in silver bromide is being followed certainly points to the inference that the want of such a toning process is real and not imaginary among all classes and workers, and that warm tones, after all, will as heretofore probably soon enjoy the balance of favour among photographers and the public.

By the way, does not Mr. Weir Brown, in stating his reasons for rejecting the redevelopment method of toning, rather exaggerate the gravity of one of his objections? We allude to the necessity he implies of having to redevelop the bleached image in the dark room. Chloride of silver so produced is really not so sensitive as to oblige

any such course to be taken, and the bleached image may be re-developed in *subdued* and comfortable daylight without any fear for the character of the results. Indeed, we are not sure that a brief exposure to direct light is not an advantage in influencing the tone of the picture in the direction of greater warmth.

THE LATE PROFESSOR PETZVAL.

We are sorry to have to announce the death of this eminent optician, which occurred on the 15th ult.

Professor Josef Petzval was a native of Hungary, where he was born in 1805. He had thus attained the ripe age of eighty-six years. He was of a studious disposition, and began his work upon optics when he was still a student. His labours were continued while filling the mathematical chair in the University of Vienna, in which city he long resided.

It was in 1839 that his attention became first directed to the desirableness of having a photographic lens of more important capabilities than any of those which were at that time being employed, and to this end he entered into alliance with Voigtlander, a manufacturing optician in Vienna, who was cognisant of the requirements of the mathematical optician as regarded the glass necessary for carrying out the end aimed at.

In 1841 that triumph of the optician's art, the portrait combination, was launched upon the world. Of all lenses extant, it is the one possessing the greatest angular aperture, by which term is now well understood the diameter of the lens in relation to its focus. In former times, when photographic processes were less rapid than they now are, it is easy to conceive of the impetus given to portrait photography by the discovery of Petzval.

About the same time that Petzval computed the portrait lens, he also invented another combination of smaller angular aperture and greater covering power—the Orthoscopic lens. This was allowed to remain in abeyance till 1857, when it was issued by Voigtlander. It consists of a front lens of positive power, and a back lens (smaller in diameter) of negative power. For several years the Orthoscopic was all the rage, especially for landscapes and out-door groups, but it gradually became supplanted by others.

Another optical invention of Petzval was the well-known opera glass, in the form in which it now exists as manufactured by the best opticians.

Some of his more purely mathematical works have been published by the Government, and some years since a strong desire was expressed that the Government should also publish his elaborate works on optics. We are not in a position to say whether this has yet been done.

AMERICAN NOTES AND NEWS.

Mr. C. Butterworth, in a paper read at the Ohio Photographers' Association, has had the honesty to speak his sentiments regarding the art knowledge of his brethren in a manner that admits of no misapprehension. Desiderating the education and cultivation of taste, he boldly asserts that photographers, more than any class of artists, lack a thoroughly well-grounded knowledge of art principles. This, be it understood, is said with special reference to American photographers, of whom it cannot be said that they are, even in the slightest degree, the inferiors in either art or *technique* to those in this country. The remedy proposed by Mr. Butterworth is to give preference in exhibition awards to works of artistic merit. A good deal of what he says applies to our home photographers, although here, we are glad to say, artistic photography is being more aimed at than formerly.

The *Photographic Times*, in an article on "Blisters in Bromide Paper," says that the cause of these blisters must evidently be looked for not in the sheet of prepared paper, for the blisters would not be of such rare occurrence if the cause lay there. Since ferrous oxalate development has been superseded by hydroquinone and eikonogen, and since the acid hypo bath is employed for the fixing of bromide prints, and the intermediate clearing bath of acetic or citric acid has been abandoned, blisters are not so frequent as heretofore, a fact explained perhaps, by the reason of acids destroying or impairing the viscosity or its extremely feeble film on bromide paper. Professor Lainer's method of hardening the gelatine film is recommended. He adds saturated solution of sulphite of sodium to a saturated solution of alum, till the white precipitate formed, and which dissolves *in statu nascenti*, remains slightly in excess. Adding this solution to an equal bulk of a one to five solution of hyposulphite of soda constitutes an excellent fixing and toning bath for bromide prints.

We quote the following from *Anthony's Bulletin*:—"A formula for intensifying negatives for photo-mechanical work, which is said to work excellently, is as follows:—

A.—Bromide of potassium	¼	ounce.
Water	4	ounces.
B.—Sulphate of copper	½	ounce.
Water	4	ounces.

Mix equal proportions of A and B, and flow on the plate till thoroughly whitened. Blacken with nitrate of silver, thirty grains to the ounce, or hyposulphite of ammonia, one part; water, four parts." It may perhaps, have slipped the memory of our esteemed *confrère* that the intensifier, in all but the latter alternative "blackener," has not only been in use, both in this country and America, for many years, but was first published in America, and has since, in Europe, been usually designated as the American intensifier.

In a former note, and *apropos* of having seen some hand-engraved reproductions of Dr. Wilson's Orient photographs in the *Century Magazine*, we spoke of the desirableness of having such magazine productions collated in classified form. Our attention has been directed to the fact that in the particular case referred to the desideratum has already been accomplished, a fact we are glad to learn.

Speaking of illustrated American journals, the *Dominion Illustrated* stands almost alone as an example of enterprise in connexion with the lavish employment of photo-mechanical methods of illustration, as in most cases their numerous engravings are, of this class, not unfrequently admirably done. The *Scientific American*, too, the prince of papers for the beautiful hand engravings of machinery which adorn its pages, is now occasionally introducing phototype blocks; but, however well these may appeal to the reader as regards realism in interpretation, they do not approach in artistic excellence those engravings for which that serial has so long been famous.

When treating of lighting the sitter, at the Convention of Ohio Photographers, Mr. John S. Schneider says it is not necessary that bold lighting should be a hard lighting; it may just as well be soft and round. To get this effect he advocates placing the sitter well under the light, and working with the light considerably open. This helps to model the face, and gives the drapery the richness that is desirable, be it black or white. He advocates the well illuminating the background. This causes the subject to stand out in bold relief, imparting an atmospheric effect. He urges the importance of illuminating the sitter that one can see the direction of the light, or on which side of the face the sidelight was. Many pictures are flat and weak because the operator did not illuminate the subject; he failed to distribute his lights and shadows effectively.

Recently we recorded the enterprise of a provincial photographer who took the pictures of a large number of babies gratuitously, giving each mother a print of her child. "Baby-snatching," as it is termed there, is carried to great lengths in America. This is how one of the brethren advertises himself. We quote from the *American Journal of Photography*:—"Baby-day at Snook's gallery! On Wednesday, August 26, we will make one cabinet picture of your baby under eighteen months, Free! No charge whatever. You bring the baby, and we will present you with its picture. This is

atch. . . . Every one can have a picture of their baby. We want 00 on that date. Remember, it costs you nothing. For the prettiest aby we will make a pastel portrait. To be decided by our patrons uring the next thirty days." The advertiser's enterprise is certainly worthy of admiration if his grammar is not. We do not envy his atrons the invidious task of deciding which is the prettiest baby—specially if any of the mothers are present at the awards.

THE sea serpent recently revisited these latitudes, but we are sorry to ay that he was allowed to depart without being photographed. The ig gooseberry has not been heard of for years. In America, how-ver, dead-season phenomena still remain to delight and astonish ankind, if we may judge from a recent paragraph in *Wilson's Magazine*. The editor acknowledges receipt of a life-size portrait of York County (Pa.) peach measuring three and a half inches square. We should like to know if the measurements are those of the peach r of the picture; and, if the former, what the size of the entire egative is. Further, was the peach sent with the picture? Three nd a half inches square is, we suppose, a possible size for a peach, but ve are tempted to reflect on the very wide field which the photo-graphing of abnormally big peaches and so forth opens up, inasmuch s it is obvious that such phenomena may be produced as often as hey are required by the simple operation of enlarging a negative of rdinary-sized fruit. We therefore suggest to any of our contem-poraries who may in the future be favoured with photographs of large ooseberries to stipulate for the production of the fruit as well as the picture.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—II.

No. 98, A. Horseley Hinton, *The Evening Ebb*.—This is one picture amongst eight exhibits, all evincing a pictorial choice of view and arrangement of matter which could be controlled, so that the evidence shows that artistic skill has governed the standpoint, in order that the guiding lines may harmonise and the light and dark portions balance each other. The scene is on the shore, where the various converging outlines assist the perspective, and some three figures with light and dark dresses assist, by their strength, in distancing the trees; all these results are the outcome of design, and show that study will do great things. But just one point; the clouds have been printed in and are somewhat dark, otherwise the picture is exceedingly good. The other exhibits show care in their selection, but the subjects are not so pictorial, and do not suggest remarks.

No. 114, J. Gale, *A Lesson in Spinning*.—An old dame seated at a cottage door, spinning, is instructing a young girl, who is standing, and one point we notice is the design in raising her arm so that the hand might lean upon the doorway. This shows an artistic perception of the necessity to have such a line, and the result is good. The leading lines of the details have been well arranged, and the harmonious result is very satisfactory. There are two other figure pictures, both good, but that which we notice presents most skill in the arrangement. One peculiarity in these pictures is the advance in the size of the figures. One could wish that the increase of size had extended to the photograph as well. However, these pictures are full of thought, and will repay careful study.

No. 128, C. S. Roe, *Sedge Gathering*.—A very nice arrangement of subject-matter, where, in the foreground, some well-grouped figures form the leading design. The extreme distance has been well selected, and the clouds have been subdued, so that altogether the picture is most satisfactory. There is a character about the photograph which suggests some process rather than a direct print from the negative, which considerably assists the effect.

No. 144, W. J. Byrne, *The Alphabet Illustrated*.—These twenty-one small photographs have been taken from four young children, and are really exceedingly interesting studies. The design has started with an apple-pie, and the letters which follow of the alphabet have all contributed to the various episodes which this apple-pie goes through. Each group has been well arranged, and, as each leading figure in the various scenes is dressed in white clothes, the effect is concentrated, and it becomes a drama where the prominent figure is always distinct and clearly points the moral of the alphabetical story. The merit of these various eighteen pictures must be entirely due to the arrangement by the exhibitor. At the same time, the children have cleverly obeyed the instructions, which show that credit is due to the carrying out of so many various arrangements of the design, which is a very pretty idea, and the whole affair reflects great credit upon the exhibitor.

No. 149, Rev. H. B. Hare, *Natural Mirror*.—The subject consists of some buildings and trees, which are reflected in water. The result is the usual good work which this exhibitor always produces, very carefully executed; but one thing only is wanted, and that is, greater contrast between the foreground and distance, also the clouds should have been more pronounced, so as to tone down the sky space, which is out of keeping with the rest of the picture, and also a more powerful foreground—or, rather, foliage—would have greatly increased the effect.

Nos. 159 and 167, his Grace the Duke of Newcastle, *Lionesses*.—Two very good photographs in a technical sense, but the attitudes might have been better chosen; they want some action which is suggestive rather than suspended. They are very carefully executed works.

Nos. 158 and 176, F. Beasley, *Scotch Scenery*.—Eight views. Careful work, but they do not completely realise the locality. It is singular how the Swiss scenery really brings back to memory the recollection of the reality much more than the mountains of Great Britain. It must be the colour of the distance which does the wrong, and also the dark green of the leaves, which causes distance to come so forward. This being the case, such views do not repay all the extreme carefulness which this exhibitor, who gives every attention to what is the right thing to insure success, does not always command.

Nos. 181 and 186, J. P. Gibson.—Six photographs in silver platinum toned all show great care in the treatment. One matter is pleasant to see, and that is the definition of the distant foliage; but some—No. 199 and others—in juxtaposition, are not so good from an artistic point of view. They are rather flat, and somewhat lacking in detail.

No. 180, London Stereoscopic Company, *Miss Lily Hanbury*.—This is one of those portraits which we have alluded to as having been treated with one flat, dark background. This intensifies the face, and certainly throws all the attention on the portrait, which is the primary object of the picture; but in the lower part of the picture the light dress on the arm is allowed to be too hard in outline; by being softer, the effect would be much improved. This treatment implies a considerable amount of artistic taste, which photography can utilise.

No. 212, C. Reid, *Horses, Sheep, Deer, and Dog*.—Some good photographs, where the scientific predominates. They are four small pictures, and are admirably manipulated.

Nos. 225, 226, W. P. Marsh.—Two pictures of kittens (enlargements). These photographs make two very pleasing pictures.

No. 230, H. Van der Weyde.—A frame of portraits full of exquisite detail. On some of the light dresses the high lights have been intensified, which adds to the roundness of the form; but this has been done by an artistic hand, and so, being good, is nothing more than the continuation of what the lens has begun. This work, being beautifully sharp in focus, enters a protest to the other system, which, being against the known characteristics of photography, cannot live, and such portraits as these are a lesson to those who are desirous of perpetuating all those special qualities which cause photography to differ from hand work.

No. 274, B. G. Wilkinson, *The Bookworm*.—This subject is a studious monk reading whilst walking in a walled enclosure, at the back of which are trees; a very good picture, where every bit is full of detail, and the dark dress of the monk, being the darkest portion of the picture, stands out and becomes intensified thereby. Now, here is a subject which not only claims attention for the fine detail, but also the contrast of opposing parts. We have also here, again, the value of dark portions in the shadow of a tree, which is at the lowest part of the picture; but, whether it has been produced from nature or by tinting, the result is equally good. With these very simple materials we give the credit for the artistic feeling which guides the treatment of the picture.

No. 291, H. Stevens, *Flower Study*.—A fine specimen of this ex-

hibitor's work. A white vase and delicate light flowers, where the lighting has been carefully attended to and the scientific manipulation been perfect. This exhibitor stands alone in the exquisite rendering of such beautiful studies.

No. 301, A. R. Dresser, *Ploughing*.—This is a very effective picture, where the dark horses, somewhat in the centre of the picture, accentuate the distance, which retires; the clouds also retire, so that the whole picture is admirable. There are other similar works by this exhibitor, but not equal to this one, where the rough paper does not seem so inappropriate as in others.

No. 314, A. Maskell, *Landscape, with Reeds and Rushes* (a print from a pinhole negative).—This, and another photograph, 313, taken in the same way, rather suffer from the want of detail in some of the dark portions of the foliage, and in these specimens the distances come forward in power almost as much as the foregrounds. In one of the specimens the clouds, unless they were remarkably still, should have been more indistinct, while, on the contrary, their outline is some of the sharpest work in the picture, suggesting that these clouds were printed from another negative, that had been exposed very rapidly.

No. 518, by the same artist, is from a negative taken by a spectacle lens, and is really a charming picture, although, as in the case of the others mentioned, the distance is somewhat pronounced. They will interest those who wish to see what can be effected by pinholes, or by lenses of the class named.

No. 366, C. H. Cooke, *Jetsam*.—This is a picture made of unpromising materials. A rising river shore, which goes up for two-thirds of the picture, some old anchors, and a boy searching for findings, and a small bit of the river and the distant shore with old buildings. The choice of the fixed material is good, and the arrangement of the movable figure is better still, although this is a subject which might not promise good results, therefore credit must be given for working out so good a picture.

No. 337, R. W. Robinson, *Peep-bo*.—A mother, just partly concealed by a small gate, presses her head through a broken portion and ejaculates the title to a little girl, who turns round with pleasant glee to recognise the mother's presence. One matter which shows the artistic perception is the child's hat, which just breaks the hitherto monotony of the upright lines of the figures. There is design in the whole arrangement, which merited the medal awarded to another picture. There are some similar subjects in other frames, but not so good as this one.

No. 409.—*Figure Studies*.—A frame of several small pictures, all exhibiting an artistic perception of unpromising natural scenes which have, however, been enhanced in value by the judicious selection of figures.

No. 430, T. M. Brownrigg, *A Surrey Brook*.—The brook runs through some gronnd under picturesque trees, which have been well chosen so as to arrange a pleasant combination of lines altogether making a good picture.

No. 433, W. J. Byrne, *Studies of Children*.—Some twenty small studies all showing a departure from the beaten track of such work, which has hitherto been treated in a very conventional mode. Such young folks as these make photographs which are decidedly pictorial. We also notice how very rich are the tones, greatly increasing the value of such carefully good work.

No. 454, J. Hubert, *The Story of the Saint and Sinner*.—This exhibit consists of seven pictures where a child is tempting a dog to eat a lump of sugar. After several resistances the poor, tempted animal finally succumbs, and then the remorse follows. This is really a clever series of designs, which reflect much credit upon the photographer who could so very cleverly arrange the little girl and the dog as to illustrate the various episodes of the dramatic duet. There is also a large amount of credit to be awarded to the actors in the domestic play. The time and skill necessary to arrange the seven scenes must have been very great, and should have met with its reward.

No. 435, S. N. Bhedwar, *Home from the Well*.—One of five cleverly arranged pictures, where female models have been well studied, and all make good pictures. The leading features are similar to those which this exhibitor showed in last year's exhibition, where light dresses are the problems to secure good contrasts. Although these are very good, yet, comparing with those in last year's Exhibition, the present serie only just carry on the reputation which his subjects last year created We select No. 435 as evincing a higher study of pose beyond th others. A girl, with a water-jug, is coming down some steps into possibly, an Eastern dwelling; one foot is just descending the lowe step, and the whole figure is very graceful, and is not killed by an lighter portions of the background. All the five pictures are abou 14 × 12, and do not contain any of those dark portions which we s generally see. This is a very commendable arrangement, and many other exhibits, from a variety of workers, might be improved by t study of these photographs.

Nos. 432 and 543, Autotype Company (enlargements from negatives by J. W. Lindt), *Group of New Hebrides*.—These are two large works, in which we find that the original negatives must have been exceedingly good, and much skill has been shown in the grouping of each set of figures, about six in each photograph. The colour of the natives produces some very excellent results in half-tones, and, although the human beings are slightly repulsive, yet the other parts of the pictures, especially the foliage, are very charming.

No. 507, J. Stuart, *Interiors by Magnesium Flashlight*.—A frame of 12 × 10 interiors of dwelling-rooms, with some large figures. There are two facts which at once assert themselves upon looking at these most successful specimens of this work by artificial light; one is the most careful attention to the production of the negatives, and the other is the movable accessories which show good arrangements, and not the less admirable is it as work done by flashlight, showing what successful results can be produced.

No. 588, S. N. Bhedwar, *Portrait of R. W. Robinson*.—This is a very good portrait, but the pose does not convey much character; the angularity of the arrangement of the left arm is not necessary, and the square result is not good; this necessitates the head being placed too much on one side of the picture, which disturbs the balance of composition.

No. 589, R. W. Robinson, *Portrait of H. P. Robinson*.—A very good portrait of this well-known photographer, but the expression is too severe; it does not do full justice to the original, whose general look is much more genial and expressive. The background should have been considerably darker, either by a natural one, or by toning down. However, the likeness is exceedingly good, and will be seen with interest.

No. 610, C. B. Moore, *Gimme a Light*.—There are about eight photographs taken from deep-coloured Mulatto boys, which exhibit much appreciation of humour; many of these photographs show the right time when to take such models, as they evince character and peculiarities which can only be seen in America.

Nos. 51 and 59, J. B. Hilditch, *Ice Floes in Richmond, January*, 1891.—Two very good pictures of well-chosen ice scenes, where the distance in one has been well rendered, and in the other a train passing over a bridge has also received full justice.

No. 89, J. P. Gibson, *The Thaw*.—Another of those well-chosen snow studies where the thaw has been rendered exceedingly realistic. The detail, which has been carefully manipulated, shows the gradual thaw which permeates the whole picture.

No. 93, F. Thurston, *Interior of a Ball-room*.—This appears to be an enlargement in carbon, but the original must have been very good, and the study for the effect has been well arranged for the point of view.

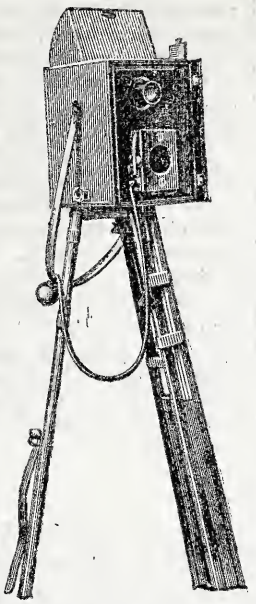
No. 134, A. Burchett, *A Highland Spinner*.—A realistic photograph, where the record of the subject-matter has been carefully executed.

No. 145, A. Keighley, *Driftwood*.—Some three or four figures looking out for driftwood, where the figures are well arranged. If the clouds had been darker, it might have broken up the square of light, and especially as the dark cliff fills the other half of the distance, and disturbs the equilibrium which is requisite to balance the picture.

The Apparatus.—II.

Since writing our first notice, we have been made aware of the new Portable Divided Camera of Messrs. Ross & Co. being now in the exhibition, although it does not appear in the catalogue. It is a bilens camera, intended for use either in the hand or when erected upon a stand. In this latter condition it is shown in the cut. It is divided

o two compartments, the upper one having a mirror, inclined at an gle of 45°, by which the image is thrown upon a focussing screen ık in the top, and shielded from light by a folding hood. The ussing screen is of precisely the same size the sensitive plate, and each compartment itted with a Rapid Symmetrical of identical us. Hence both images are alike. The ises are simultaneously adjusted by a milled ıd on the side of the camera. The working s is controlled by a shutter, which can be posed either instantaneously or by time at fitting moment. The body is covered with ther, and the workmanship throughout is the highest class.



A machine for cutting sensitised plates, by e Paget Prize Plate Company, is a marvel of enuity. The plates are fed in upon recept- les mounted on a circular table, which, as rotates, brings each under the action of a mond, by which it is bisected in one direc- n, a second diamond cutting it, when so sired, in an opposite direction. The machine an elaborate piece of construction, and ined a medal for its exhibitors.

The interchangeable plate-boxes shown th Mr. Samuels' hand camera are constructed an ingenious manner. Each contains one dozen plates in sheaths, d the arrangement is such that the plates, as they are exposed, are nsferred to an empty box identical with the one in which the supply retained, and which, when thus emptied, is made to serve as a ceptacle for the plates in that box which succeeds to the other.

IDENTIFYING PLATES IN THE DARK ROOM.

WHILE perfectly agreeing with you as to the desirability and con- nience of makers affixing some distinguishing mark to their plates that their identification in the dark room among various makes ight be easily accomplished, I don't think that a really practicable d inexpensive working method has yet been put forward. Your rrespondent, W. H. Plaish, M.R.C.S., suggests that every plate ould be backed with adhesive black paper, and he rightly claims at this would reduce halation, and lessen accidental fog (from the ck, of course). But the objections to this plan are obvious. The tra cost would be great, and the difficulties of cutting probably in- eased; for, where the cut is made through the film, the paper, in the t of separating the plates, would no doubt be apt to break, while, as cutting through the paper from the back, I have my doubts whether tters would view the task with any favour, or whether a diamond ould answer for the purpose.

Any labelling of the entire surface of the backs of the plates is erefore, I fear, out of the question on the above grounds; but still, believe, the matter is capable of being handled and wrought out to successful issue, and it is therefore with that idea that I offer the lowing suggestions.

The principal stock sizes of glass delivered to the plate-makers are, believe, as follows:—$8\frac{1}{2}\times6\frac{1}{2}$, $9\frac{1}{2}\times6\frac{1}{2}$, $10\times7\frac{1}{2}$, 10×8; and from these e smaller sizes are cut. Thus, to take the first, a whole-plate cuts o quarter-plates, or double quarters ($6\frac{1}{2}\times4\frac{1}{4}$); the $9\frac{1}{2}\times6\frac{1}{2}$ into half- ates; the next into $7\frac{1}{2}\times5$; the fourth into 8×5 and 5×4. Here, cluding lantern plates, you have all the smaller sizes, ranging from $\times6\frac{1}{2}$ downwards—$7\frac{1}{4}\times4\frac{1}{2}$ being so seldom used as hardly to call for nsideration, and $6\frac{3}{4}\times3\frac{1}{4}$ (stereo size) being, of course, cut from a uble plate. In only two instances does one plate cut into four, it is the whole-plate and the 10×8.

Now, the only real trouble in the way of makers marking their tes for us so that we might identify them in the dark room lies, course, in the fact of smaller plates having to be cut from larger es. Put the quarters and 5×4 out of consideration, and the dif- ulty vanishes. All that the user of a plate wishes to be sure of is o is the maker, and what brand or rapidity the plate is. This ormation might be printed on a slip of paper, say, two inches long, and slightly more than an eighth of an inch broad, thus, "Brown, Ex. Rapid," "Smith, xxx. times," and so on. If this paper were ready gummed, it seems to me that there would be little extra labour or cost involved in attaching one of these slips to the extreme edge of the back of a long dimension of every 15×12, 12×10, 11×9, 10×8, 9×7, $8\frac{1}{2}\times6\frac{1}{2}$ plate, and on *both* the edges of the greater sides of the double half-plate ($9\frac{1}{2}\times6\frac{1}{2}$), the whole-plate (when cut into double quarters), and along the shorter dimensions of the $10\times7\frac{1}{2}$ and 10×8 when being cut into $7\frac{1}{2}\times5$ and 8×5 respectively. The cost of print- ing and mucilage would be slight, the extra labour not, I should think, of any serious consequence, and certainly the two combined need not be taken into account as likely to much increase the price of manu- facture. And this I put forth as the view of one long conversant with the subject.

The very slight breadth of the little label which I advocate may be taken to represent the average depth of that part of a plate which is cut off by the rebate of the slide, and need, therefore, not excite any dread of influencing the negative in any way. The plates could, of course, be labelled before being coated.

As to the smaller sizes, a whole-plate intended to be cut into quarters would have to be labelled along *both* its larger sides with the information printed at intervals, so that each plate in the cut- ting got its slip, and a 10×8 would have to be served in the same way. Personally, I do not look upon the extra trouble here in- volved as very great; but makers are hard to move in these and similar matters, and I therefore make the suggestion in the hope that it may elicit inquiries as to its practicability and usefulness.

I think the question one of very great importance, and I am sur- prised that it has not been brought before any of the congresses or conventions. I see that one of your contemporaries pooh-poohs the suggestion you made the week before last; but it offers no "practical" ideas of its own on the matter, although it is not behindhand in con- demning other people's, be they "practical" or not.

GEORGE WHITWORTH.

THE PRINTING PROCESS OF THE FUTURE.

III.

IN my last article I endeavoured to note one or two important points in gelatine-emulsion-paper-printing up to the final washing stage. The method of finishing these prints by drying on glass is now well known, although, judging from the numerous inquiries from distressed correspondents to the various photographic journals, it does not appear to be the easy task often represented. During a lengthy experience with the working of this process, I have finished many thousands of prints. Failures I got at first, I admit, but these merely led me to the right road to success. My experience may, however, be useful to others travelling the same road, and may serve to shorten its length.

We will, then, consider that our prints are lying in the final washing water awaiting further treatment. The question then arises what is the best method, or rather which is the most suitable. This will depend to a certain extent upon the style or subject of the picture, and the artist must use his own judgment in the matter. There are three principal ways open to him. First, he can dry his prints spontaneously, mount upon suitable mounts, and roll or burnish. In burnishing, an aqueous solution of Castile soap is generally used as lubricator. For gelatine-chloride emulsion prints, however, this would not be suitable, as it would moisten the gelatine, and the hot plate of the burnisher would, of course, dissolve away the image. It then becomes necessary to dissolve the Castile soap in alcohol. A very fair surface is obtained by this method, equal, if not superior, to that obtained with the best quality of albumen paper. The most common method is, however, to squeegee the prints on to plain or ground glass, by which means we obtain a very brilliant or a dead matt surface.

The prints may be transferred from the final washing water to the glass plates, although I have found that this method is not always the best one. Gelatine is a very peculiar substance, and very often becomes very tender after having been through so many operations or different solutions, and in this soft state fixes itself very firmly to the plate, and is afterwards very difficult to remove. To avoid this, I prefer to dry the prints spontaneously after washing, and then, previous to squeegeeing to the glass, I dip them for a few seconds in a dish of clean water. An alum bath after fixing, or the addition

of alum to the fixing bath, will also have the effect of hardening the gelatine; the latter method, namely, the addition of alum to the fixing solution, is never to be recommended, however.

Success in this operation very greatly depends upon the quality of the glass used. As to which kind of glass is most suitable, many differ. Plate glass is often recommended; but, in my opinion, this is not the most suitable, as the prints are more likely to stick than with other kinds. The reason of this is easily explained. The hard natural surface of the glass is removed by grinding, and an artificial surface is produced; this is naturally softer and more porous, so that the prints obtain a better hold. The soft surface of the glass is, furthermore, easily damaged, and every scratch or mark upon the glass is visibly reproduced upon every print squeegeed to it. A good hard crown glass, free from defects, should be selected, and then carefully cleaned. There are few, however, nowadays who know how to clean a glass thoroughly. In the old collodion days a very great deal depended on this, and it took the operator no little time before he accomplished the task. A very admirable production for cleaning glass and other non-destructible surfaces is "Brooke's Brand of Monkey Soap." It is obtainable at any grocer's or oilshop, I think, and it certainly removes all grease or stains from the surface. Wash the plates with the soap, or any other cleanser, and dry with a clean glass cloth which has not been used for any other purpose. The plate is next laid on a level table, and well polished with a clean chamois leather. A little French chalk or powdered talc is next dusted over it, rubbed well over with a tuft of cotton wool. This done, the state of the glass becomes apparent. If not quite clean, the chalk will be found to adhere in some places to the glass, giving whitish smears or patches. The plate must be again well polished, and the chalk applied once more. If now it does not adhere to the glass, but can be removed by lightly rubbing over with a silk handkerchief, or other soft, clean material, the plate is ready, and the prints may be attached with assurance that, if the prints do not leave successfully, it has not been from faulty manipulation in this part of the process. Instead of French chalk, an alcoholic solution of wax, or even a few drops of salad oil or ox-gall, rubbed over the plate may be used. Although by this method the prints are far less likely to adhere to the glass, yet the surface is somewhat inferior to the brilliant polish of the glass itself.

Plates of glass may also be substituted by the enamelled iron plates used in the ferrotype process, or by polished sheets of celluloid, ebonite, and other similar materials. It must be stated, however, that, although with these no special preparation is necessary, the surface is not the most brilliant that can be obtained. Further, this material is very subject to mechanical injury, and, as before stated, every scratch or mark is reproduced with the utmost fidelity upon the prints. Another drawback to the use of these materials is that, if a print or part of a print does happen to stick fast, as will occur at times, it is not easily removed without injuring or entirely destroying the plate itself.

The summing up of the whole is, therefore, as follows:—Glass is the best material, undoubtedly, but it must be perfectly and absolutely clear before the prints are attached to it.

To obtain the matt, a dull-surface ground glass is used. The best for this purpose is a finely ground kind used for focussing screens in cameras. If not obtainable, it may be easily made by grinding two sheets of glass together with fine emery powder and water.

In squeegeeing to ground glass the print should be well pressed into the pores of the glass, otherwise bright spots will appear on some parts of the print and mar the dull effect. With plain glass, however, it is not advisable to bear too hard upon the print. A good flat squeegee should be used; the strip of indiarubber should be neither too hard nor too soft, and have a clean, smooth, and straight edge. This kind of squeegee will be found far preferable to the roller squeegee lately introduced. The object of the squeegee is not to press the prints firmly to the glass, but merely to remove all superfluous moisture, and to press out the air between the print and the glass. This air can usually be seen at a glance by reversing the glass plate and examining the face of the pictures. In laying the prints face downwards upon the glass, this air can be avoided, to a great extent, by putting the prints down gradually, in the same manner as in floating paper upon albumen or other solutions.

Let your prints dry on the glass spontaneously. A mistake that many beginners make is in endeavouring to hurry the operation by artificial heat, in their anxiety to see the finished effect. Stand the plates, with the prints attached, upright in a warm room, and allow them to get perfectly dry before attempting to remove them. It is not always easy to tell when they are quite dry. The paper support at the back may appear to be quite dry, but it must be remembered that the last part to become so is the gelatine film with the image, as being farthest away from the air, and this is, of course, the most important part. When, therefore, the prints are apparently quite d but not till then, artificial heat may be employed to insure perf absence of moisture.

Sometimes the prints will fall away from the glass quite of th own accord, or they may leave the glass in parts. Never attempt force a print away, as this will invariably leave unsightly marks up the surface which entirely destroy the brilliant effect.

A sharp penknife is laid under one corner, and the print gently a slowly detached. If the slightest resistance is offered, leave it for little, as no doubt it is not quite dry.

If the prints are well heated, and still refuse to leave, they may given up as a bad job, and removed the best way possible. I kno of no method of removing them intact; continued soaking in wat will not do it. A weak solution of hydrochloric acid might, but have not yet tried it. However, if the operator carefully studies th instructions given, it should be very seldom that he loses a print. Th principal causes of failure in removing the prints are the following:- The gelatine film was too soft; the squeegee too firmly applied; th glass not perfectly clean; artificial heat used in drying while th gelatine was still too moist.

In my next we will consider the important point of mounting the prints without loss of the brilliant surface thus obtained.

WALTER E. WOODBURY.

WARM TONES ON BROMIDE PRINTS.

[A Communication to the Croydon Microscopical and Natural History Club.]

BEFORE proceeding with the business of the evening—Mr. Marriott paper on *Gelatino Chloride Printing Processes*—I wish to make short communication on the subject of toning bromide enlargement I do so at the present time, as I have observed that a greater amou of interest is now being taken in this subject than was manifested i the earlier part of the year, when I first published my method o working. And as, at this season of the year, amateurs are probabl turning their attention to the production of enlargements from the summer negatives, it may be fitting that I should deal with certai points in connexion with the subject which have been raised by variou correspondents and in some recent articles.

It would appear that several experimenters have been endeavourin to employ mercurial intensification processes for the production o warm tones on bromide prints. I am glad to see it, and do not wis to discourage effort in any direction. The same method was als advocated, I think, in an interesting article by Mr. Thomas Bedding Now, I think it will be within the recollection of most of you that i my first communication on this subject I stated that the variou methods of mercurial intensification had been among my early experi ments, and that they had to be discarded on account of exactly th same troubles as seem to be besetting those who are adopting the sam course now. Whether mercurial bleaching be done before or afte fixing, the results are alike uncertain, and in very few instances ar they good. You may repeat your experiment time after time, and th chances are you will get every tone you *do not* want, and never th same twice in succession. Now, a process which is so unreliable, apar from the question of stability of the image, is not likely to commen itself to serious workers. A correspondent of THE BRITISH JOURNA OF PHOTOGRAPHY writes in last week's issue that he has obtained beautiful sepia tone by one of these methods, but that on drying th print had resumed its black hue. This need not have been so. Warm tones, *when dry*, can quite well be obtained by proper modification i the darkening of the bleached image. But there is a wide range o warm tones, and it is, I may almost say, impossible to work for an particular one with the certainty of getting it. This is not so wit the Uranium method. With very slight practice almost any colou within the possibilities of the process can be obtained time after time

In the editorial article of the JOURNAL last week, the whol subject is ably handled. It is full of suggestion, and I trust tha it may lead to serious experimenters taking the matter up. Th endorsement, in that article, of the method I have advocated of ful exposure and dilute developers is worthy of attention. The imag produced in this way is certainly much more suitable, both in colou and in general character, for toning to a soft artistic effect than tha produced by iron development. Such an image may be by no mean beautiful, but it must only be looked at as a means to an end. Fo toning with acetic acid, ferricyanide, and uranium, an image of brownish black is the best, not too brilliant, rather heavy in th shadows it may be, and fully developed in the lights and lighter tones The reason for this is that the toning is actually a process of reduetio and, although it may seem strange to say so, one of intensificatio at the same time. By the reduction the heaviness is cleared away

giving what has been aptly described by Mr. W. E. Debenham as greater apparent *separation* in the shadows, while the higher lights are slightly reduced and brightened up. The intensification is entirely one of colour, the warm shade imparted to the print giving an appearance of intensity and vigour to what might previously have been a rather flat-looking image; and both reduction and intensification, if I may say so, combining to produce a greater range of gradation at both ends of the scale than is to be found in bromide prints of the usual colour.

In the same article, this week, mention is made of bleaching the unfixed image with mercury, redeveloping with hydroquinone, and afterwards treating in a combined toning and fixing bath. You will remember, no doubt, that this was one of the methods I mentioned, and, although I had not myself worked it, it had been used by one of my friends several years before. My reasons for rejecting it untried were twofold, first and chief being that by this treatment tones were produced of the photographic purple character which I have always considered undesirable on a matt surface. My second reason was that I was then seeking a means of producing sepia and warm tones in the comfortable daylight of my outer workroom, whereas all the work in the process mentioned should be done before the print leaves the dark room.

Another objection to any of the mercurial methods is of course the uncertainty as to their stability in the presence of light and air. The question, I understand, has not been satisfactorily settled by those who are most able to deal with it; and I, certainly, cannot add anything to what is already known about it. Of one thing, at all events, there is no doubt whatever. Unless the most scrupulous care and cleanliness be exercised in dealing with prints treated with mercury, they will most certainly carry within them the germs of decay.

All these things considered I have preferred to set my affections on uranium toning, which I can assure you is most simple and easily managed, notwithstanding Mr. Bedding's suggestion that the difficulties might be greater than I was disposed to admit. I hope on another occasion, when I will not be standing in the way of another speaker, to give you some hints on the working details of the process which have occurred to me in my practice since I first brought the subject under notice.

J. Weir Brown.

A LAST OUTING.

On Saturday last the Society, of which I have the honour to be a member, held its final outing of the season in the neighbourhood of a certain Heath, which shall be nameless. It is not Lonely, and it is not Blasted, but it is sometimes called Happy, and is (or used to be) the resort of the unsophisticated excursionist who is (or was) wont to be conveyed thither in Vans. I hope the reader will rest content with this vague description; I have deliberately adopted it in order not to disclose either the identities of my fellow members, or the exact scene of their exploits with the camera.

Well, I attended the outing. I had not indulged in one this season, and so the Society's last outing was my first. My friends say I am nothing if not original; my enemies are not so polite. But I will explain. Unlike its owner, my camera had been out a very great deal during the past season; that is, out of repair. On this occasion, therefore, it stayed in—its case, and I was driven to bor——, no, to accept the loan of one from a friend. Observe the distinction. I have said *I* attended the outing. Perhaps I should also say here that about five-and-twenty other members did the same. It is always advisable to note such trifling details as this last as early as possible when you have the pen in hand; they are so apt to be forgotten.

I arrived at the trysting-place half an hour late. Four members of another Society which, for this occasion only had joined forces with ours, were comfortably seated there. In order not to distinguish them too clearly, I will call them the Veteran, the Irreconcilable, the Chemist, and the Solid Man. After the usual formalities, we moved off in search of the Others. On our way I took a back view of the Four. The Veteran suggested it. There was malice in the suggestion, I'm afraid. A week ago his own hand camera had played him false. I denied him the luxury of gloating over my discomforture. My first shot did *not* miss fire, although, alas, the behaviour of the camera by-and-by was —— But I anticipate. (Quotation.)

The Chemist talked inorganic chemistry to the Veteran and myself, as we wended our way over the beautiful landscape in the golden sunlight of the mellow autumnal afternoon. The Irreconcilable and the Solid Man, possibly scenting hydrocarbons, wisely kept out of hearing, and at length we came upon the others in detachments of twos and threes. The wooded scene was, as it were, instantaneously dotted with industrious knights of the camera (Quotation), and ever and anon the sun's rays were reflected on lens tubes and brass fittings, while the fleecy clouds that floated lazily across the azure sky were limned in the clear depths of the miniature lake, which bore upon its bosom a hundred water lilies. The Irreconcilable leaned on the bridge, and, being unencumbered with a camera, surveyed the peaceful scene with a thoughtful air which provided a strange contrast to the stirring events in which he had lately been an actor. But soft, there is Our Secretary exposing a plate on the bridge (with an extra second for the detail under the arches); and soon half-a-dozen other cameras are turned upon the same subject from different points of view. Then the Cicerone appears, followed by a small, but attentive, throng. The Cicerone has got Happy-land at his finger-tips; and many a time, and oft in The British Journal of Photography, has he told us of its beauties. "Come where the views are sweetest," says the Cicerone, and they go.

As for me, I quit the gay and sparkling scene. I wish to be alone with nature and myself. I am not fond of figures in landscape, and the costumes of some of our members *are* rather *outré*. Besides, I have a secret sorrow. The camera—it—it; well, I had laughed at the Veteran, but now I sympathise with him. I have exposed four plates in capital style, and just now a fifth, but it has stuck. *Idem est*, the sheath is a fixture, and refuses to be deposited in the well. So I would be alone, to jerk and shake my camera far from the mocking eyes of derisive members, armed with ordinary cameras on stands. I *am* alone. Now, C—C—C—K; shake; rattle! I breathe again. "Hul-*loa!* How are you? What? A hand camera! Not much light for that sort o' work. Whose plates you got? Ah! Don't like 'em. Too much gelatine and not enough silver. Seen any o' the others? Twenty odd? Lor! Which way are you going? Right. So am I." Thus, for a delicious half-hour in and out of the gorse until I leave my companion reclining on his focussing cloth, gazing out upon the blue distance.

It is "cameras, cameras everywhere" to-day. Here is one perched on its stand, and facing an old-world group of houses hidden away in a corner of the heath. As I pass it, the benign countenance of the camera's proprietor suddenly starts up. I shake—I confess it—I shake! "You've brought——" he begins, blandly. "I haven't," I gasp, "but—but—I certainly will next time;" and as quickly as I can I escape, followed by a smile of lofty pity. I fancy I can feel it on my back. The smiling one is the Authority, and what I hadn't brought is a panacea for one of the ills to which a gelatine plate is heir to, that enjoys an advocacy as enthusiastic as it is necessary from the Authority. In the confusion of my escape I spoil a plate by a chance exposure. Never mind! Here I am, alongside a kind of Rotten Row. An animated group of equestrians approaches. Swiftly I make ready, and eye the finder. "Sir," says one of the cavacade, sternly, "I object!" I bow my courtliest, and pass on. I have three plates left. I devote them to subjects which *don't* object. One of them is a patient moke, bearing an artless maiden weighing fifteen stone, if an ounce. I shall send a print from that negative to the Society for the Prevention of Cruelty to Animals.

At sundown our forces assemble at the hostelry, where our several five-and-twenty human dark slides are to be charged. In order not to identify that same hostelry too closely, I will call it the "Cow and Hedge." There is *causerie* in the arbour, and then tea is announced. The room accommodates a dozen people in comfort; more than twice that number sit down. The air has been nipping and eager, and each individual appetite has acquired an edge like a razor. Gentle reader, imagine the rest. Imagine, also, high above the clatter and clink, the sound of merry voices, and the music of much laughter, the sudden and startling announcement that fifteen grains of metabisulphite of potash to one ounce of pyro is the best proportion, and then try and conceive the good-humoured roar of disapproval at the introduction of anything photographic at the "festive plank," as one of the wags calls the tea-table. There are two wags present, and the fun is great if the wit is not. Two late arrivals are received with shouts of applause, and one is accommodated on the piano. *Our* Secretary faces the *Other* Secretary. After tea, reminiscences (and other things) are indulged in. The old member is drawn out. A census of plates exposed is taken. The Other Secretary is a capital laughmaker, but the Chemist heeds him not, for benzine derivatives have a fearful attraction for him. The Irreconcilable has long since returned to the scene of his past forays, and at length we, too, face townwards. It has been a delightful outing.

Ferrers Oxley.

PHOTOGRAPHY AND FICTION.

The Secret of the Camera.

Some time ago I came upon a sketch in *Wit and Wisdom* written by T. Wilkinson, and entitled "The Secret of the Camera." The motive of the story, as far as photography is concerned, goes to illustrate the power

of the art-science in producing marks and incipient spots not visible to the naked eye.

Fred Regnold was making a negative of a Miss Frangley, a very beautiful woman, who was visiting the same friends he was staying with at the time. He had just finished the negative, and was examining it in the light, when he found the face on the negative filled with spots that he could not account for at all. And he asked the lady if she would be good enough to sit again, and again the same result, the face in the negative being filled with spots, and the original looking beaming, bright, and beautiful. The thing was a puzzle and a mystery to Fred, and he gave it up in despair.

Some months after the date of the above incident, Fred met Miss Frangley again. It was at a ball, and she was looking beautiful and bright as ever. Fred danced with her, and, as they dreamily circled round the room, Fred was gazing with silent admiration on the soft, blush-rose tint that played upon his partner's cheek, when all at once he was horrified to see appearing on the face of his partner several small, ugly, black spots exactly like those that had so astonished him in the negative he had taken on a previous occasion. His first impulse now was to draw the lady's attention to them, but, when he looked again a moment after, the spots had entirely disappeared. He had grave doubts about these suspicious spots, for might not they be the signs of some incipient disease hanging about the lady even now? But how could he explain himself? the spots were gone. So he resolved to hold his peace and wait.

Immediately after this, Miss Frangley and her mother disappeared, and it was whispered abroad that they were only needy adventuresses, that their real name was Morrison, and that they were wanted on various charges.

About a year after this, when the affair was almost forgotten, Fred, when sitting reading the evening paper, came across the following:—

"The *New York Herald* publishes details of an extraordinary affair in Hudson County. Two or three years ago, a woman, named Morrison, whose antecedents were rather shady, left America for England, taking with her her only daughter, a girl of singular and striking beauty. Both of them, it appears, visited several of our watering-places, and at one of them the mother stole a quantity of valuable jewellery from an hotel at which they stopped. So far from being arrested, the two stopped in England for some time afterwards, and eventually succeeded in getting back safely to their native land. The mother soon died; and, after her death, little was seen of the daughter, who lived in a small house, with one servant-girl. One evening the girl implored some neighbours to come to see her mistress, who, she said, was dying. When they entered they found the mistress raving mad, with ugly jet-black spots all over her face, neck, and arms. Her fair hair was also similarly discoloured. She was removed to a hospital, where she has since died. It has transpired that the woman had for years taken small doses of quinine, and that the black spots and the insanity were plainly traceable to this practice. A New York physician informs an interviewer of the *World* that regular doses of quinine, if taken in small quantities, have the effect of producing an elated, sanguine frame of mind, often quite beyond the bounds of reason, and of greatly marring the beauty of the complexion; and that there are on record several cases of insanity caused by the use of the drug. With regard to the black spots, the same gentleman says that a painful case of the kind was under his care in 1876."

"That, then," said Fred to his wife, as he folded up the paper and looked thoughtfully into the fire, "clears up the mystery of my camera."

MARK OUTE.

THE PRESS ON THE PHOTOGRAPHIC EXHIBITION.

[*Standard.*]

FROM a scientific even more than from an artistic point of view, the exhibition of the Photographic Society of Great Britain, opened yesterday, is interesting. This year the walls of the Royal Water Colour Society in Pall Mall East display no startling novelty, though there are not wanting evidences of steady progress in the application of processes that rival, without hope of excelling, the technique of the pencil and the graver. Those whose attention has been directed to the possible use of photography as a scientific and detective agent will examine with curiosity the screen upon which Dr. P. Jeserich exhibits his plates of photo-micrographs of blood and of hair, together with illustrations of the detection of forgery by photography. The scientific interest of the micrographs of blood is especially great, as it may lead to the solution of a very obscure physiological problem. As to the forgeries, their use in criminal investigation is apparent. They illustrate even to the untrained observer the fact that the sun cannot lie. No erasure however careful, no alteration however skilful, can escape the vigilance of the sensitised film, but reveals itself in variations of colour that escape the microscopist or the expert. This distinguished German has shown that there is for photography a brilliant future as the handmaid of science and of criminal investigation. Another object of scientific value is Mr. Eric Stuart Bruce's Aerial Graphoscope, an ingenious invention for casting pictures from the lantern in mid-air without the aid of a screen. A machine for cutting dry plates, by the Paget Prize Plate Company, is a labour-saving contrivance that has received a medal. The artistic interest of an exhibition of this kind must suffer from comparison with the more varied and glowing productions of the pencil and the brush. As long as the photograph and the pencil occupy the same field comparison is natural, yet this much may be said in favour of photography—that it is comparison, and not, as in former years, violent contrast. The camera is now turned to the use of processes and materials that tend to substitute for hard outline the softer lines and tones of an etching. How great has been the change in recent years will strike every visitor to the Exhibition, for one must, in more than one instance, look very closely before deciding whether certain landscapes are photographs or fine sepia drawings. There is, for example, not a trace of harshness in *Outward Bound* (515), an autogravure of the painting by Mr. F. Brangwyn, for which the Autotype Company have received a medal. Even the manner of the brush has been printed without a suggestion of sharp focussing. In several cases most artistic effects have been attained by the use of rough paper, as in *Sunset—Winter* (49), by Mr. F. P. Cembrano, jun., who gains a medal, and in the series by Mr. A. R. Dresser (300–6). Another exhibitor who has the true feeling of an artist is Mr. R. W. Robinson. His plates are uniformly excellent, and few people are likely to complain of the award to his *A Primrose by the River-brim* (340), which is ideal in subject as well as intreatment. The medals are fewer this year than on former occasions. The absence of award is, however, not always a mark of inferior merit, for many of the best photographs are excluded from competition, their exhibitors having received medals in former years. Mr. W. M. Warneuke has gained a medal for a triumph of direct photography—Miss Laura Johnson as Desdemona (453). Similar distinction has been earned by Mr. F. L. Colls for six copperplate photo-etchings from negatives from nature (617); by Messrs. G. West & Son for a series of wonderfully clear lantern slides (643), representing scenes on one of her Majesty's ships; and by Mrs. E. Main, widow of Colonel Burnaby, for several beautiful snow pictures of *St. Moritz* (255). All who are interested in the camera and its prospects will find instruction in the exhibition which was opened to the public yesterday.

[*Globe.*]

JUST how near photography can approach art may be learned from the exhibition of the Photographic Society open now at the Old Water Colour Galleries. Some of the landscapes, especially those printed on rough paper, are hardly distinguishable from drawings, save by experts. An infinite degree of pains must have been taken by many of the photographers to pose their models and to seek subjects. One man has spent his time photographing the Manchester Ship Canal another arranged that a young gentleman should enter a room, place his hat, gloves, and stick upon the floor, and then embrace a young lady to form a picture for the title, *Till Death do Us Part*. Another submitted an interesting series of photographs of blood, with other illustrations of the detection of forgery by photography. Another exhibitor has been at the pains to think out positions and to pose four children in no fewer than twenty-two attitudes. Each is of cabinet size, illustrating a letter of the alphabet, and the whole are collected together in a frame. A was an apple pie; B bit it; C cut it; D dealt it; E eats it; and so on down to Z. All these little legends are illustrated by two or more of the children. We also note in the exhibition a novel kind of frame, which, we trust, will not be repeated, from the design of Mr. R. W. Robinson; the base is of rough wood, bronzed over, and decorated by leaves and fruit in relief.

[*Echo.*]

THE Photographic Society of Great Britain annually finds itself at this season the tenant of the "Old Water Colour Society," and its exhibitions acquire a yearly increasing importance, ranking now, indeed, with the most noteworthy of the minor picture shows of London. Nor is there cause for wonder in this. Photography invades every department of life. Like electricity, it is apparently a science of indefinitely varied utility of application, and capable of unconjecturable extension. To the astronomer it supplies a sixth sense. It seizes and imperishably records facts inconceivable beyond the reach of the human eye; it harvests knowledge from fields which lie far outside the range of man's apprehension. Students of physiology and biology find it their best aid. In Pall Mall East to-day we find photography sworn in as a servant of the State. Dr. P. Jeserich shows us photography, as attached to Scotland-yard, detective of forgeries and of spots of human blood, though we could wish his illustrations stood in little less need of a key. In private life the little Kodak camera often provides the one means of relaxation to busy men and women, the one reason for existence to idle ones. Of course, photography appears in that mirror of life—the stage; though whether it makes for literature in modern drama we must leave it to the author of *Saints and Sinners*, and Mr. Harry Paulton, the photographic Paul Pry-up-to-date of *The Mischief Maker*, to determine.

Photography is also a social power. A year or so ago the Camera Club was a little body, contentedly lodged over the shop of a Bedford-street tradesman; to-day, an imposing new edifice, "replete with every modern luxury," looks out on the National Gallery. Though we live in times when it is every man his own photographer, the professional sun-picture makers increase in numbers, and in the money value some of them set on their work. This prosperity is easily explained. Photography develops as an art as well as a science. The camera has become as much a means of making presentments of nature convey human thought as the pencil or chisel. A slight knowledge of chemistry used to be the one thing necessary to a photographer. To-day, to attain eminence, he must be born an artist. There may be as much difference between two photographers as between a P.R.A. and the pastelist of the pavement, who informs passers-by that "many can help one." As in the older branches

of art, the amateur is often found doing good work; but the best is the monopoly of the professional.

Taking all things into consideration, the present exhibition hardly attains as high a standard as we have a right to expect. Nor are the novelties of the last twelve months startling. What strikes the visitor very pointedly is the marked superiority of the pictures which have won medals. In no single instance does it seem to us the award could have been other than it is. An exceedingly beautiful series of photographs, full of exquisite gradation, poetry, and feeling, *Twilight*, *Dawn*, *Evening Mist*, and *Haymaking in Surrey*, are sent by F. P. Cembrano, jun.; but it is his *Sunset—Winter*, a poem of the riverside, one of the most exquisite gems ever produced by the camera, that is medalled. In these photographs what must be especially noticed is how the old idea of obtaining a "view" is utterly abandoned. What is aimed at is a well-balanced and composed picture, a record of a sympathetic mood of nature. Lyddell Sawyer sends some charming Rembrandtesquely-lighted groups, *The Last Rehearsal* and *Lighten our Darkness, O Lord!* amongst them. Of A. Horsley Hinton's studies—all beautiful—a "silver," called *An Essex Marsh*, has all the qualities of a fine sepia drawing, so full is it of atmosphere and charm. *A Nocturne*, printed in green, a hay-barge at night, by L. C. Bennett, is charming, and charmingly framed. The Duke of Newcastle has been successful in conveying an idea of ferocious dignity in his *Lioness*, and Gambier Bolton, F.Z.S., with his tiger, *A Captive Undaunted*. T. Birtles' *Views on Manchester Ship Canal* possess great interest of subject. Of J. Collier's *Pathological Laboratory, Birmingham* —with horrible specimens bottled in spirits of wine—we cannot say the same. The inevitable Dene Sisters, who from canvas and photograph look down from innumerable walls in England of to-day, give Van der Weyde his best chance of displaying the distinction and elegance of his work. W. P. Marsh supplies a touch of humour in his *The Latest Out*, having caught a chick emergent, as heralds would say, from its shell.

[*People.*]

The *soirée* of the Royal Photographic Society, which, as usual, inaugurates the autumn exhibition in the rooms of the Society of Painters in Water Colours, Pall Mall, took place last night, and proved a very pleasant reunion. There were additional incentives to attend this year. Not only have long-desired improvements been effected with regard to the reception and display of the exhibits, both of professionals and amateurs, tending largely to popularise the exhibition among our art-producers, but a new body, entitled the "Management Committee," has been appointed, and which has relieved the Council of many of its functions; and, as new brooms proverbially sweep clean, great expectations were formed as to the attractive nature of the arrangements. These were not falsified by the result. Never has a more interesting evening been spent in the history of the Society. Amateurs and professionals fraternised in a pleasant spirit, and the attendance of ladies was above the average. Mr. James Glaisher, the popular President of the Society, was present to receive the guests, and a large number of the members of the Council were also present. In addition to the inspection of the gallery, the "machinery in motion section," as it was dubbed, interested every one, the Paget Prize Plate Company's new machine for the automatic cutting of the sensitive plates after they have been coated with gelatine emulsion working admirably. There was also interest shown in the display of apparatus on the tables, though there was nothing very strikingly new this year. There was nothing in the way of formal speech-making, but the opportunity was taken, while refreshments were being indulged in after the inspection of the gallery, to felicitate the President on the improvements which have been effected, and the general prospects of the exhibition, which will remain open until November 12.

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION, GLASGOW.

VI.

The Exhibition closed on Saturday, the 3rd inst., that day showing the largest attendance of any given day since the opening, over two thousand persons having visited the rooms on Saturday, and showing a most unparalleled success in the way of photographic shows, as the anticipated overplus, after paying all expenses, is estimated at close on five hundred pounds. Mr. Morison, in his remarks at the close of the Exhibition, said that one of the main features that tended to the successful results was the thorough system of advertising which had been adopted, and the very friendly manner in which the Press generally had aided them on those lines. The Exhibition intended to be held had been made known in all parts of the world, and notices of it had been found as far away as Japan, and that this broad publicity had been one of the chief factors in the ultimate success of the undertaking.

But, first of all, we think that the workers of the complicated machine were the producers of the great success, from the untiring labour and unremitting zeal shown from the opening till the close, by Mr. Morison and the ever-ready executive that surrounded him, nothing but gratifying results could have been anticipated.

One thing we felt during the run of this exhibition, that the great sight-seeing public and the amateur were the principal visitors to the rooms. The professional, principals and *employés* both, did not seem to take any warm interest in the matter comparatively; with few exceptions, their visits were few and short, and this is much to be regretted; for, looking at it from an educational standpoint only, it was worth much more study than it got, especially from *employés*. The question of admission-money might have told against the *employés*, for, in many cases, they might not be able to afford it, and we believe some question was raised regarding the issuing of cheap tickets for the benefit of the hands in such cases, but nothing was done. This, however, is a matter for consideration at future exhibitions.

That the awards have given almost unanimous satisfaction is matter of congratulation; were there not some few whisperings of dissatisfaction, we would think that the millennium had come, but the Judges must feel gratified that the popular voice was with them. There was a general desire expressed that the Exhibition should be continued for another week, but as the halls were let this was not possible; so that on Saturday night, after two lectures, both of which were crowded to excess, Mr. Thompson, of Liverpool, being the lecturer, the doors were closed upon the most successful Exhibition that has ever been held in the United Kingdom, and the workers all must feel

'That men judge actions always by events,
And, when they manage by a just foresight,
Success is Prudence and Possession's Right.'

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,698.—"Improvements in Sensitive Materials for Photographic Purposes." W. H. Caldwell.—*Dated October* 1, 1891.

No. 16,708.—"Improvements in Photographic Cameras." A. Hesekiel.—*Dated October* 1, 1891.

No. 16,771.—"Improvements in Photographic Cameras." F. G. Baker.—*Dated October* 2, 1891.

No. 16,780.—"Improvements in Photographic Lenses." T. R. Dallmeyer.—*Dated October* 2, 1891.

No. 16,857.—"The Preparation of Alkylised Ortho and Para-amido Phenols as Developing Means in Photography." J. Hauff.—*Dated October* 3, 1891.

No. 16,858.—"Improvements Connected with Photographic Cameras." J. Frazer.—*Dated October* 3, 1891.

PATENTS COMPLETED.

Improvements in the Mounting of Photographic and other Pictures or Configurations.

No. 15,842. Richard Henry Lee Talcott, 216, Northampton-street, City of Boston, County of Suffolk, and State of Massachusetts, United States of America.—*September* 12, 1891.

This invention relates to improvements in the mounting of photographic and other pictures and configurations. The object of the invention is principally to provide appliances whereby pictures mounted on or behind plates of glass may be enclosed at their backs and edges. Under certain features of the invention the mounts are adapted to ensure the withdrawal and substitution at will of pictures without impairing the durability or appearance either of the picture or the mounting appliance therefore.

In carrying out the iuvention I provide a plate of glass, which is usually quite thick, which forms the foundation on which the mounting appliance is fabricated, against the back of which the face of the picture is to rest and be held, and through which glass the picture is visible.

I combine with said glass a back piece, and also edge strips or clips, or devices of other description, which serve to unite the said back by its edges to the edge portions of the glass plate. The mounting appliance is to be so constructed that when the picture is enclosed the same will be practically hermetically sealed. I prefer to have the mount so constructed, as to its one end or edge portion, that the picture or configuration, when carried on a card, may be entered or removed at will.

It is often desirable to directly cement the picture by its face to the back side of the glass, and to bind, at the edges of the combined glass and picture, with an impervious material, and the parts so combined may be understood to constitute sufficient mounting for many purposes, although the bound glass and picture may readily be placed in engagement with other edge and back-enclosing devices.

Improvements in Photographic Cameras.

No. 18,181. Walter Palmer, Westfield, Readiug, Berkshire.—*September* 12, 1891.

The object of my inveution is to provide an improved photographic camera whereby the focussing may be very rapidly and conveniently effected, the arrangement being such as to ensure the requisite rigidity of the camera in all positions.

According to my invention, I screw, or otherwise mount, the lens or lenses in a part to which are attached the outer ends of a system of "lazy-tongs," the inner or opposite ends of which lazy-tongs are connected to the back part or body of the camera in order to guide the lazy-tongs in their motion, and secure the proper rigidity, whatever may be the position to which they are adjusted; I provide frames constituting guides along which run guiding blocks or other bearings to which the adjacent outward ends of the rods of the lazy-tongs are jointed or otherwise conected. When the front of the camera is pulled out, the frames or guides move forward with the extending lazy-tongs, and when the front is moved backwards, the frames or guides also move backwards with the lazy-tongs, the guide block or bearings in each case

running along the said frames or guides. The lazy-tongs have (within or without them or both) a non-actinic or light-proof casing or covering, capable of expanding and contracting with the movement of the said lazy-tongs. The frames or guides and the bars of the lazy-tongs are preferably, but not necessarily, made to decrease in size as they are situated nearer to the lens or lenses, so that when moved back the arrangement will lie compactly against the back or the body of the camera.

The expanding and contracting system of lazy-tongs and their frames or guides may be arranged to carry two lenses or sets of lenses, and be connected with a double or stereoscopic back, the one for focussing and the other for the negative, so that focussing and view-finding are done by the same movement.

In combination with the camera lens or lenses I may provide an auxiliary focussing lens or lenses and apparatus, which may be fixed to any convenient part of the camera frame, the said auxiliary lens or lenses and apparatus being, if so desired, operated from the lazy-tongs, so that the camera lens or lenses will be simultaneously adjusted with the focussing lens or lenses, and the use of a focussing cloth may in that case be dispensed with.

The frame of the camera may be fitted with a tube so as to form a socket and a universal joint for the connexion of the camera to a tripod.

When used for instantaneous work the tripod may be dispensed with, it being convenient, in some cases, to hold the camera; or, where space is limited, to support the apparatus on the knees, or in any other suitable support.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 12	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 13	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 13	Derby	Society's Rooms, Derwent-bldings.
,, 13	Bradford.....	50, Godwin-street.
,, 13	Manchester Amateur	Manchester Athenæum.
,, 13	Carlisle and County	CathedralHall, 57, Castle-st., Carlisle
,, 13	Paisley	Committee Rm., FreeLib. & Museum
,, 14	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 15	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 1,—Mr. J. Traill Taylor occupied the chair, and there was a large and representative attendance.

The Rev. E. Healy and Mr. Maas were elected members of the Association.

Mr. Chang sent an album of views of Brighton for the use of members, and Mr. B. P. King presented several volumes of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC and THE BRITISH JOURNAL OF PHOTOGRAPHY for the library.

The CHAIRMAN read a letter, written by command of the Queen, in which her Majesty accepted an album of views of Grasse (where, it will be remembered, the Sovereign sojourned last spring), the work of Mr. A. L. Henderson. The Queen was highly pleased, and thanked Mr. A. L. Henderson very much. The Chairman was sure this intelligence would be gratifying to the Association, of which Mr. Henderson was a member.

An album of flash-light pictures, by Mr. John Stuart, of Glasgow, was passed round for inspection, and much admired.

Mr. HENDERSON then proceeded to give his promised demonstration of a perfect emulsion by a new method; but, before doing so, briefly dealt with some of the principal points in emulsion-making. It was important, he said, to have pure water; he always experimented with distilled water, and recommended its use. A great many failures were due to impure water, and he read a list of the common impurities generally found in it, and pointed out that by employing ordinary water in emulsion-making certain silver salts are liable to be formed in the emulsion, which are not amenable to some developers, and that, therefore, unequal results are produced. There were various ways of making emulsion, and he enumerated and described some of them, among them the boiling processes, which, he considered, produced decomposition of the gelatine, and consequently fog in the image. Incidentally, on the question of the gelatine employed, he remarked that this substance often contained sulphurous acid, which would have an injurious action on the silver bromide. Then, there was the precipitation process, in which no washing was required, as well as his own plan of emulsifying with ammonia, for which the late Dr. Van Monckhoven had often been given credit. He (Mr. Henderson) was the first to publish the method. The method he proposed to show them that evening consisted of the conversion of the silver nitrate into carbonate, and the introduction of the latter into a solution of bromised gelatine, or *vice versâ*. Thus, the silver nitrate at no time came into contact with the gelatine. He then proceeded to convert a solution of silver nitrate into carbonate by means of a solution of carbonate of potassium, and, having dissolved the gelatine in a small quantity of water, added the bromide to it, and mixed the two solutions. The iodide, said Mr. Henderson, should be added after the bromide, as iodide of silver was formed quicker than the bromide. The emulsion was washed by being forced into shreds through a large mesh into a sieve placed in a jar of water, soluble salts being carried off by a metal pipe. He condemned the use of canvas, and said less washing was required by his method. Many failures were caused by impure rubber piping. He recommended the black kind, the red and grey varieties containing sulphur, which causes spots in the emulsion. He exhibited a small filter for water which he had found useful and effective; it was a tube about six inches long, with a piece of sponge at each end, and the centre filled with charcoal. By reversing the filter on the top it was self-cleansing. Mr. Henderson filtered his finished emulsion through washleather, hastening the process by pneumatic pressure. He then showed a coating mug, the emulsion passing through a piece of muslin; he usually had a piece of fine silver gauze. By this means he avoided bubbles. The action of the centrifugal separator in removing the soluble salts was then shown. Concluding, Mr. Henderson said that, if he wanted an emulsion giving clear shadows and great density, he would convert the silver nitrate into acetate or citrate, instead of carbonate, and such an emulsion would do for line or lantern-slide work. He strongly recommended that, in ripening by heat, uniform temperature and bulk of water be employed. He further said that impurities in chemicals must be guarded against, and mentioned the instance of a pupil of his whose bromide, when tested, was found to contain one-third of another substance, which the manufacturer subsequently admitted. Another pupil got spotty pictures, which he (Mr. Henderson) found to be due to the deliquescent iodide containing some sulphates. The formula he now recommended as a good base:—

Silver nitrate	120 grains.
Water	3 ounces.
Potassium carbonate	60 to 90 grains.
Water	3 ounces.
Gelatine	240 grains.
Potassium bromide	90 ,,
Potassium iodide	1 grain.

The gelatine to be dissolved in sufficient water, and the emulsion to be made up to fifteen ounces. He preferred to do without alcohol. A washed emulsion of this description, if treated with a solution containing two grains of potassium nitrate, one grain of potassium bromide, and half a grain of chrome alum in ten or fifteen ounces of emulsion, and allowed to stand at a temperature of from 80° to 90° for some hours, increased in rapidity, and also gave more density. If the salts are to be removed by the centrifugal separator, it would be necessary to have the bromide dissolved in a small quantity of gelatine, say, fifteen grains, and then, when separation had taken place, the bulk of gelatine added; a still finer precipitate will ensue by the addition of gelatine to the formed carbonate of silver. In emulsion required for subjects of great contrast, more iodide and gelatine will be found advantageous.

At the conclusion of the demonstration Mr. Henderson was heartily applauded. One table was entirely occupied by the utensils and apparatus employed.

Mr. WELLINGTON said, as regards spots caused by impure rubber, he had rubbed some of the sulphur off into the wash water of an emulsion and could not produce spots. Further, he had sprinkled plates with dried sulphur, and still failed to get them.

Mr. HADDON inquired the speed of an emulsion prepared according to the formula.

Mr. HENDERSON said from sixteen to seventeen on the sensitometer, but if kept for twenty-four hours at 80° it would go up to twenty-four, and even higher.

Mr. BARKER found that, in his experience, no disadvantage resulted from the use of ordinary water; but as it contained chlorides, one effect of its use would be to convert a portion of the silver into chloride. Boiled water could safely be used for washing purposes.

Mr. COWAN doubted whether a chloride displaced a bromide in emulsions, as Mr. Barker thought.

Mr. DEBENHAM hoped the evening's demonstration would attract all the attention of photographers, who depended upon the plate-makers too much, as a great many interesting things had been brought out that night.

Mr. HADDON thought it was gratifying that so many amateurs were present, and remarked that Mr. Henderson was making emulsions when the Association was born, and that it was before the members that he first introduced his ammonia method. He thought this modification was a good starting-point, as the manner in which the silver came into contact with the gelatine must eliminate compounds of gelatine and silver otherwise formed. The large proportion of soluble bromide gives speed without cooking, and probably enables the bromide of silver to take the particular crystalline form which regulates the speed of the plate. Bromide of silver, under the microscope, exhibited a variety of crystalline forms, but which particular form the sensitive body usually is has not been settled.

Mr. HENDERSON was cordially thanked and the meeting closed.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING of the Association, held October 2, at 55 and 56, Chancery-lane, Mr. Freshwater, Chairman: two applications for assistance considered and grants made.

Mr. W. J. Tabrum, 55 and 56, Chancery-lane, was elected to serve on the Committee.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

OCTOBER 2.—The CHAIRMAN (Mr. J. Weir Brown) read a brief paper [see page 648], in which he met objections recently raised, and referred to articles which had appeared with respect to the uranium toning of bromide prints, and gave he results of his later experiments.

Mr. W. LOW SARGEANT exhibited a cardboard double back for films, which weighed when loaded only two and a half ounces. He also mentioned that in a recent tour on Dartmouth, on opening a packet of films flashes of light were visible when he separated them. Query, Was it due to electrical discharge or phosphorescence? He feared that when he developed them they would be streaked.

Mr. E. MARRIOTT then read a paper on *Gelatino-chloride Papers*. He said: The demand for gelatino-chloride papers has increased wonderfully during the last three years. Four or five years ago it was very little known amongst amateur photographers. It is very popular in America and Germany. Till lately nearly all our supplies have been obtained from the last-mentioned country. At last our English firms are waking up to the fact that there are trade possibilities in this line, and as a consequence we need no longer send to Germany for our supplies. I use the gelatino-chloride papers for the following reasons:—1. They print quickly and tone readily any shade

from brown to black. 2. They make the most of a poor negative, and give more detail than ordinary silver paper. 3. Because, by the proper treatment, any kind of surface is readily obtained. 4. Because I believe in their comparative permanency. Two years ago not more than two or three makers manufactured this paper; to-night I have seven kinds with me, and shall pass round prints finished both with a matt and enamel surface from all these makes. The kinds are Obernetter, Leisegang aristotype, celerotype, Fallowfield's chloride, R. Talbot's (Marion, agent), Jacoby's, and Adams's luminotype. The Chairman will exhibit a print on the new Ilford paper (hand-coated), as it is not yet quite ready for sale. I print rather deeply, and, without any washing, the prints are transferred to the combined toning and fixing bath. Results equally good are obtained from other toning baths, but I have not experimented with any of them, and cannot therefore say much about them. I know that the one I use works well, keeps well, and will tone any paper or transparency that requires it. I have with me two lantern slides to show the difference in colour produced by using this bath. The following is the formula copied from an old BRITISH JOURNAL PHOTOGRAPHIC ALMANAC:—

Chloride of gold	6 grains.
Tungstate of soda	60 ,,
Sulphocyanide of ammonium	100 ,,
Hyposulphite of soda	960 ,,
Acetate of lead	3 ,,
Boiled water	8 ounces.

A few scraps of untoned silver paper.

The gold should be added when the other chemicals are dissolved, and the bath should be kept a day or two before being used. If the bath is occasionally filtered and kept in the dark when not in use, it will last a long time and never need be thrown away but added to a new one, obviating the necessity of the addition of scraps of silver paper. When the prints in the bath have nearly reached the desired tint or tone, they should be removed to clean water and washed for two or three hours in several changes of water. I find aluming unnecessary except in very hot weather. If I wish to obtain a print with a highly glazed surface, I enamel it in the following manner:—I thoroughly wash a piece of glass or celluloid, or enamelled iron plate or ebonite. If glass, after I have dried it I rub a little talc (French chalk) over it with a piece of soft rag. I do not use talc for anything else, and am not particular about omitting it for glass when the glass has been in use for some time. I put the glass in water with the print, and place the print face downwards on it. When the glass is lifted from the water the print is covered with blotting-paper, and a squeegee employed to press the water out of the print and force it into optical contact with the glass. If no air bubbles are visible, and they are not likely to be if the contact was secured under water as directed, the prints with their support should be left in a draughty position or in a gentle heat to dry. When dry, they will easily peel off. If excessive heat is used, or the support is dirty, they are liable to stick. I have prints put on glass, celluloid, and enamelled iron with me, and shall be pleased to have them removed by any member to prove that it is not a difficult operation. For matt surfacing, proceed exactly in the same way as with enamelling, only use a finely ground surface instead of a polished one. I have some of Fry's films from which I removed the emulsion, and I obtain my best matt results by using them. They are kept in a jar holding enough water to cover them; they are handy, always ready, and clean. If the prints are to be mounted with starch or any aqueous mountant, they should be backed with paper—note paper will do—whilst they are damp on the support. To save this operation many dealers keep a spirit or naphtha mountant. I have not tried them. The two snow scenes before you were mounted with a spirit mountant obtained from Adams's by Mr. Carter. The celerotype makers supply a good mountant for the purpose. Most of the prints before you were mounted by a mountant made in the following way:—I soak good glue in water all night; the next morning I remove the glue from the water with a piece of stick. It is then boiled for half an hour and bottled. When partially cooled I add methylated spirit until it is thin enough to work easily. If the spirit is added slowly no core is formed, but if added quickly a white core is produced, which must be removed. Used carefully, this mountant does not injure the enamelled surface. The various styles of mounting are shown by the specimens before you. Thanking you for your kind attention, I beg to leave the subject to be discussed by the meeting. The toning bath mentioned was put to the test upon some prints and it toned them quickly and well.

The next meeting, October 16, will be a lantern night.

CROYDON CAMERA CLUB.

THE permanent rooms of this Society are now at 56, George-street, Croydon, instead of No. 96 in the same street.

The first of the regular fortnightly meetings in the new rooms will be held on Monday, October 12, when the winter session will be inaugurated by a discourse on *Flashlight Photography*, with demonstrations by the Hon. Secretary (Mr. G. R. White).

October 26, lantern night.

RICHMOND CAMERA CLUB.

FRIDAY, the 2nd inst., was the first lantern night of the season. Slides by Messrs. Ardaseer, Cembrano, Davis, Arthur Hunter, and Lowry were shown.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

OCTOBER 6.—The first of a series of papers and demonstrations of an elementary and popular character was held at the Club's rooms, "Colonnade" Hotel, when Mr. Simkins gave a paper on *Exposure*. He strongly advocated backing plates and giving very full exposure. A discussion followed. It is hoped that these papers, &c., which are intended for beginners and those members who are less advanced, may prove of great value to them.

At the next meeting the subject will be *Development*.

BATH PHOTOGRAPHIC SOCIETY.

ON Wednesday last, the 30th ult., the Society, by kind permission of the Prior, was afforded an opportunity of visiting and photographing at the monastery of St. Gregory, Downside, near Chilcompton. This extensive pile of buildings, by no means completed, comprises a large priory church, monastery, and numerous other buildings, such as swimming baths, master's residences, &c., and are excellent specimens of Early English style. They are approached from Stratton-on-the-Fosse by a pleasant carriage road, and at almost any point present a picture suitable for the camera. The Guide-book informs us that the Order settled in this country about 1793, and in 1814 commenced the construction of this establishment, which is destined to be one of the finest in the kingdom. The first adaptation of the old Manor House, which was purchased, was by Mr. Goodridge, architect, of Bath. Subsequently a monastic chapel was added from designs by the late Mr. Joseph Hanson, of Clifton, and a new Priory Church has been designed by his son, Mr. E. J. Hanson, of the firm of Dunn & Hanson, Newcastle. The work is being carried out by the monks themselves, without a contractor, and no pains have been spared to make every detail thoroughly harmonise, and make the structure as solid as it is beautiful. The transept of the church is completed, and is now used for divine worship. The lady chapel, and a series of small private chapels, are in course of construction, and the choir, which is to connect the transept with these, will, it is hoped, be shortly commenced. The noble proportions and rich detail of the church were photographed by some twenty of the party. This is the last excursion of the season, and, thanks to the glorious day and excellence of the subjects presented, formed a capital wind-up to the summer work of the Society.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION

THE first general meeting of the session was held in Lamb's Hotel, Dundee, on Thursday, October 1, at eight p.m.

Mr. J. D. COX (President of the Society) submitted the annual report, in which he stated that in the course of the past session thirty-two new members had been admitted into the Association, that being the greatest number admitted during any year. Referring to the desire of the Association to make their meetings more attractive, the Chairman said the want of premises of their own was a great drawback, and until they had club premises he feared the attendance would not increase very materially. With the Society in such a prosperous condition as it now was, he thought this question should again be brought up and considered. He then intimated the results of a competition for landscape prints, in which sixteen sets had been forwarded. In the size 5×4 five sets had been given in, and the prizes had been awarded as follows:—1, Mr. D. Ireland; 2, Mr. D. Ireland; 3, Mr. J. R. Stewart. For half-plate and larger pictures there had been eleven competitors, and the result was as follows:—1, Mr. V. C. Baird; 2, Mr. V. C. Baird; 3, Mr. D. L. Honeyman.

Mr. ANDREW STEWART then read a paper on *How our Members make their Lantern Slides*, and said:—Of course those of you who were not present at the Council meeting last week, when this subject was settled and I was appointed to take it up, may well be disposed to wonder how I happen to have any special information as to how the members make their slides; so a few preliminary words of explanation are necessary. The Council then, it may be stated, had a difficulty in finding any one willing, on such short notice, to give their services for this occasion. It was at length suggested by some one that the members might be allowed to exhibit their own slides, and to explain the method by which they are made; but as objection was taken to this, on the ground that not many members would be likely to come forward for such a purpose, I proposed, by way of getting out of the difficulty, to exhibit sets of, say, six slides of any member who chose to send such forward, and to explain the process of their manufacture if I was supplied with the necessary data for that purpose. In short, my duty was to be simply that of sub-editor, to receive, to arrange, and to submit to you the material sent forward for that purpose. To further enhance the interest of the occasion it was suggested that I should preface the exhibition of slides by a demonstration of how my own slides were made; and, to make a long story short, let me say at once that eventually I consented even to this. Now this, let me candidly confess, is the only point of to-night's business that I do not care about, and I think it says more for my simplicity than good sense that I ever agreed to it. And why? Because there are others far more able than myself if they had only been willing to illustrate the art of slide-making. My experience is exceedingly limited, and it is confined to such a small range, with what many may consider all too inadequate apparatus, that it seems presumption on my part to set up as a demonstrator in the midst of a company of experts. I cannot hope to teach among teachers. At the furthest I can only hope if I succeed at all in perhaps stimulating some diffident or young member to try his hand at a recreative branch of photography from which I myself, by the simplest and least expensive means, have derived much genuine pleasure. I make no pretence to ever having taken up photography from a love of art. This, no doubt, is its highest end and aim, and no doubt those who have followed it out in this spirit have had their reward. I have simply taken it up as a recreative amusement, and as a source of pleasure to myself and friends, so that I am pretty low down in the scale of motives among amateur photographers. My experience of photography having been chiefly confined to the working of a cheap quarter-plate camera, you will see that I am not in a position to assume airs of superiority in a company like this. But I am not going to apologise for my quarter-plate, for I hold a very strong opinion that, when photography is pursued simply as a recreative amusement, recreation and amusement cannot very well go hand in hand with a big camera. Whenever an amateur photographer makes himself the beast of burden, the donkey, so to speak, of his hobby, and sweats and groans along roads and up the sides of mountains with a large-sized camera and a supply of plates, he becomes transfigured at once into an "enthusiast," and deserves our respect as a worshipper of art. Recreation and amusement are not in his lexicon. Now, apart altogether from the consideration of expense, I am one of those who would have been excluded on the score of bother alone from the ranks of photography if I had been condemned to carry

a kit under which so many of our members groan. I have never, as I have said, systematically used any other than a quarter-plate camera, and I maintain that I have had *all* the recreative amusement from that insignificant apparatus that a big camera could possibly give, and I save myself much worry and bother over and above. Every element of satisfaction to be obtained from the making of a good photograph can be obtained from a quarter-plate except the satisfaction of having a large picture, and even that satisfaction is not withheld, seeing that the small plate lends itself so simply, so handily, so cheaply, to enlargement as a lantern slide. But I will not pursue this tempting side of my subject further than to remark that the tendency of the times seems all towards small cameras, and it would seem as if at no distant date the hand camera was to be the instrument of the future, for all the mechanical skill of the instrument-maker is now bent in the direction of perfecting the detective camera. There are several distinct and genuine sources of pleasure in photography, such as toning, enlarging, selecting subjects, making transparencies, &c., but I will only refer to two of these—viz., the developing of a good negative, and the production of a good transparency. These are, to a large extent, selfish pleasures, for, even if you take a friend into the dark room with you to share with you in the rapture of seeing the image unfold with that steady, slow deliberation with which Nature matures all her perfect works, you can never tell, in the gloom of the dark room, whether he is yawning or laughing at you, and you generally have a strong suspicion that he is, at least, not enjoying himself, and is quite unfit to sympathise with you in your efforts to obtain pluck, depth, and detail. No; the delights of development must, I fear, ever remain solitary delights, and you can only look forward to the time when—fixed, washed, and complete—you are able to rush out, with the dripping work of art in your fingers, and to hold it up in the full blaze of day for your friends and relatives to look at and—and—admire. The production, then, of a good negative is a source of genuine pleasure, and this pleasure is altogether irrespective of the size of the plate. When it comes to my next source of pleasure—the making of a good lantern slide—the advantages are altogether on the side of the small negative. There is no tiresome process of reduction; bother is reduced to a minimum, without in the slightest degree reducing the satisfaction. I am sometimes inclined to think that the production of good slides affords a keener and finer enjoyment than the making of a good negative. In this position your joy is instant and complete when you examine it. Every detail can be scrutinised, and its tone, depth, and transparency gauged. With the negative your satisfaction is incomplete. You are not inclined to be too dogmatic about it. You must wait till you see a print before you can rightly judge, and so your measure of satisfaction is less. I look on an evening spent in the printing of lantern slides as one of the most delightful sources of recreative amusement I know, and, with Burns, I am inclined to say that—

"The sweetest hour that e'er I spent
Was spent among the (g)lasses, oh."

One looks forward to such an evening with keen relish. You select the best of your negatives with every care; you arrange your materials; you light your red lamps; you shut the door of your dark room; and, with the hope big in your breast of excelling all your previous efforts—nay, of licking the combined members of the Society, and carrying off, perhaps, as the reward of your noble efforts, a packet of lantern plates as a prize—you set to work. You expose your plate to the flame of the gas for the calculated number of seconds, and with dainty care you consign your creamy slide to the developer, and watch for the appearing image with almost breathless anxiety. Then, at last, like the blush mantling a maiden's cheek, like the penumbra of the earth across the white face of the moon in an eclipse, the latent image hints at its coming beauty. Steadily, like sunrise over the landscape, the deft pencil of the developer traces out the lines of beauty, and, growing in intensity, the face of the emulsion is covered with the perfect picture; and you watch the moment when the work of detail has been completed to snatch the plate away, and arrest the work of the creative agent, which in a moment more would have assumed the aspect of the black destroyer. And now the hypo—faithful, humble, indispensable servant—sweeps the obscuring fogs away, the kindly alum clears and firms the image, the pellucid water purifies the whole, and the slide is now ready for examination against the light of the opal globe in the presence of your friends. Then, if all things have worked together for good, you have, indeed, "a thing of beauty and a joy for ever," which awakes at once the admiration of young or old, and in the exclamations of admiration thus excited the lantern-slidist is fully rewarded, and only the completeness of his joy awaits him in the perfect image thrown upon the screen for the delectation of our audience. That is the lantern-slidist's hour of triumph, when, displayed upon the white and spotless orb of a twelve-feet disc, his slide shines out, rich in tone, delightful in light and shade, perfect in detail, with a sky as unspeckled as the breast of your Sunday dickie or the azure above the tip of Ben Nevis, and with a subject so set and so chosen, and so harmonious and beautiful, as to delight the eye of the most illiterate, and to set on fire the heart of the artist. That, I say, is the moment of the slidist's triumph; do not grudge him the happiness he feels, for it has been well earned in the care, the labour, the drudgery he has taken upon himself to achieve this result. A man is all the better of having a hobby, and I know of no purer, finer, or more educative hobby than photography, and no better home recreation for the winter evening than lantern-slide making. Your mother or your wife has noting to fear in secing you retire into your dark closet. She knows that, though you are engaged in works of darkness, your deeds are not evil; that though your den, in its ruddy glare, looks as if you were engaged in some incantation for summoning spirits from the vasty deep, the only witchcraft you engage in is that which pertains to the magic of the developer in summoning the past to reappear on the plate before you, and to fix by the magic of your art the evanescent image before you. There is no time for an evil thought to intrude into the sacred precincts of the dark room. Every faculty of the mind is delightfully occupied, and the devil is thus effectually kept at bay.

Mr. STEWART received a number of sets of slides from members of the Association, and, as the slides were exhibited on the screen, described the processes by which they were made, each worker having sent in copious notes as to his method of preparation.

Mr. J. W. MUNRO exhibited a very ingenious hand camera he had designed and made himself, of magazine pattern, and carrying three dozen quarter-plates; in point of size, less than most magazine cameras carrying only one dozen plates, and having the advantages of being able to focus at will and use lenses of different focal length without in any way altering the general mechanism.

Correspondence.

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

IDENTIFYING PLATES IN THE DARK ROOM.

To the EDITOR.

SIR,—I see in last week's JOURNAL a letter from Mr. Plaish on the subject of identifying plates in the dark room. What he suggests is most absurd. I ask him, as a practical photographer myself, what the good is at all of notes on the back of the plate? When are they to be put there, before you go out or when you come home, and if you keep a note-book, what more do you require? As regards backing the plates with paper, it would be more trouble to us professionals than it is worth. The nuisance of having to clean every plate before you could develop it would be simply unbearable. If he wants to stop halation, why doesn't he resort to the proper method, and cover up the window? As regards backing plates, my experience has been that it did no good whatever.—I am, yours, &c., A PRACTICAL PHOTOGRAPHER.

Brighton, October 5, 1891.

THE DISCOVERER OF THE GELATINO-BROMIDE PROCESS.

To the EDITOR.

SIR,—I quite agree with your correspondents that we are approaching a fitting opportunity for expresssing in a tangible form our gratitude to Dr. Maddox for the enormous benefits which the publication of his experiments in gelatine emulsion-making have conferred upon photography, and I think that too much stress cannot be laid on the fact that the good doctor has never reaped the slightest pecuniary reward from his discovery. There are many people in the photographic world who have reaped enormous rewards from gelatine plate-making, and I am sure that many, if not all of them, would cheerfully subscribe towards a testimonial, while I am also confident that every photographer, professional and amateur, would be delighted to participate in the privilege of placing a tribute at the feet of so modest and kindly a gentleman as Dr. Maddox has often proved himself to be.

Some year or two ago the Britannia Works Company, whose liberality and public-spiritedness are well known to us, and to whom the photographic community are under lasting obligations as the pioneers of cheap plates, generously offered to found a studentship, and placed 100*l.* aside for that purpose. The offer, alas! was never accepted. May I respectfully venture to suggest that, in a testimonial to Dr. Maddox, the Company would find an excellent and graceful opportunity for the disposal of the money, or, at least, a portion of it?

I shall be willing to add my mite to the list as soon as one is started, and, enclosing my card,—I am, yours, &c., GREEN LABEL.

Maitland-park, N.W., October 5, 1891.

To the EDITOR.

SIR,—I am pleased to note in your issue of the 25th ult., a letter from a correspondent to the effect that some general recognition of the benefits conferred upon photography by Dr. Maddox, the inventor of the gelatino-bromide process, should now be made. By refusing to patent and claim for himself a legal monopoly, Dr. Maddox made a great and generous gift of his marvellous discovery to the world, and I feel sure it will be universally agreed that some national and, if possible, international recognition of so unusual and unselfish an action ought to be offered Dr. Maddox, who could have readily realised a large fortune had he but chosen to make the public pay for the use of his discovery. Such a testimonial to his worth and unselfishness would not only be a graceful and a merited reward, but would also be a timely and acceptable tribute to qualities but too seldom met with in these days of selfishness.

The merits of great discoverers and men of science are but too frequently ignored during their lives, when they could appreciate the gratitude of their fellow-men, to be extolled and magnified after their death, when it is too late. I trust that in this instance it may be averted, and that Dr. Maddox (who, I hear, is in poor circumstances) may be enabled to live the remainder of his days in comfort, and still pursue his investigations into the mysteries of our art. I saw a letter in your issue of October 2 proposing a subscription of 1*s.* towards a testimonial to Dr. Maddox. This, I venture to think, would be inadequate. A subscription of 1*l.* would be more to the purpose. At the same time, those who could not well afford this could give lesser sums. Personally, I feel so much indebted to Dr. Maddox for the pleasure his discovery has given me that I fear that my subscription of 1*l.* is insufficient—I am, yours, &c.,

Exeter, October 5, 1891. AN AMATEUR.

MR. HENDERSON'S DEMONSTRATION.

To the EDITOR.

SIR,—In case your report of my lecture and demonstration on *Emulsion Making* may not be comprehensive enough, from the rapid manner I treated the subject, if any of your readers desire any further information I will be pleased to reply through your columns.—I am, yours, &c.,

277, *Lewisham High-road, October* 7, 1891. A. L. HENDERSON.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I enclose copy of letter sent to-day to the Secretary of the Photographic Society, and shall be obliged if you will kindly publish it.—I am, yours, &c., HENRY VAN DER WEYDE.

182, *Regent-street, W., September* 30, 1891.

[Copy.]

"To the Secretary of the Photographic Society of Great Britain.

"SIR,—My attention has been called to an article published last week in a leading London daily on the Pall Mall Exhibition, stating that 'the choice of the medal to be allotted to the portrait section lay between a charming group by Mr. Van der Weyde of the Countess, &c. (giving titles), and a life-like portrait (giving name) by Mr. Warneuke. Ultimately it was awarded to the latter, as Mr. Van der Weyde's picture had been exhibited in London, and was, therefore, not entitled to competition.'

"Now, sir, as my picture was entered for competition, I hasten to correct the false impression which has, doubtless, been formed by this statement, especially after what occurred last year, by saying that the picture referred to has never before been publicly shown.

"It is possible that it has been confounded with one of two similar pictures before exhibited, but quite distinct, not only as to the posing of the heads and hands, but also as to the relative position of the ladies at the table, the Lady Helen having changed places with her *vis-à-vis* in one, while in the other the ladies are represented as taking tea instead of embroidering.

"As the imputation has been allowed to go forth to my discredit without inquiry or contradiction, I am compelled to ask you to lay this my resignation as a member of the Society before the Council at their next meeting.—I am, sir, yours very truly, "HENRY VAN DER WEYDE.

"182, *Regent-street, W., September* 30, 1891."

[We can quite understand that our correspondent felt excessively annoyed at the misstatements he refers to, and which, we think we are justified in saying, are entirely without foundation in fact; but we cannot understand upon what principle he seeks to make the Executive of the Society responsible for their appearance or their correction. A more or less lengthy report of the Exhibition has appeared in at least one hundred papers, and it is manifestly impossible for the officers of the Society to supervise and correct this number, even were it their duty to do so, which clearly it is not. When a journal entirely devoted to photography quotes the title of a medalled picture "A Primrose by the River Brun," instead of "A Primrose by the river-brim," it is not surprising to find greater inaccuracies in the daily press. Mr. Van der Weyde's proper course, it appears to us, would have been to write to the editor of the paper containing the erroneous report, desiring him to make the necessary correction. This undoubtedly would have been done.—ED.]

EXHIBITION OF INSTANTANEOUS PICTURES.

To the EDITOR.

SIR,—May we ask you to be good enough, through the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY, to draw the attention of all those interested in photography to the fact that we have made arrangements whereby we shall have on exhibition at our West-end branch, 26, Charing Cross-road, the whole of the interesting collection of photographs of the celebrated instantaneous studies of Anschutz? These consist of over 1000 prints, some of which are considered to be the most marvellous examples of instantaneous work yet produced.

The series comprises: Man running, soldiers marching, dog running, horse leaping, bird flying, man jumping, camel running, &c. The exhibition is free, and will be open to the public from the 12th to the 17th inst., inclusive. Thanking you in anticipation,—We are, yours, &c.,

81, *Aldersgate-street, E.C., October* 1, 1891. ADAMS & CO.

NEW RAPID CARBON TISSUE.

To the EDITOR.

SIR,—We notice in a leaderette of your last week's issue some remarks on the want of progress in every-day printing processes, which, in regard to sensitiveness, are little advanced from the standpoint reached twenty years ago. You point out, in especial relation to carbon and platinotype printing, the loss of material, the impaired quality of results, the vexatious delays that come with the winter months, and suggest experimental research in the direction of shortening exposures.

In regard to carbon printing, the accuracy of your statements and the practical importance of your suggestion are undeniable, and the question of increased sensitiveness of pigmented gelatine has been before us for years—sometimes actively pursued, at others abandoned as almost hopeless, differences found in apparently identical makes of gelatine complicating the problem. During the current year, however, definite practical advance has been made, and accompanying this letter we take leave to forward you, sir, for comparative testing of results, samples of the ordinary and of the new tissue, simultaneously sensitised and ready for exposure. We find in our own practice a definite gain of one-third in sensitiveness, and this ratio augments as the tissue is kept. On the other hand, the keeping property of the new tissue is diminished by nearly one-third, but it is good, with ordinary care, for ten days. With increased sensitiveness comes an improved grip of the finer gradations of the negative, which are less liable to be washed away in development. We expect shortly to announce the new tissues as ready for delivery.—We are, yours, &c., THE AUTOTYPE COMPANY.

Ealing Dene, October 5, 1891.

Exchange Column.

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

Wanted, 10×8 rapid rectilinear, in exchange for new electro-plate spade guinea, &c.—Address, C., 11, Waterloo-crescent, Dover.

8½×6½ French portrait lens, in exchange for quarter-plate bellows camera, with three double backs.—Address, J. H. AINLEY, 426, London-road, Sheffield.

Samuel's hand camera, rectilinear lens, carries twelve quarter-plates, two finders, time and instantaneous shutter, for quarter-plate camera and three double backs, no lens.—Address, J. K. SMITH, Little London, Rawdon, near Leeds, Yorkshire.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:

J. T. Barker, Stourbridge.—*View of Adam's Hill, Clent, Stourbridge.*

H. Hinchcliffe, Liverpool.—*Group of Everton Association Football Club.*

G. Emberson, jun., Cornhill.—*Two Portraits of the Lord Mayor of London.*

PLANS.—Use slow plates and a well-restrained developer.

JOHN POWER (Ballantrae).—Your letter is unsuitable for insertion.

H. COUCH.—About fifteen grains of ammonium nitrate will, in all probability, suit the emulsion you describe.

INQUIRY.—We cannot tell you the names of any firms in Germany who produce "cheap imitation silver prints."

NIAGARA.—Mr. Spooner, of the Strand, will, no doubt, be able to supply you with unmounted silver prints of Niagara Falls.

J. R. G.—The weight of double bromide of ammonium and cadmium required to convert one grain of silver nitrate into silver haloid will be approximately ·725.

WORCESTER.—Your pictures did not deserve the strictures of the publication referred to. For a novice of a few months' standing they are highly creditable.

CYMRY (Cardiff).—Better keep to the carbonate of lime; the other material, if pure, would not answer the purpose. If impure, it possibly might, provided the impurity was in the right direction.

DOUBTFUL.—Unless you let us know precisely the description of your lens we cannot, of course, answer your question; but we may say that nearly all wide-angle combinations work equally well from either side. Why not try your lens yourself?

ACETATE.—There is considerable latitude in the proportion of acetate of soda in the toning bath. The best proportion is thirty grains to the ounce. A little more or less makes but small difference with the recognised brands of chloride of gold now in the market.

W. WILMOT.—The cause of the carbon tissue not adhering to the temporary support, and behaving in the way it does, is that it is insoluble before it is printed. When this is the case, it will not adhere to whatever it is to be developed upon. Keeping the tissue too long after sensitising, or its being too long in drying, will fully account for your difficulty.

MANX CAT writes: "Enclosed you will find two cabinets, which are badly stained. Can you tell me the reason why?"—The stains are caused by splashes of nitrate of silver. It is obvious that they reached the pictures after they were mounted, as there are several on the margins of the mounts themselves. Of course, we cannot say how they got there.

A. H. KIRK says: "Will you kindly tell me how to precipitate the silver in old developers. I have saved both eikonogen and pyro in the same jar. Will that make any difference?"—In the developer from dry plates there is no silver to be recovered, inasmuch as it contains none. All the silver to be recovered from dry plates must be sought for in the fixing bath.

LIONEL PERCY TAYLOR.—We do not know of any process by which a positive print may be made from a cloth or paper tracing on bromide paper showing black lines on a white ground. Long exposure would certainly reverse the image, but the results, we fear, would be of no practical use. Study Colonel Waterhouse's paper on reversals by thio-carbamides. These are the only chemicals which, when added to a developer, reverse the image.

B. A. (Cambs.).—As the whole of that dozen plates showed a fogging at the same corner, and all other plates used in the same slides did not, we can only surmise that there must have been a hole in the box in which they were packed. Possibly the box had a fall, and pitched on the corner, and so fractured it and the wrappers inside. We had a similar experience ourselves a few months ago. The damaged box was a a proof of the cause.

E. W. W. (Grahamstown, Cape Colony) says: "May I ask you to inform me where paper shades for the stereoscope (stereograms) can be purchased in England, and whether the firms publish lists of the series they may be able to supply?"—Very little is being done commercially at the present time with stereographic photography. Most of the slides now to be had will be of an old date. You might write to Messrs. England, Wilson, Bedford, and others. Stereoscopic photography here, we regret to say, amongst professional photographers is at a very low ebb.

R. MCAVOY.—You are quite under a misconception with regard to the law on copyright. You say that you copied an original painting which had never been photographed or engraved before, and made your reproduction copyright. Now some one else has copied it, and is selling his copies, and you seek to restrain him. This you will be unable to do, seeing that your copyright only exists in your own work, and not in the painting. Had the second copy been made from one of your copies, you would have had redress; but, as it was made from the original picture, the same as yours, you have none.

H. HERBERT writes: "We are very much troubled with the printing, and cannot find any cause; they print such a nasty dirty yellow colour, and some refuse to tone. Others are just as good from the same batch. We have a printing-room away from any house, and, as this is such a damp district, I fancy it must be caused by damp. Would you kindly tell me, through the JOURNAL, if damp would cause this? The spoilt ones are dull and mealy, with no depth in the shadows. We get good prints from the same negatives. We have been using paper and thin toning bath."—Answer: By fuming the paper with ammonia before printing, your troubles will probably disappear.

N. A. W. complains of the "inky" tones he obtains when making enlargements from strong negatives on bromide paper. He says he uses daylight, and at times an enlarging lantern; but there appears to be little difference in the result, as both yield dense, black tones, without any transparency in the shadows.—This is one of the weak points of bromide paper. With tolerably thin negatives good results can be obtained by novices; but, when hard negatives have to be dealt with, considerable experience is necessary. The only course to pursue is to give a very long exposure, and to use a much diluted developer; then tolerably good results may be obtained, even from hard negatives.

J. F. M. writes: "Would you kindly tell me if we can expect an apprentice to take home some of our orders when completed when within a reasonable distance, and if it is the custom of the trade so to do? Also, what time is it usual for them to leave work of an evening?"—Much will depend upon the terms of the indentures. Usually the conditions are that the apprentice is to be taught the trade or "craft," and the functions of an errand boy scarcely apply, as this has nothing to do with any branch of photography. With regard to the hours, they should not be longer than those of operators or printers. An apprentice must not be made a drudge; but, as we have said before, so much depends upon the terms of the apprenticeship.

THOMAS TURNER writes: "Will you please tell me what you consider the cause of the stains in enclosed prints? My printer has had many spoiled in each batch for some weeks, which I told him was caused by pyro, through want of cleanliness. This time I stood by him, and watched throughout, and the result was the same. You will notice that the stains are all on the albumenised side of the paper, which is so in every instance."—From the meagre data furnished, it is impossible to say positively the cause of the stains on the prints. They have all the appearance of being imperfectly fixed. We should like to have full particulars as to what stage of the operations the stains first make their appearance. We should then be the better able to form a definite opinion, and, as our correspondent was overlooking the work at the time, he will, doubtless, be able to furnish them. We do not undertake to answer per return of post.

T. GARDNER.—So much depends upon the indentures. An apprentice, after paying a pretty good premium, and receiving but a very small salary for five years, can scarcely be expected to do dusting and cleaning of the show and work-rooms. In the usual course of apprenticeship the apprentice is to be taught the business. A very little tuition will suffice to teach dusting and cleaning rooms. The question is within the jurisdiction of the nearest magistrate.

THE LANTERN SOCIETY.—The next meeting will take place on October 12th, when the slides going to America will be shown.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—October 15, first lantern night; October 22, ordinary meeting. Visitors invited.

THE PHOTOGRAPHIC CLUB.—Wednesday, October 14, first lantern night of he season. Subject for discussion, October 21, *The Theory of Development.* October 28, smoking concert and exhibition of members' pictures.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.—Tuesday, the 13th inst., Exhibition of Slides, Moseley-street Café, Newcastle. At the approaching Annual Competition, there will be an open class for lantern slides. The last day for sending in is Nov. 4th.

THE Fry Manufacturing Company announced a second series of demonstrations to be given on alternate Friday evenings. The subject for the 16th inst. is *Lantern Slides;* that for the 30th, *Bromide Enlarging.* The demonstrations commence at eight o'clock p.m. Tickets gratis by sending a stamped directed envelope, or by personal application.

THE Tunbridge Wells Amateur Photographic Association holds its fifth Annual Exhibition from November 25 to 28. There are several open classes for amateurs and professionals. A champion class would certainly have increased the attractiveness of the Exhibition, and would, we do not doubt, have given considerable satisfaction to the competitors in the open classes.

THE tenth winter session of instruction in photography at the Polytechnic Schools will commence on Tuesday, October 20. Mr. W. E. Debenham, who, during the absence of Mr. Howard Farmer abroad, will conduct the technical and practical course of photography, will deliver the introductory lecture explanatory of the general principles of photography on the evening of the date named. The syllabus arranged is very complete, and thoroughly well covers the ground Mr. Debenham proposes to traverse. Mr. Debenham's very long and extensive practical and theoretical knowledge of all branches of photography should insure him a large attendance throughout the lectures, in the course of which, we may note, he proposes to treat of perspective in relation to photography.

BY the courtesy of Messrs. Adams & Co., of Charing Cross-road, we have been enabled to inspect the large collection of instantaneous studies of animals by Herr O. Anschutz, of Berlin, which is now in their hands for exhibition. It has never before fallen to our lot to examine such excellent examples of what is, undoubtedly, one of the most difficult branches of practical photography. Herr Anschutz has evidently devoted an infinity of care and patience to his work, for each photograph is a perfect scientific and technical study, and the entire collection besides, forms an invaluable object-lesson in zoology, which should on no account be missed by any one at all interested in the subject. Herr Anschutz has brought animal photography to a stage of development not hitherto dreamed of in this country.

DEALING with the subject of the identification of plates in the dark room, to which we devoted a leader a fortnight ago, a contributor, who, we believe, speaks with some practical knowledge of the matter, makes, in our present number, a suggestion which we commend to the attention of plate-makers and others concerned in the solution of the difficulty. It would be an immense boon to small and large users of plates to be always able to handle them with a certain knowledge of their identity; at present, where several makes are employed, it is often a case of working in the dark in a double sense.

As in this country newspaper editors "down under" resort to all sorts of prize-giving devices in order to increase their circulation. *Town and Country,* a Melbourne journal, recently starts, in an advertisement, with the unimpeachable postulate that photography has long assumed the dignity of an art, and then goes on to say that, in order to encourage that art, the editor offers a prize of 25*l.* for the best negative and mounted print done in Australia, and a prize of 15*l.* for the best negative done by a competitor, the "developing and mounting" by others. The last condition is evidently a mistake, and should, no doubt, read "*printing* and mounting." The prizes are liberal, and the conditions, on the whole, equitable, and the high quality of the work done by Australian photographers should make the competition keen and interesting.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

The application of the telescope to a photographic camera for obtaining large views of distant objects has been known and practised for many years. The subject seems to be arresting attention on the Continent, if we may judge from some of our foreign contemporaries, one of whom, the other day, gave two illustrations, of which one showed a distant scene, in which a statue in the tiniest of dimensions was to be seen; the other showing what purported to be that same statue, now large and full of detail, taken from the same spot. But, however this may go down with the uneducated public, it only requires the slightest examination by any one conversant with perspective to ascertain that the so-called enlarged or telescopic view of the statue has, in reality, been printed from a negative taken within a few feet of the object, and that it is not a telescopic photograph at all.

We have before us two genuine telescopic photographs, taken without a telescope, on which we shall make a few remarks. The readers of our issue of last week may have observed among the list of patents one by Mr. T. R. Dallmeyer for "Improvements in Photographic Lenses." Although we are not yet authorised to state the particulars of the construction of the new lens, we may say that it is simply a double combination, which has the property of producing any size of image from the minimum—when the plate is almost in contact with the back lens—by simply placing the plate at any distance whatever further away.

In all constructions for the production of large images hitherto accomplished, the principle involved has been that of the formation first of a primary image, which has been subsequently enlarged, and herein lies the difference between the invention we refer to and former constructions. We have seen the instrument, and also some examples of its capabilities; one, an instantaneous photograph of a crow in mid-air, about to settle on the top of a tree over 100 yards distant, the crow itself measuring three-quarters of an inch from tip to tip of its wings; the other a direct photograph of the sun three-quarters of an inch in diameter, and in both cases the extension of the camera from the anterior lens to the focussing screen only measured two feet. The image given is that produced by the ordinary photographic lenses—viz., primary and inverted. The great feature of this construction, that has never before existed in a photographic lens, is that a considerable distance can exist between the image and the anterior lens, and a much smaller distance between this and the screen, still giving a *magnified* image of the object. Its various applications will, in all probability, suggest themselves to our readers, but we understand that the instrument itself will be fully described by its inventor in the course of a month or so.

We have frequently dwelt upon the advantages that would accrue from such a combination. It may at first suggest itself to some that, having with an ordinary lens obtained a sharp negative of a distant object, it might afterwards be magnified by the ordinary processes of enlargement. But to do this to the extent now under consideration would ensure the granulation of the image, with other possible film defects, making themselves apparent. Hence the advantage of having the magnification done in air.

THE NEWEST EMULSION PROCESS.

It is to be hoped, and we fully anticipate such will be the case, that Mr. Henderson's demonstration at the last meeting of the London and Provincial Photographic Association may cause a revival in the interest taken in the making of emulsions, as well as in the mere use of them. There is surely nothing beneath the dignity of any, except the most "advanced" amongst the followers of photography, in the possession of a knowledge of how to prepare the films upon which they work. Ten years ago there was no lack of amateurs, nor of professionals either, who prepared their own plates, and, as a consequence, scarcely a meeting passed, or an issue of the Journal was published, without some item of useful information being made public. But now the whole object seems to rest in the hands of the plate-makers, whose main object is to sell their wares without telling the world too much about them.

In the very full and lucid description given by Mr. Henderson there is little that is necessary left unnoticed; but, in the expectation that the process as published will be subjected to the usual "improvements" by some of those who try it, we may touch briefly on one or two points that seem to deserve a little greater prominence than could be given to them at the meeting.

The first is the necessity for pure or distilled water—a matter upon which the demonstrator certainly dwelt, but to which the casual reader is not likely to attach as much importance as actually attaches to it in this process. Unlike the late Dr. Van Monckhoven's process, based upon the conversion of carbonate of silver by means of hydrobromic acid, which, when properly conducted, formed an emulsion containing no soluble matter requiring to be washed away, the process under review introduces matter of a highly dangerous character if allowed to remain in the emulsion, or if removed by unsuitable means. We allude, of course, to the carbonate of potassium formed by the double decomposition of the carbonate of silver and bromide of potassium. The presence of this salt, at least for a short time, in contact with the gelatine exercises little or no deleterious

action on the latter, though in the case of collodion emulsion, when the same process was published some twenty or more years ago, the alkali set free in the act of sensitising was found to destroy the pyroxyline, and with it the emulsion. If permitted to remain in contact with the gelatine for an indefinite period, the carbonate of potash would, no doubt, prove highly injurious to the setting powers, but we have never found the comparatively short contact required in Mr. Henderson's process to produce any ill effect.

With regard, however, to the question of washing with pure water, it is well known that most, if not all, "hard" waters contain, amongst other matters, soluble salts of calcium and barium, and in very many cases, when the water is stored in lead cisterns, or passes through lead pipes, there will also be traces of lead in solution. Such matters would be at once precipitated upon coming in contact with carbonate of potash, or any other alkali, with the result that much of the precipitated matter would cling to the gelatine, and render the film more or less opalescent after fixing.

It may be urged that the proportion of impurities of this character in ordinary potable water, or such as is likely to be employed for emulsion purposes, is so small that the effect produced would be barely appreciable, and such might indeed be the case if the result depended upon the lime, or other salts, contained in the water with which the emulsion was *made only;* but this is not so, as a moment's consideration will show, especially if the washing of the emulsion be performed in a constantly changing stream of water, as is frequently the case. Under those circumstances the mass of emulsion charged with carbonate of potash becomes a trap, so to say, for all the precipitable salts in the water employed for washing, and the more rapidly this is changed the larger will be the quantity of lime thrown down, much of which becomes firmly attached to the particles of the emulsion itself.

If the emulsion be permitted to soak for some time in a limited quantity of water, and this be subsequently changed for a second, third, and fourth quantity, also limited, the case will be different, for then a large proportion, if not the whole, of the alkali will be drawn out in the presence of but a comparatively small quantity of precipitated salts. If distilled, or at least purified, rain water be used, the result will be better still, though how far such treatment could be pursued commercially we cannot say.

The effect of washing such an emulsion wholly in ordinary tap water is to produce a dense but beautifully fine opalescent appearance on what ought to be the clear portions of the negative; but, if the plate be immersed for some time in a fresh bath of new hypo, much, if not the whole, of this will disappear. In cases where distilled water is unavailable, it may be useful to add to the washing water certain salts, such as the soluble nitrates, in which carbonate of lime is more or less soluble, in order to prevent its formation.

Another point in the process, upon which, however, Mr. Henderson laid a special stress, is the low temperature to be observed in "cooking." Of course, all who have worked the ammonia process are aware of the necessity of this condition; but it may not strike them that an equal necessity exists when carbonate of potash is present, while any attempt to combine the boiling process with this method of converting the carbonate would result in nothing short of disastrous failure. One of the most convenient methods of reducing the haloid salts of silver consists in boiling them in the presence of alkali in conjunction with glucose, or a glucoside, or, indeed, almost anything of a saccharine, starchy, or gelatinous nature since the chemical action of the alkali in the organic matter frequently suffices to set up the necessary conditions where they do not originally exist. Though the action is most energetic with grape-sugar and a caustic alkali, carbonate of potash and ordinary sugar will bring about as perfect reduction, though in a longer time, and a gelatine emulsion boiled for a short time in the presence of a little carbonate of soda or potash will rapidly blacken, from reduction of the bromide by the combined action of the excess of alkali and the products of the decomposition of the gelatine. Between the visible discolouration of the emulsion and slight fog there are, of course, many grades; but it is not very difficult to believe that, in working any process of emulsification in which a free alkali is present, safety lies on the side of low temperature. It is possible to work at a temperature as high as 100° Fahr.; but it is far wiser to adhere to the lower grade named by Mr. Henderson, viz., 80° or 90°, especially as it must be borne in mind that the agent that produces sensitiveness is the alkali, and not heat. The presence of the alkali at the time of the formation of the silver bromide has an important effect upon the sensitiveness, though this is further heightened by judicious "cooking."

Here, again, crops up a point worth emphasising. Mr. Henderson mentions the addition to the emulsion before cooking of a small quantity of nitrate of potash and bromide of potassium; but, in our brief report of the proceedings, the reason for this addition is not mentioned. After the conversion of the silver carbonate the emulsion contains, in addition to bromide of silver and carbonate of potash, about the ordinary excess of soluble bromide, and differs, therefore, from an ordinary emulsion in being free from soluble nitrates. Now, these, as has frequently been shown, conduce greatly to the cleanness and freedom from fog of emulsions, whether of collodion or gelatine; and, therefore, our emulsion may be said to be short of one of the principal safeguards against fog. The soluble nitrates probably exercise a greater influence in this direction than the bromides, for in such processes as Monckhoven's with hydrobromic acid, or any of the precipitation methods, where the pure bromide is allowed to subside and is then remulsified with fresh gelatine, the two restraining influences being entirely absent, it is impossible to cook without producing fog. If a large or comparatively large dose of bromide be added, the cooking may be proceeded with; but then the necessity for washing the emulsion is created. But a very small trace of bromide in conjunction with nitrate will have the same fog-preventing effect without introducing the necessity for washing.

That reminds us of another possibility of the process not mentioned by Mr. Henderson, namely, the production of an emulsion not requiring washing. We, some years ago, attempted this in exactly the same manner, substituting bromide of ammonium for the potassium salt. The result was a highly sensitive but rather thin emulsion, the free ammonia given off in the process conducing largely to this result, which dried upon the glass with a peculiarly "matt" appearance, amounting almost to granularity, and yet producing no such effect on the image. The carbonic acid liberated from the silver carbonate in this case appears to combine only partially with the ammonia, or to separate again if it does, and the films in drying lose all smell, and present only the granular appearance we speak of, arising from the sesquicarbonate of ammonia they contain. The latter, being an efflorescent rather than a deli-

quescent salt, shows no tendency to cause any alteration or injury to the films from keeping; indeed, we have kept them for several weeks in an ordinary plate box without injury. Our reason for relinquishing our experiments was chiefly the difficulty arising from the opalescence, and a tendency to oversensitiveness, and consequent thinness of image.

ABOLITION OF "HYPO" IN PRINTING PROCESSES.

In our "Continental Notes" of a few weeks since we noticed a positive printing process in which a lead and a potassium salt are chiefly active in the formation of the image, and again this week we give details of another process, the perfected picture thereby produced consisting of gallate of iron, a compound which, we also point out, is closely analogous in its composition to ordinary writing-ink. It is not our intention on this occasion to enter into any examination of the artistic and practical value of these processes, which only considerable discussion and a prolonged series of experiments could determine, but we will pause to point out that in each case the fixing agent is simply ordinary water, which by its solvent powers fulfils the function of, and may therefore take equal chemical rank with that bugbear of photographic development and printing, "hypo."

One of the chief triumphs of the beautiful platinum processes is clearly attributable to the circumstance that so comparatively harmless and innocuous a body as water, slightly acidulated, it is true, is the sole fixing agent required; and for a similar but not identical reason we anticipate that a large measure of favour awaits the recently introduced kallitype process. Any system of printing which obviates the employment of hypo as a solvent of the unaltered portions of the picture has a strong argument in its favour. It is certain that prints which are subjected to hypo fixation often carry the germs of their own disintegration in a double sense, as it is a moot point which of the two evils is the earlier to assert itself in the fading of the picture, imperfect fixation or the presence of hypo due to insufficient washing.

It is rather late in the day for us to discuss the various dangers involved in an unintelligent use of (photographically considered) so dangerous a compound as hypo. They are perfectly well known to most, if not all, of our readers. Many attempts have from time to time been made to provide substitutes for it, which shall as readily dissolve the silver salts as—to take a case at random—water does the persalts of iron, but so far without success. Had the experimentalists succeeded in this object, we have no hesitation in saying that the platinum, developed bromide, and kallitype processes would have had a far harder battle to fight than has been the case, although the contest for supremacy has in all conscience been severe enough.

Mr. J. A. Forrest, in his brief paper in our present number, probably echoes the sentiments of vast numbers of workers with regard to the imminent risks of fugacity involved in the employment of hypo as a fixing agent for prints. "My fifty years of experience," says Mr. Forrest, "has led me to the conclusion that no process of printing on paper is safely permanent which employs hyposulphite of soda as a fixing agent." Practical testimony of this nature weighs down a large amount of theory. It is beside the mark to argue that properly fixed and washed silver prints are as permanent as it is possible to get them; the incontrovertible fact remains that large numbers of prints turned out are imperfectly fixed and insufficiently washed, which arises not so much from the want of skill on the part of the operator as from the inherent difficulty of telling when fixation and washing are sufficient. If we contrast the albumen-silver system of printing with the platinotype processes, we shall remark an enormous disparity in the simplicity of the respective fixing methods, which, of course, tells vastly in favour of the latter from every single point of view it is considered.

For these and many other perfectly well-known reasons, then, we welcome any experiments which aim at the provision of printing processes that do not involve hypo fixation, and this is why we have given formulæ for two such processes in the hope of directing attention to the chief point at stake. Beautiful as are some of the existing printing processes which exhibit such a formidable rivalry to albumen-silver, they are not, we believe, destined to altogether oust the latter process from the photographer's formulary. Take it all in all, there is a surprising amount of vitality in the "old dog" yet. Is it because the *real* universal printing process has still to be discovered—a process capable of attaining such a pitch of popularity as albumen once—and not so very long ago—enjoyed? We shall not presume to answer our own question, but we will close by laying it down as a guide for any experimentalist thirsting for fame (and fortune) that the fixing agent for the process of the future must be no more dangerous a chemical compound than is ordinary water.

It will be remembered that a short time back we called attention to the fact that the lenses of detective cameras were often, good though they be, the unsuspected cause of inferior negatives, arising from a thin film of dust on the surface of the glasses, which the construction of the camera does not admit of easy removal. Here is another instance where a lens may be the cause of inferior pictures: A friend of ours recently purchased, second hand, a stereoscopic camera fitted with a pair of instantaneous lenses of the Petzval type, bearing the name of one of our leading opticians. The fault found with them was that one worked quicker than the other, and did not yield nearly so brilliant a negative. Seeing that the lenses bore consecutive numbers, and knowing the reputation of the maker, we had little doubt that the instruments were accurately paired when first issued. The negatives shown by our friend, also one taken by ourselves, fully proved that there was a marked difference between the two lenses. On removing the glasses from the mounts the reason was at once apparent. The inside of one mount was the same dead black as it was when it left the factory, while that of the other was quite glossy, evidently from frequent cleaning. Both tubes were reblacked, and the performance of the lenses was then identical. It was subsequently ascertained that the camera had not been used for many years, but one of the lenses had been fixed on a lantern front, and extensively used during several winters.

When a lack of brilliancy in negatives is noticed, it is too often attributed to the plates, whereas it is frequently due to the gloss on the inside of the lens mount or the camera. Particularly is this the case in the studio where the cameras and lenses are in daily use, and are constantly being dusted, by which treatment the dead black in time becomes glossy. This fact is often overlooked by professionals.

Since the hot burnishing of photographs has been introduced, the waxing of them is seldom now practised. The question as to whether the hot treatment conduces or otherwise to the stability of the picture is quite a moot point. With regard to the waxing, we think there is not a difference of opinion that it does enhance the permanence of photographs. By waxing, in this instance, is meant treatment with encaustic paste—a cerate composed of wax with a small proportion of a resin dissolved in turpentine or similar material. The treatment is

just analogous to the old-fashioned way of polishing furniture with beeswax and turpentine.

We were forcibly impressed with the value of waxing on turning out a portfolio of photographs, taken a score or more years ago, which had been kept under adverse conditions. All the prints that had not been "encausticised" showed decided symptoms of fading—some were almost gone; while the others were but slightly affected, and some not at all. By the waxing process the surface of the print becomes repellent of moisture, and it is to an extent also protected from noxious atmospheric influences.

Speaking of waxing reminds us that most modern photographers when they see an old paper negative pronounce it as being by the wax-paper process, simply because it has been rendered translucent with wax. This, however, is not always the fact. Calotype negatives were almost universally waxed, but these were not what were known as wax-paper negatives. In the wax-paper process proper the paper was waxed before it was prepared, while in the calotype process the wax was not applied until the negative was finished. In this process it was customary to iron the paper with a hot iron when finished. The great stability of some of the old paper negatives is to be attributed to the paper being thoroughly indurated with wax, so that the image is protected with a coating that is impervious to moisture and the atmosphere.

One would have surmised that opal pictures, of the scrap type produced by the carbon process, were cheap enough in all conscience. However, some time ago we saw silver prints on albumenised paper, mounted on opal glass, in imitation of them, at a still lower price. These have now been outdone by lithography, for we were recently shown some varnished "lithos," similar to those so familiar at watering-places, mounted on the opal, to be sold at yet a lower price. We suppose they find purchasers, although the pictures in no way represent "porcelain?"

Our brief mention of the fact, on September 18, that we were within measurable distance of the twenty-first birthday of the gelatine process has brought us, as our readers are aware, a number of letters suggesting that Dr. Maddox should be the recipient of some mark of acknowledgment of the immense value attaching to his discovery, as well as of his generosity and unselfishness in making it public. We cordially endorse the suggestion, and, from the nature of its reception, we have no doubt it will be carried out in a manner befitting the importance of the occasion and the unquestioned merits of Dr. Maddox.

The formation of a Committee for the purpose is advocated in our present number by our correspondent, General Innis-Gibbs. On the grounds stated by that gentleman, as well as on others, we think his idea eminently worthy of support, and we shall therefore be glad to hear from those who have any practical suggestions to make in connexion with it. Such a Committee should be a thoroughly representative one, and we hope to hear that it will embrace professional and amateur photographers, plate-makers, scientists, and others who have directly profited by the introduction of the gelatino-bromide process.

Some excellent reversed negatives were, we learn, exhibited last Thursday night at the London and Provincial meeting. They were exposed in contact, thirty inches of magnesium ribbon, burnt at a distance of twelve inches, supplying the illuminant. It does not appear to be generally known that very good negatives *from* negatives may be obtained by making the exposure to daylight in the printing frame. Daylight is cheaper than magnesium, if rather more variable. Several articles on this subject have from time to time appeared in these pages.

At the same meeting the chairman, Mr. J. Barker, an old and experienced gelatine emulsion experimentalist, hoped that the action of the Excise authorities, in directing the addition of mineral naphtha to methylated spirit, would receive attention from photographers and others interested. Beyond the letter of Mr. Warnerke, no protest against this regulation has so far reached us from those most intimately concerned in the employment of a suitable spirit for emulsion purposes. Surely, if the traditional coach-and-four could not be driven through the regulation, we should ere this have heard from the dry-plate makers?

In *Nature* last week appears the first instalment of what promises to be a valuable series of articles by Mr. A. Mallock, upon photographic definition. He says: "It is a matter of some interest to determine what are the limits to the definition obtainable in photographs. In examining this question three distinct classes of problems present themselves, namely:—(1) Those depending on the wave-length of light, and the action of a perfect lens on such wave-lengths; (2) the various aberrations of real lenses; (3) the qualities of the different sensitive surfaces on which the pictures are formed." His first article deals with No. 1, and treats of the limits to photographic definition on the supposition that the lens has no aberration of any kind, *i.e.*, that all the waves which reach it from any point arrive at the image of that point in the same phase. A large number of diagrams accompany this chapter, and it may be apprehended that the series will well repay perusal by the scientific student of chemistry.

This subject is somewhat akin to that of photographic magnitudes of stars, which is one of great importance in connexion with the star chart, and is now attracting much attention in consequence. Dr. Scheiner, of the Potsdam Observatory, has published some results of his own examination of the question, and they are considerably at variance with accepted theories and inductions. The assertion is widely accepted that increasing the intensity of the light is exactly equivalent to increasing the time of photographic exposure. But Dr. Scheiner argues that, owing to the complex character of the disc produced on a film, such a principle is a very unsafe guide, either as a rule for the determination of the feeblest magnitude impressed on the negative, or as offering a satisfactory explanation of the growth of the diameter or area. The general issue of the result of experiments made by Dr. Scheiner is, says *Nature*, "so grave and disquieting that it may not be utterly ignored." Among his results is found ·53 as a mean of increase of magnitude following upon successive increments of exposure each 2·5 times its predecessor. The accepted increase is one magnitude for each of such increment. *Nature* concludes its summary of the points raised by saying that, "allowing for errors of exaggeration and observation, the result is very interesting, and not a little alarming, as implying that photography is not so powerful an engine as was at first anticipated, and that, to accomplish the full hope of all that was expected of it, longer exposure, and, consequently, greater expenditure of time, will be needed."

A paper read before the Paris Academy of Sciences by M. A Chauveau will be of interest at the present time, when the optical properties and powers of the human eye have been so much to the front, showing, as it does, the extent to which the eye is governed by external influences. M. Chauveau finds the excitement of the retina of one eye by coloured glass influences the optic nerve of the other as well, in such a manner too, that, while the eye acted upon indirectly sees the colour, the retina, actually excited, sees the complementary colour. It is well known that, if a white surface is observed for a short time through a piece of coloured glass, then, when the glass is removed, the white surface appears tinted with the complementary colour. But M. Chauveau points out that, if the eye first used be closed, and the white surface be examined with the other, it appears to be of the same colour as the glass, and not the complementary colour, as with the first-used eye. This is a very singular experience, and teaches how careful it is necessary to be using unaided eye indications for accurate observation.

The vexed question of the cause of the luminosity of flame, whether suspended solid matter ignited or highly heated gaseous matter, has

ot been solved by photography, but Sir G. Stokes has been able o prove that to the existence of solid particles the luminosity is ue, by using a ray of sunlight in another manner. He simply con-enses the ray by means of a lens, and passes the concentrated beam hrough a candle-flame. Where the cone cuts the luminous envelope ere seen two patches of light brighter than the general flame, and hese were "evidently due to sunlight scattered by matter in the en-elope, which was in a state of suspension." The light from the atches also showed the polarisation of light scattered by fine particles. inally, the beam sent through the blue base of the flame gave no cattered light.

N *La Nature* for the 26th ult. will be found an interesting article on hotographing from a camera suspended from a kite, the writer being I. Albert Londe. Some time ago M. Arthur Batest described a kite amera, but the new one described by M. Londe is the invention of I. E. Wenz. Briefly, the kite is held down by a heavy bar in which orks the huge spindle for winding the kite string. The camera is ade of wood and cardboard, and works plates up to about 10×8 in ize. The shutter is the important part; it is a simple guillotine attern, and the exposure is made either by means of a slow match or use, or by a second string, as in M. Londe's system.

PROFESSOR PETZVAL.

APROPOS of what we said last week when announcing the death f Professor Petzval, we now give a portrait of this distinguished *avant*, which shows the great mathematician as he appeared soon fter having made the invention of the portrait-lens, and when he was

t the zenith of his intellectual power. The most recent portrait in ur possession shows Petzval as a venerable old man of decidedly atriarchal appearance. It will, however, prove more interesting to ur readers to let them see him as he was photographed at the eriod indicated. The cut is a careful reproduction from the photo-raph.

CONTINENTAL NOTES AND NEWS.

MEMBER of the Strasbourg Amateur Society has invented a anging tent. We concede its novelty, but we prefer, for the esent, to place the question of its utility, or even its practicability, nong things for consideration. You strap a couple of bands round our waist, and into them fix the legs of a square frame, which pports the non-actinic material used to form the tent. You then sit down on the ground, and proceed to "change." What capital sport for a bull—or even a small boy!

THE current issue of the *Bulletin* of the Photo Club de Paris contains a number of humorous little "doggy" pictures printed in the text in collotype by Messrs. Thevoz. The effect is decidedly artistic and pleasing, and the pictures lose nothing by the paper employed, which is of a high-class character and eminently suitable for the process. Collotypic printing in the text of most publications in this country is, of course, out of the question, on account of the inferior quality of the paper generally used.

THE multiplication of developing agents proceeds apace, although it is not clear that any substance so far discovered possesses a power of "bringing out" an image, which, under suitable circumstances, is not also the property of our much-attacked but still-popular friend, "pyro." Time after time it has been claimed for new reagents that they allowed of the exposure being considerably shortened, but practice has never substantiated those claims. If the efforts of chemical science were concentrated upon this consummation instead of, as at present, simply the establishment of the fact that a great many bodies have the hitherto unsuspected power of reducing the haloid salts of silver, we might, perhaps, be in a position at no distant date to announce the introduction of a really new developer—new, that is, in developing strength compared with pyro; but the tendency of modern efforts makes one sceptical of such a thing being accomplished for a long time.

But not only do the developing agents multiply; printing processes also, just now, are betraying most healthy signs of fecundity. Last month we described a method of making positive pictures in which lead acetate and potassium iodide were the active image-forming agents, the finished picture being entirely innocent of silver. The latter advantage, if advantage it be, also characterises a process mentioned in a recent number of *L'Amateur Photographe* by M. Charles Gravier. The basis of the method is an old one, but the after-part of it is, we believe, new. Paper is first coated with a four per cent. solution of potassium or ammonium bichromate, and dried in the dark as usual. The sensitised paper is exposed behind a negative in the printing frame, and the picture washed for some time in a feeble light.

HERE comes, perhaps, the new departure. The picture is immersed in a five-per-cent. solution of ferrous sulphate, and after a minute or two is again washed. It is then treated with a solution of gallic acid, which acts as the developer. The image is said to take a violet-black tone, and is afterwards washed and dried. To obtain a blue picture, potassium ferricyanide should be substituted for the gallic acid. The former image consists of gallate of iron, and the author says it is comparatively unalterable in the air. It will be seen that it is constitutionally allied to ordinary writing-ink. Without offering any opinion as to the stability of these iron-gallate pictures, we are bound to add that we should hardly be disposed, from a theoretical point of view, to assign the process a high place among those printing methods in which permanency is a desideratum. And is there a modern photo-printing process in which it is not?

DR. KOPP speaks. He claims to have succeeded in impressing all colours on a single film with short exposure. We also gather that he has solved the fixation question, and, although direct sunlight affects the image "somewhat," it will not be long before he will overcome the difficulty. Dr. Kopp employs an emulsion, and gives a short exposure in the camera. He has obtained the greens and yellows of the meadows and trees entirely true to nature; but he will not send out any proof of camera work until he has arrived at a certain degree of perfection. He has been for three years perfecting his new process, which differs from any former process, and he does not wish to publish it at present, so we must still wait for the grand revelation. Dr. Kopp's

name has an ominous ring about it, which those learned in slang lore will quite understand.

Some attention, not to say amusement, has been excited by the recent adventure of the Czar with the photographer, who laid in wait for him while he was staying at the Castle of Fredensborg. His Imperial Majesty has, it is well known, a perfectly invincible repugnance to being "taken," and it is not easy to exceed his displeasure when, in spite of his precautions, some one succeeds in fixing his appearance upon the sensitive plate. One morning he was taking a walk by himself along a road running past a wood. All at once his Imperial ear was arrested by the sharp click occasioned by setting a drop-shutter. The Czar turned pale with wrath (or was it perhaps with fear?). At this inauspicuous moment the photographer advanced, bowing and scraping, to request the favour of a pose. "*Jamais!*" exclaimed the enraged potentate, continuing his walk, or, rather, changing his course and returning to the castle. Such is an account of the scene furnished by an old woman, who was an unintentional spectator of the incident.

Dr. Miethe reports the results of a series of experiments with Gaedicke's collodion-emulsion plates. For treating them he employed Lainer's rapid hydroquinone developer, as employed for Schleussner plates.

Solution 1.

Hydroquinone	6·6 parts.
Sulphite of soda	23 „
Ferrocyanide of potash	16·6 „
Water	370 „

Solution 2.

Water	370 parts.
Caustic potash	30 „

Treated with this developer, the images appeared instantly. The orthochromatic effect is, as was to be expected, considerable. The plates were fixed in the ordinary fixing bath, 1:5, in about 15·25 seconds. For printing, the collodion plates appear to possess a remarkable superiority to gelatine. When properly varnished, they appear to require only about three-quarters to four-fifths of the time necessary for printing from a gelatine negative of apparently equal density. Examination, by means of the microscope, showed the grain to be very fine and regular. Dr. Miethe gives the new plates what is, on the whole, a very satisfactory certificate.

Dr. Miethe also reports at length on the preparation of transparencies and lantern slides by means of chloride of silver collodion paper. For toning he recommends the following:—

Ammonium sulpho-cyanide	10 parts.
Water	1000 „
Chloride of gold solution (1 : 100)	40 „

The toning thus produced is not affected by the fixing bath.

Messrs. Wolf & Lenard recommend turpentine as an accelerator for hydroquinone developers. They found that a drop of this substance added to the hydroquinone solution shortened very considerably the time required for developing. They cut a plate which had been exposed into two parts, one of which was developed with a solution of 100 parts of water, 8 of soda, 0·5 caustic soda, 5 sodium sulphite, and 1·2 of hydroquinone. The other half was treated with the same solution, to which three drops of oil of turpentine were added. In one minute this half of the plate was finished, while the half which had been treated with solution not containing turpentine was too faint to be of any use.

The same gentlemen have also been making researches in regard to the alleged formation of bubbles in the film when employing hydroxylamine as a developer. These appear to be unavoidable under all circumstances. The fact that this developer on its first introduction gave such excellent results is attributed by Messrs. Wolf & Lenard to the greater hardness of the plates then in use.

Messrs. Wolf & Lenard have also made the discovery that potassium meta-bisulphite ($K_2S_2O_5$) is much more efficacious in preserving pyrogallol and hydroquinone against oxidation than is ordinary sulphite.

Liesegang reports that Herr Veress, of Klausenburg, who once upon a time made some stir in the world, has been continuing his experiments on photography in natural colours. In the case of the example he recently sent to Herr Liesegang, the time of exposure had been reduced to three-quarters of an hour. Herr Veress also states that he has succeeded in producing his colours in transparencies. All this, however, does not amount to a very great deal in the way of progress, and the process must become a very different affair before it can become anything like a practical success. We hear nothing further about the fixing of the colours.

The controversy provoked by Herr Lautner's publications relative to the incorrectness of attributing certain pictures to Rembrandt has become a pretty lively one. Herr Lautner promises shortly to publish a pamphlet on the subject, directed principally to the pulverisation of his opponents.

PORTRAIT NEGATIVES.

The production of portrait negatives in the present day in all probability occupies more attention than any other class of photographic negative work from which direct results are obtained, and none varies more in kind and quality. The portrait negatives produced by some of our leading men are so different in *technique* that they might be the outcome of entirely different processes, although we know the materials used are practically the same, the difference depending entirely on the methods of use and conditions of illumination; accidental conditions might, perhaps, be not altogether an inappropriate term.

The standards of perfection being as varied as the studios in which the exposures are made, it is marvellous that the printed and finished results should bear the close resemblance in general appearance that they undoubtedly do. There is an immense amount of portrait work that almost entirely depends on the retoucher for any good quality it may possess; so much so, that the title "photograph" is entirely a misnomer. It may be fairly inferred that the decadence of portrait photography will be due to the excessive and ill-judged use of the pencil. From year to year we see the growing reliance placed by photographers on hand work, and the comparatively small importance attached to the quality of the negative itself.

The posing cannot, of course, be much influenced by the retoucher, but individual form and features are daily *improved* (sic) out of all resemblance to the originals; crooked noses are made straight, and stout figures are made slim; in fact, any alteration that panders to the vanity of the sitter is adopted as a matter of course. Adverse criticism by friends on such alterations is generally considered too delicate a matter to be rashly indulged in; so the retoucher flourishes, and lying resemblances are handed down to posterity, or so long as the prints will last.

It is a debatable question whether, providing all retouching could be wiped off existing negatives, the photographs remaining would not be considerably worse than they were before it became such a universal practice. These remarks, of course, merely apply to the technical quality of the negatives, for undoubtedly, from an artistic point of view, they have vastly improved, and continue improving. But, if there is one better way than another to make a portrait negative, it should be the standard for imitation. One leading operator has for his standard a negative which, when held up to the light, shows very little detail in the shadows, on account of its exceeding thinness. The image itself is merely a ruddy stain, visible enough when laid in close contact with white paper, but not otherwise. Another produces an image in which the detail in the shadows is very pronounced, and the highest lights are scarcely distinguishable from the secondary ones. The two kinds of negatives form a striking contrast, yet the prints are equally good, and barely distinguishable from each other, when finished and mounted, in respect of quality.

That there must be some difference in reality is patent to everybody that understands it, but that difference does not appear on the surface. That such thin negatives require most careful printing in a subdued light, and the denser ones a longer time in a brighter light, goes without saying. The difference will be most pronounced in the permanence of the results that time can alone develop, and which I fancy will be to the advantage of the print from the denser negative. There are many variations of quality between these extremes, and all

oducing excellent results according to the amount of skill bestowed the printing; but the point at issue is to what is the difference due. dgment and development may have something to do with it, but t nearly all, as the same worker will be unable to get the same ıss of work in one studio as another, try as he will; all may be od, but of a distinct character, which seems to depend almost tirely—at any rate—more than is generally thought, on the actinism d concentrativeness of the light used, which is controlled by the lour of the glass of the skylight, or the murkiness of the atmo-here and general surroundings, rather than by the particular style lighting that may be adopted.

It will be noticed that negatives taken by the electric light are ually of the thin character and ruddy colour, whereas those taken ordinary daylight in large towns are of the denser kind, the time exposure being the same in both cases. The light transmitted rough perfectly clean glass at a seaside place is of great actinic wer, and conducive to the production of thin brilliant negatives of warm colour, the tint of the image with either soda or ammonia velopment being browner and more non-actinic than if taken under ıs favourable conditions of light, in all cases a perfect exposure being derstood.

There is no doubt that warm colours are closely associated with ıeness of deposit, and fineness of deposit is a decided advantage hen enlarged reproductions have to be made, as they so frequently ve to be, besides causing a negative to print with more creaminess d quality than when of a colder and blacker character. The larger e scale on which the portrait is taken, the more pronounced is the ect of the colour and density of the image on the quality of the int. I do not think it would be possible to get richer-looking ıults by any process whatever than those procurable from collodio-ıumen negatives; in these the image partakes more of the character a stain than a deposit, and the gradations are perfect. The slow-ss of this process precludes its use in the studio, but, providing they uld be made rapid as gelatine, the days of gelatine, probably, would numbered, on account of the great superiority of the quality of the age on an albumen film.

It is a conclusion reluctantly arrived at, that a surface of *great* pidity must be accompanied by a corresponding coarseness of bromide silver. Whether this will ever be otherwise it is impossible to say, hough it is on record that very rapid plates have been produced in njunction with the finer bromide possessing the characteristic orange lour by transmitted light. All the very rapid plates I have seen, d are now available, without exception transmit blue or grey light, d it will be a great step towards quality when orange is the prevail-g colour in lieu of it. Generally speaking, a very rapid exposure quires a very prolonged development to get out as much detail as ssible, which also tends to coarseness and blackness of image. A newhat parallel case is the act of crystallisation, when the slower e process the larger the crystals. A coarse image, whether result-g from the emulsion itself or the development of it, can never produce delicate and rich a print as when the image is finer in quality. I ink, in most cases of studio work, it is as well to sacrifice some pidity to fineness of quality. Plates showing nineteen on the arnerke sensitometer are sufficiently rapid for most studio work, en in densely populated towns; and even slower plates than these ght be used with advantage at seaside or other places, where the ht is exceptionally brilliant and actinic.

With regard to developers, "pyro and ammonia" seems to be e general favourite, except under special conditions, when a very pid exposure and bad light indicate some advantage in the use of onogen. In a steady, good light, carbonate of soda will produce arming results, but has the disadvantage of producing images diffi-lt of reduction in case of over-development and consequent over-ensity, the yellowness produced being very often a source of trouble d impossible to satisfactorily get rid of. Take it altogether, I do think there are any developing agents better than our old friends, ro and ammonia. They work uniformly under most conditions, l negatives are easily amenable to after-treatment, both as to reduc-n and intensification, a quality not to be despised, especially when ch large work is done, and a waste of plates would be a serious s. I believe that an exposure that will admit of a fairly rapid velopment will produce a better quality of negative than if the ocess was slower. If the exposure has been much too long, instead getting a rapidly developing negative, it is just the reverse; the essary density being difficult to get, the process has to be much gthened.

With under-exposure, development is, of course, slow; but, for an posite reason—that of getting detail instead of density—lengthened l forced development tends to produce a coarse image, irrespective the quality of the plate itself, although this always exercises considerable influence on the result. A thinnish, stainlike character of image, of a good non-actinic colour, will produce better prints, other things being equal, than any other class of portrait negative; and, if some modification could be devised, either in the preparation or after-treatment of the plates, that would conduce to this end, combined with orthochromatism, it would be a step towards doing away with retouching in its most pronounced and objectionable form.

EDWARD DUNMORE.

REPRODUCTION OF OLD COPPER-PLATE ENGRAVINGS.

THE engraved copper plates which come down to us from ancient Greece and Rome are seldom suitable for multiplying from in the press, as they are often thick and uneven, while the surface as well as the inscription retain the ink. In consequence of this superficial roughness and numerous spots, photographic reproduction of them does not yield the best results, notwithstanding that bright side light, direct light, or artificial light may be employed for the exposure.

The following plan, which I adopted, gives good results. By means of a pledget of wadding I apply talc to the whole of the plate, and then well brush the plate with a soft brush. The superfluous talc is thus removed from all but the sunken portions of the plate. The plate is now photographed, the wrong side of the letters being turned upwards. From the transparency so obtained a negative in the usual way is made, yielding black letters on a clear ground. The prints so produced are more easily read than the original itself.

To clean the plates from the talc it is only necessary to wipe them with a wet cloth. MAX JAFFÉ.

—*Die Photographie.*

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—III.

No. 5, Karl Greger, *Reflections.* — A small picture but well arranged; a female leaning on a country fence: the figure comes out in consequence of the retiring objects, together with the clouds, making a bright picture.

No. 6, F. H. Evans, *Portrait of H. Perigal, Esq.*—A small but exceedingly good likeness, but it is wrong to show only one hand, which is near the head, whilst the other is somewhere outside the picture.

No. 35, J. Russell & Sons, *H.R.H. The Duke of Edinburgh.*—A very well-arranged portrait; no glaring lights on the detail of the uniform which, in many instances, kills the face; but in this work, although small, the attention is given to the face, which should be the primary object.

Nos. 79, 80, 81, Lyddell Sawyer.—These three photographs are scarcely worthy of the exhibitor, having strong effects of light and shade, the dark portions being almost black, with no transparent bits to relieve the gloom. Such a treatment requires special subjects. No. 70, *The Last Rehearsal,* in which a couple of good-looking damsels appear to be in some underground place in circumstances which hardly justify the title. Photography is so real that any model should be treated in some more poetical way than such a scene as this presents. Again we have, in No. 80, *Lighten our Darkness, O Lord,* another of those disagreeable realistic subjects which photography makes repulsive. Here the treatment is similar to the other one; but in this case the model is a blind man with a book, the text being in relief, and a lamp on the table. The third subject, No. 81, *The Toper,* is unworthy to be exhibited. A subject like this, where a man is by himself in a maudlin condition, lowers the photographic reputation of reproducing what is good and pleasant.

No. 94, A. Horsley Hinton.—These are six similar pictures, which are printed on rough-grained paper, which, if this craze continues, will eventually degrade the speciality which distinguishes photographic work. In work done by the painter the usage of such paper can only be properly effective by the touch of the artist, which expresses the difference between large and small detail; but here, in photographic work, there is the same touch, and shows the machinery by which the effect is produced. In these productions the selection of bits of nature does not lend itself to such treatment, and hence the otherwise good work of this exhibitor becomes lost, and does not do him justice, although it must be stated that in some of these views the clouds are too darkly printed, and overwhelm the other parts of the pictures.

No. 102, S. N. Bhedwar, *Reverie.*—A small picture, but very nice in artistic design; the subject, a lady reposing—apparently with

pleasant thoughts. The details of the white drapery are good, and the tones of the face are also managed in harmony with the same. The picture suggests a copy from a painter's work, so carefully has the light and shade been arranged.

No. 107, E. Calland, *In the Month of May.*—A small picture, but well chosen for subject-matter, and delicately manipulated.

No. 120, E. Spencer, *They grew in splendour side by side.*—Some well-chosen arrangement of trees with foliage; but this picture wants effect. The light and shade has not been so well considered as it might have been, and the result does not quite realise the effect which it promised.

No. 123, T. M. Brownrigg, *The Break of Day.*—This picture is rather wanting in detail. In the very early dawn, there are generally some few points lighter than the rest, which simply does away with that flatness which this picture shows.

No. 125, Col. J. Waterhouse, *Botanical Gardens, Calcutta.*—There is also a second picture of the same subject; but, being enlargements, we can only say that the original negatives have been well chosen for picturesque effects, and the results are satisfactory. Another photograph by the same exhibitor, is *Rialto Bridge, Venice,* 126, which appears too far away, and the boats in the foreground would have been better larger, and nearer to the lower line of the picture.

No. 127, G. F. Urquhart, *Flatford Bridge.*—A nice bit of scenery. A bridge, with a towing-path, which, as it runs down from the bridge to the bottom of the picture, would have better if the rapid perspective had been broken up by some object; also the printed-in sky is too much pronounced in tone—it comes forward.

No. 150, G. W. Tyser, *In the Lane.*—A very pretty snow scene, where a good use has been made of the materials for producing a pictorial work.

No. 169, A. G. Tagliaferro, *Characteristic Studies.*—These are three photographs, being interiors, with some curious wall-papers which occupy a large space on each print; all details are exceedingly sharp, so that possibly the intention may be to testify what an amount of detail can be secured. There are some figures, which are all well photographed; but, however, they are overwhelmed by the wall-papers.

No. 129, T. Birtles, *Views on the Manchester Ship Canal.*—These consist of six of this canal, which might be supposed to be most uninteresting; but, as truthful records of peculiar work, they are useful. They are well done, implying no artistic skill, but show some good photographic manipulation.

No. 194, W. Clement Williams, *Sea Studies.*—These are three carbon enlargements. The colour of each is rather blue, which is unpleasant. Again, the original negatives possess some very good detail, the clouds being strongly obtrusive, and, as a result, they form the prominent feature of the exhibits, which show some good manipulation. The silver light of the moon is scarcely so violent as shown in these photographs.

No. 227, T. J. English, M.D., *Love's Old Sweet Song.*—A very good arrangement of accessories in a room, with two figures—a gentleman at the pianoforte and a lady standing behind him—which compose a promising picture, and shows that in some future efforts greater results will be forthcoming.

No. 228, C. E. Whitaker, *On the Medway.*—A small picture showing an artistic perception in the choice of leading lines of composition, and there is a good perspective in the depth of detail which promises well for future work.

No. 237, F. Thurston, *Boudoir,* 19 *Grosvenor Square.*—Another good interior, where the play of light makes a very nice pictorial work. As this is a carbon print, we assume that the negative is the same size, and therefore more credit is due to the skilful manipulation shown.

No. 249, H. G. M. Conybeare, *Egyptian Studies of Temples.*—There are four frames of these subjects, which show clear detail and a choice of light and shade which are very good, and, besides, they have been so well and carefully manipulated that they at once show what work has been done in studying so interesting a series of old temples.

No. 262, H. W. Bennett, *East Coast Fishing Fleet.*—There are three other frames containing similar subjects, *Fishing Boats.* These have been well executed, making some good pictorial wor which have been carefully selected, and the result is a ve pleasant series.

No. 278, H. Baker, *Law Courts, Birmingham.*—An exceedin good interior where the perspective lines have been well defined, a the time chosen has been carefully selected, so that there are no d spaces, and all is clear and bright.

No. 290, J. Chamberlain, *Studies in Cairo.*—These four pho graphs all have the same background, which however good it m be, being an Eastern doorway, yet, when seen in one frame, distu the vision; so that, although there are evidences of some thought the disposition of the figures, it would have been better if t four photographs had been separated.

No. 292, G. West & Son, *Yacht Racing.*—This is a better pictu by these exhibitors than we have seen for some time; this g beyond a mere diagram of a sailing-vessel, the result being an eviden of pictorial selection in form, which promises good work, and it time that the skilled mastery of the difficulties experience has p duced should be attended by more attention to the pictorial, whi this photograph shows can be done.

No. 295, K. B. Murray, *Views in the Vosges, France.*—They are six frames, and are capital pictures; 296 is the best, where so pictorial skill has been shown in the selection of the point of vie and the work has also been very well photographed. Anoth evidence that, as the scientific side of photography advances, mo facilities are open for the artistic to develop in greater proportions.

No. 352, W. W. Winter, *Portraits of Children.*—These are sma but well chosen, and carefully executed.

Nos. 385-386. W. Atkinson. *Taormina* and *Greek Theatre.*—Tv classical bits, but being almost all ruins, the subject does not appe to be suggestive of pictorial value, although as bromide enlargemen they are good.

No. 399. F. Cobb. *Chanctonbury Ring, Sussex.*—A pleasi rendering of a most unpromising subject. No. 400, by the san exhibitor, is better for the choice of subject, and the balance of outlin is good; much wrong is sometimes done by choosing a scene whi would be more suitable for colour than for black and white.

Nos. 406-8. Colonel W. L. Noverre, *Three views in Cornwall an Devon.*—These are not very good subjects, for, being printed on roug paper, they require detail, and the rough granularity which asser its power destroys all that, and breaks up any effect which the plai paper might have given, all detail is gone and the scenes becom common.

No. 417. E. Resta, *Children's Portraits.*—Some nice studies an away from the hitherto conventional treatment of children, which n so long ago seemed to be the fashion; the present mode of investin some more pictorial study in these always pleasant portraits of youn people enhances their value materially.

No. 421, H. Baker, Portraits in Sepia.—Some fine, small studies i sepia, which suits the subjects admirably, as they look somewhat lik copies of paintings. The arrangements of the various outlines o position have been well considered.

No. 433, W. J. Byrne, *Studies of Children.*—A most excelle collection of portraits of young people, where the positions are una fected; but another quality these photographs possess is the brilliane of the more transparent parts of the negatives, which gives a powe to the prints by which they stand out, while a larger scale of tones ha been secured.

No. 439, E. Spencer, *A Pastoral Scene.*—A very pretty scene, bu where the outlines of the grass in the lower part of the picture ru too parallel with the outline of the distant trees. These also seem t have been mingled with the sky when it was printed; this disturb the distinctness, which should be clear, although it need not have bee very powerful in tone.

No. 461, C. C. Cole, *Oxford Architectural Studies.*—Some exceed ingly fine work in the three frames of photographs which compris these studies; they show great care in the usage of the scientifi materials, resulting in the clearness of the details of each picture, an especially in the lower and upper portions of the negatives.

No. 488, W. Wainwright, *An Old Cottage.*—This is only a ordinary subject, which this experienced photographer has (with

another picture) sent for this year's exhibition. There is some effect produced by the graduated light and shade which individualises this work; but, as there are no leaves on the trees, much difficulty has been avoided, so that this exhibit, although a good photograph, does not carry our thoughts much beyond what the early producers have done from time immemorial.

No. 498, Lieut.-Colonel E. T. D. Cotton Jodrell, M.P., *Up the Nile with Cook*.—This is a picture, very full of detail, which has been very carefully attended to; but, as the subject-matter is full of colour, the translation into black and white scarcely does sufficient justice to the natural scene; it becomes, then, simply a record of form, which, without colour, loses its power of pictorial charm.

No. 565, J. Rigaux, *La Casque Envasée*.—A very pretty bit of well-selected pictorial matter for making a picture, consisting of some near trees and a middle distance with water between, yet the result appears flat. Our own producers of landscapes get more power, and, consequently, much more effect.

No. 571, J. Collier, *Cabinet Portraits*.—What a pity it is that the dark shadows on the faces of these portraits are so much beyond any effect that can be utilised for photographic work, and, when associated with light dresses, becomes an exaggeration! We have before remarked that, in painting flesh tones, dark shades can be relieved by transparent pigments, which produce another result; but, in photography, these dark portions appear like solid masses, which cannot assist the tones and do not improve the likeness, which is the important matter.

No. 580, W. R. Cassels, *Till death do us part*.—A nicely arranged picture, in which a young couple are plighting their troth. The attitudes have been carefully arranged, and the lady, whose back is towards the onlooker, has a light dress, which has been most carefully modelled. The two chairs from which they have arisen help the composition. This photograph has been well manipulated, and, with the other exhibits, clearly shows that subjects like these lend themselves for photographic pictures if managed with a full knowledge of the capacity of scientific implements to assist in their production.

There are several exhibits which only require a notice of their presence, viz., H. Bedford Lemere, No. 553, some interiors, showing excellent work, which have been hung at the back of the lantern platform. Seymour Conway, Nos. 257, 464, 465, 475, 483, good work but not so pronounced as formerly. J. C. Douglas, some nine exhibits, Nos. 217, and others, which show some advance on last year's studies. F. Hollyer, Nos. 270, 319, 568, exceedingly good photographic copies of oil paintings; and also his son, F. S. Hollyer, Nos. 320, 321, 322, shows most excellent copies of oil paintings. R. Terras, Nos. 361, 362, 363, not quite so good as we expected from this exhibitor. H. Symonds, Nos. 423, 434, 435, *Sailing Vessels*. Very good, but not so striking as formerly. S. G. B. Wollaston, Nos. 441, 442, some carefully manipulated studies of hoar frost.

PHOTOGRAPHY, ITS VALUE AS AN HISTORIC RECORD.

[A Communication to the Birkenhead Photographic Society.]

Hitherto a negative has been considered permanent with an ordinary washing of half an hour, and so far may be fairly put down as a valuable historic record. The quality of a negative and its density for printing purposes is, I admit, only learned by experience; but, invariably speaking, the half of the process is a pleasure which is greatly enhanced by the process of development.

To see the picture developing like an exhalation, out of chaos into light, is as magic in its effect as it is pleasing to the eye. It is this captivating feature of our art science which renders it so popular.

The next phase of photography is the printing of the negative, and here he has to meet with endless trouble; and unless he has a good stock of patience and perseverance he will throw it up in disgust, which many too frequently do. Our first duty is to guide them to such processes as time has proved really permanent, such as carbon. This includes Woodbury, which is of a similar nature, as shown you in my first lecture to have stood the test of twenty-seven years without the slightest evidence of deterioration.

The next on the list is platinotype, which is admitted on all hands as thoroughly permanent, and also the easiest in manipulation of all the processes. Printing transparency and lantern slides may also be classed within the range of permanence.

All these pictures I now exhibit for your inspection, produced by members of this Society who have made their mark in the progress of the art, namely, Messrs. B. J. Sayce, Paul Lange, W. Bree, George Latimer, along with our worthy President, George E. Thompson, last not least. It is an honour to any society to possess such an array of distinguished members.

My fifty years' experience has led me to the conclusion that no process *printed on paper* is safely permanent which employs hypo-sulphite of soda as a fixing agent (a good servant, but a bad master).

I showed instances in my last lecture that this was not always the case, nevertheless it is the rule.

Some years ago I called attention to the fact that if albumenised paper were first coated with casine, in course of fixing after printing the latter would separate from the paper and leave an impression on the albumen, which I transferred to opal, and now show you samples thirty-five years old, which I admit show signs of decay; consequently I am compelled to fall back on my original conclusion. If you want permanent photographs, you must look to carbon, Woodburytype, and platinotype processes for the solution of the question.

James Alexander Forrest.

HOW TO SUCCEED.

Real success is seldom attained without earnest effort, and in these days of fierce competition it must be intelligent effort too. Business is almost an exact science; if you know the rules and follow them, success is nearly certain; if you disregard them, failure is equally sure.

A photographer needs to be a business man as well as an artist and mechanic. Not every one can be the leading artist of his town or city. Very few can amass a fortune in the picture business. No artist can ever hope to make pictures fully up to his ideal. To attain these objects might be called success, but the kind of success we wish to consider here is for all.

A man who has a steady and increasing business, enough to give himself and family a comfortable living, and a little laid by every year for old age, ought to be as happy as a Gould or Vanderbilt, and it can be done with most any business built on the foundation of *thoroughness*.

In order to succeed in photography just four qualifications are necessary: *Honesty*, *promptness*, *courtesy*, *cleanliness*—just these four—no more, no less. Now, perhaps, you will say the chief requisite is left out, viz., ability to do good work. You are mistaken. Some men succeed who make indifferent and even poor pictures.

If you are honest, as I understand the term, you will try and give every customer the value of his money. If you are an indifferent workman, you cannot expect to command as high a price as your more artistic neighbour; but do the best you can for every customer, and your work will, more than likely, keep improving. Of course, there must be some degree of adaptability for the work attempted. If you are not adapted to the business at all, any person who is your friend will say, "Get right out of it at once, and do something else." You cannot expect to teach music if you cannot distinguish one tune from another.

Now, in regard to the first qualification—honesty. No permanent and long-continued success can be expected without it. You *must* give your customers at least a fair return for their money, or they will not stay with you. Sharp practice, and pretending to give something for nothing, may pay for a while, but people are sure to find you out after a while if you run a business in that way. Do not deliver a picture that you would not be willing to pay the price for yourself.

A great many do not realise the immense importance of promptness. This is one of the chief elements of success in any line of business. It is not necessary to hurry and worry yourself, and help to death in order to be prompt; but you will need to be orderly and systematic. Take a reasonable length of time to finish your work, and have it ready when promised—that is promptness. If you promise pictures in one week and then take three or four to finish them, and let people come in half-a-dozen times before they get them, do not expect any great success, because you don't deserve it, and you won't have it.

With many people first impressions are strongest. If you meet them in a kind and friendly manner, they will probably like you ever afterwards; while, on the other hand, if crustiness is visible, they may take a dislike that can never be overcome—and every one to a greater or less extent appreciates courtesy. If you cannot be agreeable yourself, it will pay you to hire some one who can, and let that one talk with your customer.

Many a man has won his way to fame and fortune by his agreeable manners. Be not servile; but courteous and manly.

Another important matter to be mentioned is cleanliness. Begin first with yourself; wear clean collars; keep your shoes blacked; keep neat and clean always. Ladies notice it. And your gallery—keep it clean and orderly from one end to the other. Spasmodic cleaning up once in a while amounts to almost nothing. It is just as easy to keep clean and look well *all* the time, instead of one day in a week or month. Have a place for everything; let it be as near as possible where it is used, and when done with put it back in its place at once. Do you not see that

takes less time to do so than to look in several places for it the next time you want to use it? Have a room in your gallery for everything unsightly, and keep every such thing in it all the time. Have a basket for waste paper—sweep the floor regularly. Do you not see the effect it has on customers? If they come in and see your studio neat and clean, and showing every evidence of good taste, they think the same qualities will appear in their pictures.

Do you keep your gallery in a constant clutter, with cameras lying around on the floor, disreputable-looking boxes obstructing passage-ways, lenses gathering dust in some corner, or temporarily laid in some chair? Do not think this picture overdrawn; it is the actual condition of some galleries. I believe many a good business has been ruined by keeping a slovenly, dirty gallery.

In conclusion, the proprietor of the gallery is reponsible for almost everything. If he sets an example of neatness and order, and insists upon it, the help will usually fall into the same habits. The same may be said in regard to courtesy, and it does not avail much for the help to have these qualifications if they are lacking in the employer, unless he keeps out of the way, and lets him run the business.

The proprietor should also look after all the little details, see that no stock is unnecessarily wasted, that wastes are saved, and examine all work before delivery to see that it is right.

If business is dull and decreasing from year to year, do not blame the amateurs, and say that they are spoiling the business, or that the *luck* is against you, or some other excuse. Just examine yourself, and see if you are not getting behind the times. Perhaps your competitors are doing more artistic work than you, at the same price, or just as good at a lower price. A score of reasons will suggest themselves. Examine the situation carefully, and see why it is that you do not succeed. If patrons have been gradually leaving you, and business declining, there *must* be a radical change, either in business methods or quality of work, in order to turn the tide the other way, and you can do it if you *will*. Just let me add one word more: always have one or more of the best photographic journals. Perhaps you think you cannot afford it, but you cannot afford to be without it. E. B. Luce.

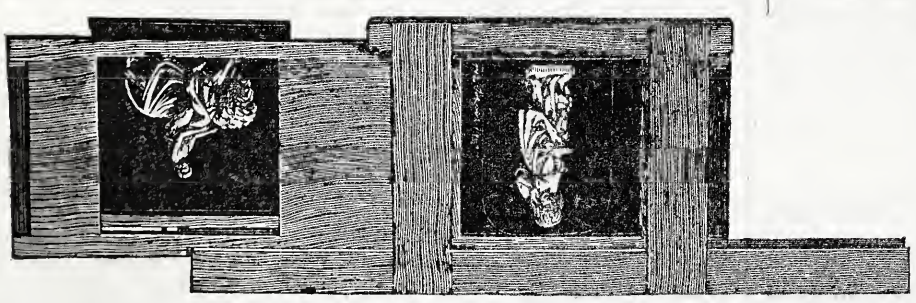
—*Photographic Times.*

Our Editorial Table.

An Improved Lantern Slide Carrier.

By J. Wrench & Son.

Some eight or nine years ago Mr. A. Cowan introduced, at the London and Provincial Association, a slide carrier, which has incidentally proved the cause of many improvements having been effected in means for the convenient display of transparencies in the lantern. This carrier was a double one, and it ran easily in an outer frame, under such conditions as to bring either of the two pictures contained therein in the line of the optical system, and it paved the way for the introduction of blinds, to cut off the light for a moment while the one picture was being withdrawn, and the other placed in front of the



condenser. One desideratum remained, viz., a convenient method by which the plate could be lifted from out of its recess in the holder. This has been effected in the carrier now before us, and of which we append a drawing.

By an extremely simple appliance, while the picture before the audience on the screen is placed centrally, no sooner is it pushed to one side to make way for the companion picture than it is raised above the top surface of its frame, thus enabling it to be grasped by the fingers, and removed with facility. The automatic manner in which this is accomplished must render this little invention a boon to all photographers who use the lantern.

Photographic Pastimes.

London: Iliffe & Son.

This, translated from the German of Hermann Schnauss, forms a series of experiments for amateurs for obtaining "novel and curious" effects with the aid of the camera. Herr Schnauss leads off with floral photography, and gives hints how flowers may be arranged so as to secure the best effects. Animals, water, snow scenes, lightning, and other topics follow. In photography for sportsmen he shows how the smallest of fish on the angler's rod may in the photograph be enlarged in the picture to the dimensions of a tarpon by the simple expedient of holding it close to the camera lens, while the angler himself stands at a distance. Several other methods of obtaining curious effects are also given.

Photography Applied to the Microscope.

By F. W. Mills.

From the same publishers we receive the above. The opening chapter is written by Mr. T. Charters White, its subject being the preparation of microscopical objects, a subject on which he is well qualified to speak. The mounters of preparations for photographing are not, in Mr. White's opinion, sufficiently aware of the necessity that exists for mounting objects in a perfectly flat manner, so as to be in strict coincidence with the optical plane of the lens employed; for, unless this condition exists, it is not possible to avoid the blurred, out-of-focus appearance which an irregular surface presents. Such want of flatness in the slides put up by a professional mounter may, in many cases, be overcome by warming the slide and pressing it and the cover glass between the finger and thumb. Mr. White then goes on to speak of the cutting of sections, such as those of anatomical and pathological tissues, and the means of hardening and mounting them. This chapter is certainly the most interesting and valuable of the series. The author of the book, Mr. Mills, after describing the fitting up of a microscope for photography, gives directions for lighting and exposing subjects, developing the negatives, formulæ for mixing both pyrogallic and hydroquinone developers being given. He concludes by giving instructions how to print upon paper, giving preference to carbon printing. It is intended mainly for amateurs.

Gelatino-Chloride of Silver Printing.

By Walter E. Woodbury. London: Hazell, Watson, & Viney.

Mr. Woodbury has in this handsome volume judiciously collated from the mass of matter that has been issued relative to the gelatino-chloride of silver printing-out process. After describing the manipulations requisite in printing, Mr. Woodbury gives formulæ for quite a variety of toning baths suitable for paper of this class, some being more specially adapted for commercial papers mentioned. In his remarks on trimming and mounting, the author very truly says: "Nothing looks worse than a badly mounted print. No matter how artistic the picture may be, its effect is ruined if no care is taken in the mounting of it." Those who prefer making their own emulsion, and preparing their paper themselves, will find several formulæ from which to make their selection.

Hinton's White Waterproof Varnish.

Messrs. Hinton & Co., Bedford-street, W.C., have, in this varnish, sought to get one which, when applied to even the whitest paper print, will dry quickly without causing the faintest stain or discolouration. Such trials of it as we have made entirely bear out their claims. We have also tried it on a thin white blotting-paper, which was instantly rendered quite waterproof. For backing gelatino-chloride and other prints, previous to mounting, the directions given are to lay the dry print face downwards on a sheet of clean paper, and apply the varnish to the back with a brush. After allowing about three minutes to intervene for the ensuring of the varnish becoming quite dry, it is then mounted with any good paste.

Messrs. Archer & Sons' Optical Magic Lantern Catalogue fitly reaches us at a time when the lantern season is on the point of inauguration. It contains particulars of every requisite connected with the lantern. The same firm's catalogue of photographic apparatus is full of interest for the amateur just commencing, as it gives prices,

drawings, and details of everything necessary to enable him to pursue his photographic studies successfully.

Magic Lanterns: How Made and how Used.

By A. A. Wood, F.C.S. London: E. G. Wood, Cheapside, E.C.

This is the fourth edition of a well-written and comprehensive manual of the lantern. Mr. Wood takes the reader through the whole subject of description and manipulation, explaining the various kinds of lanterns, lights, dissolvers, screens, and screen supports. He also describes various effects and phenomena capable of being produced by the lantern.

Carbon Tissue.

By The Autotype Company.

From samples of carbon tissue recently received from the Autotype Company, it is abundantly evident that in the preparation of this article their "hand has not lost its cunning." Some of it is plain; other samples ready sensitised. The directions for using the latter are to expose the same time as for silver paper. We did so, and found admirable prints to result therefrom; but our standard of silver paper was one of the most rapid procurable. We confess to a preference for plain carbon tissue over the ready sensitised, although this latter must prove a boon to those who do not care to incur the small trouble of sensitising, which consists in immersing the tissue in a solution of potassium bichromate for a very brief period, and hanging up till dry—simplicity itself. The tones of the sample tissue sent are charming. It prints quickly, and develops easily.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,936.—"A Double Action Instantaneous Shutter for Detective Hand Camera." T. E. Smith.—*Dated October* 5, 1891.

No. 17,143.—"Improvements in Photography and in Photographic Apparatus." A. Brin.—*Dated October* 8, 1891.

PATENTS COMPLETED.

Improvements in Optical Lanterns.

No. 15,292. William Stroud, Yorkshire College, Leeds, and James Robson Rendell, Whinside, Accrington.—*September* 19, 1891.

In connexion with the projection of images on a screen by means of an optical lantern our improvements consist (1) in the provision of means for illuminating objects in a horizontal or vertical plane, without shifting the source of light; (2) in the provision of means for accurately adjusting the position of the burner.

The first improvement consists in attaching a mirror to an axis so as to be capable of being introduced between two of the lenses of a condenser in such a manner that it may be removed altogether from the path of the rays when the object to be illuminated is in a vertical plane, but when introduced between the two lenses at an angle of forty-five degrees or thereabouts with the axis of the instrument it may reflect the approximately parallel beam in a direction at right angles to the original direction, so that the rays afterwards pass through a converging lens before they illuminate the object to be exhibited.

The second improvement consists in attaching the burner to a stout triangular tube, which can move up and down on a triangular rod, and can be fixed to the rod in any position by means of a thumbscrew. Attached to the rod are arms, against which screws, passing through studs attached to the base of the instrument, press. The rod has a circular hole in the direction of its length, through which an upright rod, fixed in the base, passes. The arrangement provides for steady motion in both horizontal and vertical planes.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 19	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow
„ 20	North London	Wellington Hall, Islington, N.
„ 21	Bury	Temperance Hall.
„ 21	Hyde	
„ 21	Manchester Camera Club	Victoria Hotel.
„ 21	Edinburgh Photo. Club.....	5, St. Andrew-square.
„ 21	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 22	Burton-on-Trent	The Institute, Union-street.
„ 22	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 8,—Mr. J. Barker in the chair.

Mr. Everitt exhibited a sample of sienna backing medium, consisting of gum arabic, methylated spirit, and sienna.

Mr. Teape once more introduced the subject of the relative merits of sienna and caramel as backing agents, and, referring to the experiment which he had described at a former meeting, and the utility of which had been questioned on the ground that wet caramel had been pitted against dry sienna, stated that he had since modified the experiment so as to use dry sienna and dry and wet caramel. The difference between the dry and wet caramel could now be seen. For practical purposes it did not seem necessary to him to use the caramel dry. Objection was also made to the gloss of the black paper used. He had substituted a sheet of tinfoil, with diamond-shaped openings, behind the backing. There was an entire absence of halation on the part of the plate backed with dry caramel, but the result given by sienna was remarkably good.

Mr. Debenham observed that the results here shown confirmed his own experiments. As regards the drying of the caramel backing, the caramel was non-deliquescent when mixed with gum.

Mr. Teape also exhibited some reversed negatives obtained by contact exposures, burning thirty inches of magnesium ribbon twelve inches from the negative. He used Ilford ordinary plates and a modification of Thomas's developer. The image appeared reversed from the commencement of development, and was not, as sometimes was the case in reversal methods, first of all of a positive character. Twenty-eight inches of magnesium ribbon were insufficient to produce complete reversal in one instance.

Mr. G. W. Atkins described an iris diaphragm which he had constructed for himself, and exhibited the paper model from which he had worked out his ideas, as well as the completed diaphragm.

The Chairman hoped the question of the new regulations as to methylated spirits (which had been raised in The British Journal of Photography) would be taken up by the Association and photographers generally. Personally he was much inconvenienced by them.

Mr. John Howson, of the Britannia Works Company, then gave a short discourse on the *Ilford Gelatino-Chloride Printing-out Paper*, and produced a large number of specimen prints of various tones, and matt and enamel surfaces. He claimed that the process was a simple one, and that colours of any shade could be obtained with it, and incidentally observed that the paper was slightly quicker than albumen paper in printing. Having dealt with the various points of the process, he toned and fixed a number of prints, which, with the specimens brought, were passed round and much admired.

Mr. Debenham said this kind of print certainly gave more detail in the shadows than other kinds, and he ridiculed the objections of "superior persons" to the vulgarity of highly glazed surfaces. Sulphocyanide toning gave more promise of permanency than ordinary toning, as there was a greater deposit of gold.

Answering Mr. Everitt, Mr. Howson said it was not necessary to print deeper in order to avoid loss of half-tones. He mentioned that Mr. J. Stuart, of Glasgow, had been using a similar kind of paper for some years, and had never seen a deteriorated print upon it, and this he considered a testimonial of its permanency.

The Chairman remarked that fading was due to want of fixation, and not to want of washing, as was generally supposed.

In reply to a question as to the keeping qualities of the toning bath, Mr. Howson said of course it would not keep indefinitely; it should be renewed from time to time, not only with gold, but with stock solution. He could not say the number of prints toned with a certain quantity of gold, but he thought this paper took up double the quantity of gold of albumen paper. As to the washing before the toning, recommended in the formula, he did not know that it was absolutely necessary, but at present he was disposed to keep to the recommendation. The prints he toned that night were made on paper only coated the previous day. He did not recommend the combined toning and fixing bath, although a formula was given for one. Alum was unnecessary, as the gelatine used was a hard variety.

At the conclusion of Mr. Howson's remarks, the Chairman read extracts from a paper on *How to make Gelatino-Chloride Paper for Printing Out*, which he contributed to The British Journal of Photography of March 6th, 1885, and also exhibited a number of prints made on paper coated with the emulsion he described, and toned according to the formula he gave.

A vote of thanks to Mr. Howson concluded the proceedings.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

October 12,—Mr. J. C. S. Mannering in the chair.

Mr. Roland Whiting delivered to an audience of fifty members and friends a most interesting and exhaustive lecture on the subject of *Intensification and Reduction of Gelatine Negatives* [this will appear in a future number].

The lecture was followed with great interest.

Three candidates were proposed for election as members of the Society.

CAMERA CLUB.

The first technical meeting of the winter session took place on Thursday, October 8, and Captain Abney read a paper entitled *On Light and Lights*. Mr. Stroh occupied the chair.

Previous to the lecture the Hon. Secretary handed round some examples of coloured photographs, lent for exhibition by the Art Colour Photograph Company. In these the paper print is rendered translucent, and the colouring is done roughly from the back. Some improvements in the method are claimed, so that the work can be done with certainty and ease by unskilled hands, the photograph giving all the modelling.

Captain Abney in his lecture dealt with and compared the visual and photographic values of certain lights, sunlight, gas, electric light, and magnesium

light, and showed that practically sunlight and the arc electric light alone are available for printing purposes. He then proceeded to describe very simple arrangements for enlarging by these lights direct upon platinotype paper, and illustrated his remarks and directions by a large number of excellent examples.

The lecture excited the greatest interest, and many questions, with some discussion, followed the paper.

On Monday, October 19, the first of the series of elementary lessons will be given by Mr. Lyonel Clark, the subject being *Lenses*.

On Thursday, October 22, the subject will be *Reversal*, when Mr. Henry Sutton will give a paper with illustrations and demonstrations.

HOLBORN CAMERA CLUB.

OCTOBER 9,—Mr. James Rennie, jun., in the chair.

Mr. E. BENEST gave a lecture on *Light and its Action upon the Haloid Salts*, which will appear shortly. This he followed by showing the experiments detailed in the appendix of his paper. This lecture and experiments were very interesting, and afforded much pleasure to the large number of members present.

ON Saturday, the 10th inst., it had been arranged to have an outing to Hyde Park, and finish up with a smoking concert at the club rooms in the evening. Owing to the rain, however, the former portion of the programme had to be postponed until next Saturday. An excellent programme was provided at the Club, and a very enjoyable evening was spent by the members present.

WEST LONDON PHOTOGRAPHIC SOCIETY.

ANNUAL REPORT FOR 1890-91.

THE Council of the West London Photographic Society, in presenting their third annual report to the members, have much pleasure in congratulating them on the continued prosperity of the Society, the number of members being now sixty, as compared with fifty-four in 1889-90. Early in the year the Council received, with great regret, a letter from Mr. Hodges, the then Hon. Secretary, announcing that through ill-health he felt compelled to resign his appointment. The Council felt that they must reluctantly accept his resignation, but thought that, considering the way in which Mr. Hodges had performed his arduous duties as first Secretary of their Society, they ought in some way to show their appreciation of the same, and, with the consent of the general body of members, had presented him with a lens, suitably inscribed. The Council had appointed Mr. H. Selby as Secretary in his place, an appointment which had been duly confirmed by the Society. Mr. Lionel Bennett had, at the same time, resigned his post as Assistant Hon. Secretary, and, after thanking him for his past services, the Council had asked him to accept the post of Hon. Auditor. Mr. Leslie Selby had been appointed to the post of Assistant Hon. Secretary.

During the session papers were contributed by Mr. Jones (of the Platinotype Company); Mr. Andrew Pringle, *Bromide Printing;* Mr. J. Martin Dickins, *A Suggestion, and a Photographic Yarn;* Mr. W. Schooling, *Application of Photography to Astronomy:* Mr. C. Whiting, *Lantern Slide Making* (by special request); and Mr. G. F. Blackmore, *Legitimate Photography.* In addition to the above, they had had four lantern evenings, two technical meetings, and a smoking concert.

The outdoor meetings have been but poorly attended, but the Council hope that, after the experience they have gained during the last two summers, they may be able next session to arrange excursions that will be more appreciated by the members.

The second exhibition of the Society was held at the Broadway Lecture Hall, Hammersmith, on January 9 and 10, and received great commendation from the judges and the press.

The Society had competed at the Crystal Palace for the Challenge Cup, and, although not successful, had nevertheless the honour of seeing a larger number of medalled pictures in their exhibit than had been shown by any of the other societies.

The question of cheap railway fares had been brought very prominently forward by the Society during the year; but, although supported by nearly all the Metropolitan and Suburban Societies, and the photographic press generally, the Council regret to say that the railway companies are still obdurate, and will not make any concessions.

Some few additions have been made to the Society's library during the year. Mr. Blackmore had also presented them with three volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY.

The annual general meeting was held on Friday, October 9, when the officers for the next session were elected.

RICHMOND CAMERA CLUB.

OCTOBER 9,—Mr. Ardaseer in the chair.

A very interesting discussion took place on the subject of *Blisters on Silver Prints*, &c. Several members gave their experiences—some had enjoyed a happy immunity from the infliction, but most had suffered from it in the case of either albumenised or bromide paper; a few, in the case of both; while one unlucky individual had found blisters form in the coating of his plates! Various remedies were suggested, but no one had had the courage to essay the prescription to be found in the *American Journal of Photography Annual* for 1890, viz., to fix your prints in a nearly boiling hypo bath, and thence transfer to a solution of salt strong enough to float a potato!

The CHAIRMAN gave the different theories by which blisters in prints are commonly accounted for, viz., first, the change of temperature from one bath to another, the remedy for which is obvious; second, the difference in density of the successive baths, a remedy for which is to thoroughly drain the prints at each transfer; third, the generation of carbonic acid gas by some unexplained means in the hypo bath, which may be prevented by the thorough washing of the prints between toning or development and fixing, and the addition of ammonia to the fixing bath; and, fourth, the use of too strong a hypo bath, a solution of one in eight being quite strong enough.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at the Masonic Hall, Surrey-street, on Tuesday evening, October 6, Mr. B. J. Taylor in the chair.

The Treasurer presented his statement of accounts, which showed a very considerable balance in hand. The accounts were considered satisfactory and were passed.

The Secretary read his general report of the proceedings for the year, showing that there had been three resignations and twelve new members. The Society was never in a more flourishing condition than at present, and the proceedings had been characterised by an amicable tone throughout, each member being anxious to promote the general good of the Society. The excursions had received considerable attention and support, and had been much more numerous than for several years past. They had produced some splendid work, especially the one to Lincoln.

The officers for the ensuing year were elected as follows:—*President:* Mr. B. J. Taylor (elected for the third time).—*Vice-Presidents:* Mr. G. Bromley and Mr. Thomas Firth.—*Council:* Messrs. E. Sampson, W. T. Furniss, W. V. Davy, Josh. Smith, and T. G. Hibbert.—*Treasurer:* Mr. Ernest Beck.—*Reporter:* Mr. E. H. Pearce.

Votes of thanks to the retiring officers concluded the meeting.

ROTHERHAM PHOTOGRAPHIC SOCIETY.

THE second annual meeting of the Rotherham Amateur Photographic Society was held on Tuesday night, October 6, Dr. Baldwin (President) in the chair.

The report of the Council reported a steady growth in the membership, and an increasing interest in the aims and objects of the Society. The number of financial members was thirty-three as against twenty-seven last year. Average attendance at monthly meetings, thirteen and a half. For the coming year an attractive programme was in the course of preparation. There was a satisfactory balance in hand after discharging all liabilities.

Officers were chosen as under:—*President:* Dr. F. B. J. Baldwin.—*Vice-Presidents:* Messrs. E. I. Hubbard, W. H. Haywood, and G. T. M. Rackstraw.—*Council:* The Officers, Messrs. L. Berry, J. Wright, W. H. Shephard, W. Mason, and J. W. Whittington.—*Treasurer:* Mr. J. Leadbeater.—*Hon. Secretary:* Mr. H. C. Hemmingway.

Several alterations of rules were made, and the word "amateur" was removed from the name of the Society.

Eleven new members were elected, bringing the total to forty-six.

Afterwards, Mr. E. I. Hubbard very successfully demonstrated the working of gelatino-chloride paper.

MANCHESTER PHOTOGRAPHIC SOCIETY.

OCTOBER 8.—Annual business meeting, the President (Mr. Garnett) in the chair.

After the usual business had been disposed of, the HON. SECRETARY read the report of the Council, which, on the motion of Mr. Brothers, seconded by Mr. Whittaker, was adopted. The Treasurer's financial statement and balance-sheet was presented and accepted.

REPORT.

The past year has been marked by several alterations in the conduct of the Society, the amended rules, as approved at the last annual meeting, having come into force, and have been found to work satisfactorily. The interest and attendance at the ordinary meetings has been, on the whole, very good, though it is to be regretted that the bulk of the members have left the few old workers to contribute most of the subjects brought up for discussion.

The present Council had left them by their predecessors several recommendations which they hope have been acted on to the best interests of the Society. One of these recommendations was the registration of the Society, in order to give a legal standing to recover any moneys that might be owing. This matter has been under the consideration of the Council, and after a thorough investigation, and from information obtained, it has been found unnecessary to proceed with registration, as the Literary and Scientific Societies Act of 1854 gives ample protection, and empowers the Society to recover any debts that may be owing. A proposition to obtain an optical lantern has been acted upon, and under the direction of Mr. Whitefield, and with the very kind assistance of Mr. Chapman, both gentlemen having given much time to the subject, the Council has had specially constructed a projecting lantern worthy of the Society.

The Council have to record their very sincere thanks to Mr. Chapman, who, in addition to supplying the lantern body and jets, had presented the condenser for the same.

In December the exhibition of members' work was held, and, being on a somewhat larger scale than had been attempted during the past few years, a great amount of work devolved on the members of the Council, but they are pleased to say that the result amply repaid them.

The Society has lost twenty members by resignation and death, and ten new members have been admitted.

The library still continues to be increased by the addition of books bearing on Photography, and the Council are indebted to the publishers of the *Optical Lantern Journal* for copies of the papers sent from time to time as published.

The twelve ordinary meetings have been devoted to papers and discussions of a varied kind. Many of the papers and demonstrations were illustrated by means of the lantern. In addition to the formal papers, short chats on many photographic matters were enjoyed, and a large number of prints shown at the different meetings.

The outdoor meetings have not this year been as great a success as might have been desired; owing, no doubt, to the unsettled weather during the summer, the number attending has not been large, and, in four cases, the trips had to be abandoned.

The lantern section meetings have always been popular with the members and their friends, and the last season was no exception in this respect. All the meetings have been held at the rooms, 36, George Street, and on one or two occasions have been rather uncomfortably crowded. The season comprised five meetings (the December meeting being merged in the exhibition). It not being possible to have the Society's new lantern finished in time for use during the session, reliance had to be placed on members to furnish the necessary apparatus, to whom the Council desire to express their thanks.

Mr. G. N. Skipp was duly elected a member.

The election of officers for the ensuing year then took place, and resulted as follows:—*President:* Mr. Abel Heywood, jun.—*Vice-Presidents:* Messrs. A. Brothers, F.R.A.S.; T. R. Cobley, S. Okell, F.R.A.S.; J. Schofield, and H. M. Whitefield.—*Council:* Messrs. Benson, Burt, Chilton, Edwards, J. T. Hughes, Macnamara, J. Wood, and H. Woolley.—*Lantern Committee:* Messrs. Thompstone, Whitefield, Wood, and Woolley.—*Hon. Custodian of Apparatus:* Mr. M. W. Thompstone.—*Hon. Librarians:* Messrs. J. Schofield and C. H. Coote.—*Hon. Treasurer:* Mr. G. Coote.—*Hon. Secretary:* Mr. W. H. Farrow.

During the counting of the votes Mr. Cobley passed round some of the new matt-surface Obernetter paper prints; Mr. Schofield exhibited a number of stereoscopic slides, and showed three to explain the faults likely to be made in printing such slides; Mr. Blakeley also showed a quantity of stereoscopes.

A brass tubular lime-box, supposed to be airtight, was brought to the meeting by Mr. Whiteley. He had left several limes in it last winter, and the result was the complete destruction of the case by expansion of the limes through the absorption of moisture.

A question as to the best intensifier elicited a discussion and replies from several. The general opinion was that silver intensification was the easiest to control.

Mr. SCHOFIELD gave the formulæ as follows:—Soak the plate in a saturated solution of alum, to which had been added about ten drops of saturated solution of citric acid to the ounce of solution; then add a few drops of a forty grain pyro solution to twenty ounces of silver solution. To each ounce of the alum solution the amount of pyro and silver would vary according to the density required. The above solution would give the negative a dirty colour, which would disappear and the negative assume a bright appearance on washing and immersion in hypo solution.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.

OCTOBER 7,—Mr. A. Clarke in the chair.

Mr. H. M. SMITH, of the Eastman Photographic Materials Company, gave a lantern entertainment, *Slides from Kodak Negatives.* Mr. Smith commenced by describing the Kodak camera, and claimed that it was, *par excellence*, the camera for those who knew but little of photography, as, by following the directions, any one with care could obtain good negatives. Having shown the mechanism of the roll-holders, he said that some people object to their use on account of their having to expose the whole of the roll before commencing to develop the films. This, he contended, was a fallacy, as one, two, or more negatives can be detached, and the film refixed in the holder. He stated that, though the camera is designed principally for hand or instantaneous work, yet it is capable of being fixed on a tripod and used in the ordinary way, and in this manner negatives may be obtained which, for sharpness of detail, cannot be surpassed by the use of any ordinary camera.

A large number of slides were then passed through the lantern, and, judging by the applause which many of them received, were generally appreciated by the audience.

LEEDS PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held on Thursday evening, the 1st inst., in the Society's rooms, Mechanics' Institute—the President, Mr. Godfrey Bingley, in the chair.

Mr. H. M. SMITH, of the Eastman Company, of Oxford-street, London, attended and delivered a lecture, with limelight illustrations, on *Film and Kodak Negatives, and Lantern Transparencies therefrom.* The slides were principally from negatives taken by the lecturer, as well as some remarkably fine examples by Mr. and Mrs. A. R. Dresser. A number of those by Mrs. Dresser were fine interior and architectural photographs. The majority of the pictures shown were, however, instantaneous exposures, and in this respect possess not only technical but artistic merit. The lantern slides themselves were on collodio-bromide plates, and were of excellent quality and tone.

At the close of his remarks a discussion took place, Mr. Smith answering a number of questions addressed to him respecting the working of film negatives.

During the exhibition of the pictures the appreciation of the audience was frequently shown by the manner in which they applauded some of the exhibits, and at the conclusion a hearty vote of thanks was unanimously carried.

OXFORD PHOTOGRAPHIC SOCIETY.

THE annual meeting was held on October 6, in the Society's rooms, 136, High-street,—Mr. Councillor Salter (Vice-President) in the chair.

The minutes were read and signed.

The Secretary (F. A. Bellamy) was then called upon to read the annual report of the Committee.

The Treasurer (J. Minn) read his balance-sheet, and the Secretary read his balance-sheet of the furnishing fund.

In the report it was stated that thirteen members had been elected during the past year. Rooms had been engaged for the Society (and it was afterwards found that this could be done without increasing the subscription beyond 7*s.* 6*d.*) and various papers and books had been lent.

The Treasurer's report showed a balance in favour of the Society of over 2*l.*

The Secretary's furnishing fund showed a deficiency of 6*l.* 6*s.*, 20*l.* having been given by the members.

Five names were read for membership.

The rules were to have been revised, but as it was getting late they were sent to the Committee to revise, and will be brought up at a special meeting on October 20.

The Rev. F. J. Smith, M.A., resigned as he is leaving Oxford.

The Officers and Committee were elected as follows:—*President:* Mr. E. A. Ryman-Hall.—*Vice-Presidents:* Messrs. C. C. Cole, A. F. Stanley Kent, M.A. and A. F. Kerry, M.A.—*Councillor:* Mr. J. H. Salter.—*Committee:* Messrs. N. G. French, W. J. King, G. W. Norton, H. M. Phillipps, Rev. W. H. Price, M.A., A. Robinson, G. A. Smith.—*Hon. Treasurer:* Mr. James Minn.—*Hon. Secretaries:* Mr. F. A. Bellamy, F. R. Met. Soc., 4, St. John's-road, and Mr. H. Minn, 105, Walton-street.

October 20.—Ordinary and special meeting at 136, High-street. Revision of the rules.

LEWES PHOTOGRAPHIC SOCIETY.

OCTOBER 6,—Mr. J. G. Braden in the chair.

The sets of prints from hand-camera negatives sent to the quarterly competition were on view. Mr. J. Hunter Graham, a member of the Brighton Photographic Society, kindly acted as judge, and awarded the certificate to the set bearing the *nom de plume* of "Quadrant." Upon the envelope being opened the set was found to belong to the Hon. Secretary, Mr. E. J. Bedford.

The President then gave *A Few Notes on Exposure*, and, in his introductory remarks, thanked the members for having again elected him as president for the year. He hoped that all members would, as far as possible, attend the meetings, and bring with them, not only their good work, but also their failures, for he thought that often more might be learned from a failure than a success. He said to produce a perfect negative it was necessary to give the correct exposure. He had brought Watkins' exposure meter, which he fully explained, and said that, after a series of experiments he had made with the instrument, he had come to the conclusion that it was a very great help to photographers in ascertaining the exact exposure required for any subject. He showed examples exposed in accordance with the meter, which seemed to be perfect in every way, and they were subjects which differed very widely in the time of exposure required. The President also said he thought it would be a good plan to purchase two or three meters, and let the members experiment and bring their results to the meeting, and it was resolved that a Watkins' exposure meter be given as a prize to the member who should produce the best results in some future competition.

HULL AMATEUR PHOTOGRAPHIC SOCIETY.

ANNUAL REPORT.

IN presenting their eighth annual report the Council has again to congratulate you on the continued success of the Society.

The financial position has somewhat improved, the deficit (including some small outstanding accounts) amounting to about 10*l.*, whereas last year it exceeded 20*l.* This deficit was met by a call on the guarantors of the Club Room Fund, and was readily responded to by them. Your Council regret that again this year a call not exceeding 10*s.* must be made, and, at the same time, wish to express their sincere gratitude to those gentlemen who by their liberality have enabled the Society to exist. Considering in how large a measure the club rooms have contributed to our success, your Council advise that they should be continued; but, inasmuch as the Guarantee Fund closes with this year, think it would not be expedient to extend the lease of the present rooms, and suggest that less expensive accommodation be looked for.

Our membership remains about the same. Your Council urge on each member the necessity of inducing his friends to join, as at least one hundred members are required to make the Society self-supporting.

Our thanks are due to those gentlemen who contributed papers and demonstrations during the last winter session. A lengthy syllabus of summer excursions was provided, but the attendance was meagre in the extreme.

It has been decided to hold our exhibition early in the coming winter, your Council by this means hoping to stimulate the members to increased activity, and, judging by the promises of support, believe that success will crown their efforts.

It is intended to continue the winter evening lectures and demonstrations, also the lantern entertainments, which have hitherto proved the most attractive and successful portions of the programme.

HALIFAX CAMERA CLUB.

OCTOBER 6,—Mr. J. I. Learoyd in the chair.

Mr. H. M. Smith, from the Eastman Photographic Materials Company, Limited, was present with two of their Kodak hand cameras, and explained their working, &c. He afterwards gave a lecture and demonstration of lantern slides, made from Kodak film negatives, which were shown upon the screen by Mr. M. Manley with his biunial lantern. The slides were made by the collodio-bromide process, and for clearness, definition, and brilliancy they would be difficult to excel.

GLENALMOND PHOTOGRAPHIC CLUB.

AT a meeting held on Tuesday, October 6, the officers for the term were elected as follows:—*President:* Mr. A. S. Reid, M.A., F.G.S.—*Librarian:* Mr. W. H. Maxwell.—*Keeper of Album:* Mr. Kitto.—*Treasurer:* Mr. L. H.

Maxwell.—*Secretary :* Mr. C. Cunningham Craig. At this meeting it was settled that the Club should meet fortnightly on alternate Saturdays.

On Saturday, October 11, the first regular meeting for the term took place, the President in the chair. The more important business having been discussed and settled, it was proposed that a lantern-slide competition should be started. It was settled that all competitors should have their slides (viz., a set of three) sent in by December 2. The meeting then became general to examine some photographs shown by the President and Mr. Harrison, and some opals by Messrs. Maxwell.

SUNDERLAND PHOTOGRAPHIC ASSOCIATION.

The Annual Meeting of this Association was held on the 5th inst.. at the Café, Mr. Broderick presiding.

Secretaries' Report, 1890–91.

The third year of the Sunderland Photographic Association, which has just come to a close, may fitly be considered the most successful through which the Association has passed. There have been nineteen new members added to the roll, and only six have dropped out, the number at present on the books being forty-eight. As the Treasurer's balance-sheet shows, there is a balance in hand, although the year began with the balance on the wrong side.

The entries for the competitions which have been held have not been so numerous as the Council could wish, but it is hoped that, by having the various subjects brought up for competition monthly during the coming season, all members will endeavour to enter in some of the classes.

The Winter Session was a very successful one, the various meetings being interesting and generally well attended. The best thanks of the Association are due to Mr. W. Milburn, who on several occasions lent and manipulated his limelight lantern; to Mr. E. G. Lee, Mr. Robson, and Mr. H. M. Smith, for their papers on *Lantern-slide Making*, *Retouching*, and *Enlarging*, &c., respectively; to Dr. Haswell for kindly acting as judge in the various competitions; and to Messrs. W. Stafford, H. H. Pinkney, and T. Walton, who gave prizes.

The Association provided lantern entertainments at the Infirmary and Workhouse, which were very highly appreciated by the inmates and officials of those institutions.

A very good fixture-card of outdoor meetings was arranged for, but the keeping of the various fixtures was very seriously interfered with by the bad weather which has prevailed during the summer, which made it impossible for some of the meetings to be held, and greatly lessened the attendance at others. In connexion with the river excursion to Lambton, the thanks of members must be given to Mr. J. Heslop, who lent his boats on that occasion.

The Officers for the ensuing year were elected as follows :—*President :* Mr. W. Pinkney.—*Vice-President :* Mr. A. Stafford.—*Council :* Messrs. Bartram, Broderick, Lynn, Milburn, Peddie, Pope, Pratt, R. Stafford.—*Treasurer :* Mr. T. Walton.—*Secretary :* Mr. C. E. Cowper, Thornhill Gardens, Sunderland.

The Association's Landscape Competition resulted in a tie between Messrs. A. Peddie and J. Lynn, the prize being divided.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The first meeting after the summer recess, being the ninth of the season, was held on Wednesday, the 7th ult., in the Hall, 20, George-street. The President, Mr. H. C. Blanc, occupied the chair.

The first portion of the business was opened by the Secretary, Mr. J. Barclay, in the form of a question—"What constitutes a good printing negative?"—in which he gave his views on the subject, accompanied by examples.

This evoked a lively series of remarks and opinions from many of the members on the differing qualities of eikonogen, ferrous oxalate, hydroquinone, and pyro, and their likes and dislikes, among the most notable of which were, perhaps, those of Mr. McKean, who summed up his views by stating that, having tried all, he found that by using hydroquinone he got a negative the colour and quality of which enabled him to obtain a very much larger number of prints in a given time, and that alone was a high recommendation to a professional photographer.

Mr. Bashford, in the course of his remarks, said that for a considerable time he had pinned his faith on hydroquinone, and would see or hear of no fault whatever with it, from its meeting his requirements so fully; but one day recently he found he had unexpectedly run quite out of his favourite, and, on looking over, he found an old sample, which must have been at least six months made up, of his discarded ammonia pyro, and on using it, to his astonishment, he found it gave him a much superior quality—three times as fine, in fact, especially in the deeper shadows. After that, he need not say that he had returned with pleasure to the use of that developer.

The discussion was accompanied by handing round a number of negatives taken with the different processes by several of the members in illustration.

The formal business of reading minutes, balloting for new members, nominations, &c., having been get through, the Chairman then intimated that "the Photographic Convention of Great Britain" had accepted the invitation of this Society to hold their next annual meeting in Edinburgh. The Council and himself had been busy with the preliminary arrangements, but nothing had been thoroughly adjusted as yet. He might, however, say that the idea at present was to open the Convention week with a special meeting on the Monday evening. The days would probably be occupied with photographic excursions to the various places of interest in and around the city; the evenings would be devoted to business meetings, reading and discussion of papers. Friday would probably finish up with a social gathering, and the Convention disperse on the Saturday. Before sitting down he called the members' attention to the forthcoming annual show of the members' work for which medals were to be awarded.

This concluded the work of the meeting, which then adjourned.

Correspondence.

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

ENLARGING DIRECT ON PLATINUM PAPER.

To the Editor.

Sir,—Judging from the sensation caused at the Camera Club on Thursday last by Captain Abney's paper on *Light*, in which he described his method of enlarging on platinotype paper by electric light, it seems more than probable that quite a revolution will be caused in photographic methods, the power used being only about 1100 candle-power, bringing it within the reach of a large number of photographic enthusiasts.

The specimens which he exhibited were 7½ × 5 prints from quarter-plate negatives, taken with the Platinotype Campany's "Key Camera," and the results were such that no doubt more amateurs than ever will, while travelling, content themselves with a small hand camera instead of a half or whole-plate apparatus, thus saving much weight.—I am, yours, &c.,

F. W. Mills.

Camera Club, Charing Cross-road, W.C., October 13, 1891.

MOUNTING PHOTOGRAPHS.

To the Editor.

Sir,—In your last issue (October 9) I notice, in "Patents Completed,' by Mr. R. H. L. Talbot, of Boston, U.S.A., a method of mounting photographs, &c., whereby, by the use of glasses, such pictures, &c., may be hermetically sealed, &c. So far back as 1875 I suggested the same idea exactly. A very pretty effect the photograph showed was, after binding and varnishing the edges of the glasses containing the photograph, I placed in a picture frame. I backed this with a piece of maroon velvet, having a margin of velvet, thus presenting the effect of being mounted on the velvet. My idea was printed in your contemporary of that date, so that our American friend is rather late with his patent.—I am, yours, &c.,

Dare Lucem.

October 13, 1891.

ACID FIXING BATH.

To the Editor.

Sir,—In The British Journal of Photography, October 9, is an article on *The Acid Fixing Bath*, which should decolorise negatives developed by pyro. I have been using this bath for more than a year, and come not quite to the same conclusion as suggested. Develop your gelatine plate with carbonate of potassium and pyro, and you will find your negative comes out of the acid fixing bath a very nice colour, similar to a wet collodion plate; now wash the negative thoroughly, and you will find that the negative changes slowly to a proper yellow one. If you use carbonate of soda, as generally recommended, this does not occur; but the time for fully developing a negative is just three times longer. If you use yellow prussiate of potash with soda and pyro, the result is also a yellow negative.—I am, yours, &c.,

Operator.

Plumstead, October 10, 1891.

IDENTIFYING PLATES IN THE DARK ROOM.

To the Editor.

Sir,—There is a great deal of truth in what your contributor, Mr. G. Whitworth, says as to the increased cost and difficulty in cutting through a paper-backed negative; but, perhaps, the inventive ingenuity of photographers may be able to get over this latter difficulty. I know nothing about the commercial preparation of plates, though my friend, Mr. B. J. Edwards, has often invited me to watch the process of manufacture in his factory—an invitation which I certainly shall accept. As regards the letter of the Brighton "Practical Photographer," I may tell him there is no cleaning required, and here lies one advantage in paper-backing over the messy gummy solution generally used—the backing comes off after a minute's soaking in water. Whilst developing, I generally have three or four negatives soaking, so no time is lost as regards the notes on the back of the negative. I simply mention this as a wrinkle which I have found of much utility. After exposure, and whilst changing my plates at night, I write on the back, before removing from the slide, the subject and the exposure, &c., and on my return home, for I never develop when on a holiday, I know what each negative is without possibility of making a mistake. I am glad Mr. Whitworth agrees with me that a properly backed plate reduces halation, and I think it is the general consensus of opinion. I shall be happy to send some of this black paper to the "Practical Photographer" if he writes me.—I am, yours, &c.,

W. H. Plaister.

Tottenham.

BOSTON CAMERA CLUB SLIDES.

To the Editor.

Sir,—I think it my duty to inform Hon. Secretaries of the Photographic Societies of the United Kingdom who are making their arrangements for lantern slide exhibibitions during the coming winter that the Boston Camera Club, U.S.A., have sent us another lecture, entitled, "The Yosemite Valley," prepared by members of the California Camera Club.

This is a gift to the Amateur Photographic Societies of Great Britain, on the same terms as "Illustrated Boston," the "White Mountains of New Hampshire," and "In and Out of Columbus."

There are now four complete lecture sets of about 80 slides each, with accompanying lectures, neatly mounted in type of American scenery in free circulation among photographic societies in this country, and which can be lent on application to me.

The only conditions are that the carriage of the boxes be paid at least one way, that an account of the lectures and press notices of the same be posted by societies at once to Wm. Garrisen Reed, 25, Kilby-street, Boston, U.S.A., the Manager of the "Interchange of Illustrated Subjects," and that the greatest care be taken of the slides; any accidents to which, as far as possible, to be made good, and the same reported to me immediately.—I am, yours, &c., E. M. TUNSTALL, *Hon. Sec.*

Liverpool Amateur Photographic Association,
3, *Lord-street, October* 10, 1891.

MR. HENDERSON'S DEMONSTRATION.

To the EDITOR.

SIR,—As Mr. Henderson so kindly offers to give further information, I venture to ask as to the following:—

In your report the silver nitrate is given as 120 grains and the bromide of potassium as ninety, and in the after discussion Mr. Haddon observed that the large proportion of bromide gives speed without cooking. Now, ninety grains of bromide to 120 grains of silver is not a large proportion, in fact, it is rather less than is usually allowed, and sixty or ninety grains of carbonate of potassium is a little vague.

In another report of the meeting which I have seen, sixty grains of silver is given with sixty grains of bromide—this is a large proportion—and the carbonate is ninety grains to the sixty of silver.

The gelatine and iodide is the same in both—240 gelatine and one of iodide.

A few words from Mr. Henderson to make these points clear would be much appreciated and gratefully received.—I am, yours, &c.,

Ipswich, October 10, 1891. G. M.

To the EDITOR.

SIR,—As one who makes his own plates, I was greatly interested in Mr. Henderson's demonstration of a new method of emulsion-making. Many of the details are not clear to me, and doubtless to others, and I gladly avail myself of Mr. Henderson's kind offer of further explanation. In the formula given, it appears, the iodide is dissolved with bromide before adding to the silver nitrate solution, though it is stated otherwise in a previous paragraph. How much water should be used to dissolve the gelatine? Are the plates coated easily without alcohol? I use a spoon, and place the exact quantity required on the plate. For slow plates, am I to understand that the treatment with potassium nitrate, potassium bromide, and chrome alum can be omitted? How is the emulsion to be "treated" with the above? Is the gelatine to be of a hard kind, such as Heinrich's, or mixture of hard and soft? If the latter, in what proportions? For a finer precipitate I presume a soft gelatine, such as Nelson's No. 1, to be added to the carbonate, would be recommended. Will the plates keep well coated with the quicker emulsion? Might I suggest to Mr. Henderson that he gives us a definite formula, with remarks, on process of mixing, &c.; also quantities, &c., for the alternate methods referred to? Hoping I shall not be trespassing too much on his time.—I am, yours, &c., R. W. S.

Royal Insurance Buildings, 10, *Park-row, Leeds, October* 12, 1891.

THE DISCOVERER OF THE GELATINO-BROMIDE PROCESS.

To the EDITOR.

SIR,—In reference to the proposed subscription for a testimonial to Dr. Maddox on the twenty-first birthday of gelatino-bromide to make it worthy of the object in view, it strikes me, as the field is so far-reaching that a small committee, or executive, should be first formed; that a short circular, explaining the nature of the scheme in the language of the different countries to be adopted, should be forwarded to the editors of the various photographic journals, at the same time asking them to give their kind support by opening their pages to the list of subscribers. The circulars might even be sent to the different photographic societies, both of this and other countries. The executive should also endeavour to approach the editors of some of the daily papers, as *Times*, *Daily Telegraph*, *Daily News*, &c., to assist in the object by a leaderette, and permission for a list of subscribers to appear once a month in their respective papers. Arrangements should also be made with some bank to kindly receive the gatherings. All expenses to be deducted from the sum subscribed. With-out some such plan I fear the results would not be adequate to the merits of the case. With these suggestions allow me to subscribe myself.—Yours, &c., J. INNIS-GIBBS, *Major-General, Retired List.*

Junior Army and Navy Club, October 13, 1891.

To the EDITOR.

SIR,—It was with great satisfaction that I saw in your JOURNAL a suggestion that a substantial testimonial should be raised on behalf of Dr. Maddox, the recognised discoverer of the extreme sensitiveness to light of the combination of the silver salts and gelatine; and, though the twenty-first anniversary of such a discovery seems a fitting occasion for such a memorial, I am only astonished that such a proposal has not taken shape years ago.

Dr. Maddox is well known to the scientific world for his valuable researches in other directions; as an indefatigable worker he is excelled by none, and, when it is realised in what shattered health and at what an expense of body and mind he has for years steadily and untiringly pursued his investigations, I feel assured that every one interested in scientific matters will feel laid on him an important duty to respond heartily and liberally to such a proposal. Neither should it be forgotten that, had the discoverer of the silver and gelatine process been less retiring and more mercenary, he might have secured a small royalty on each dozen plates, which would have brought him a most handsome income for the last twenty years, and so have released him from laborious exertion now at his advanced age.

When this matter has taken more definite form, and the subscription lists are open—when you, Mr. Editor, should be Treasurer—I shall be happy, with, I hope, *all* other photographers, amateur and professional, to add my contribution.—I am, yours, &c., JOHN B. BEST.

Sandholme, Broxbourne, Herts, October 12, 1891.

To the EDITOR.

SIR,—I am very glad to read in your last week's JOURNAL that the subject of raising a suitable testimonial to Dr. Maddox is prominently brought forward by two of your correspondents.

If you are disposed to kindly open a list for subscribers, will you place my name for the sum of ten shillings.

I think the amount of subscription should not be limited, as the many who have reaped the benefit would, I am sure, wish to give accordingly.—I am, yours, &c., C. G.

October 12, 1891.

PHOTOGRAPHIC SOCIETY'S LANTERN ARRANGEMENTS.

To the EDITOR.

SIR,—The lantern arrangements for next week at the Exhibition are as follows:—

October 15, Lantern Slides, by Messrs. A. C. Edwards and F. W. Evans.

October 17. Amateur Photographic Prize Competition Slides.

October 21, Slides by Mr. A. R. Dresser, illustrative of a tour through Brittany.

October 22, Slides by Mr. C. Essenhigh Corke, illustrative of Knowle House.—I am, yours, &c., H. A. LAWRANCE, *Assistant Sec.*

50, *Great Russell-street, Bloomsbury, W.C., October* 12, 1891.

Exchange Column.

Will exchange two backgrounds, nearly new, interior and exterior, 8×7, for good strong studio camera stand.—Address, HORTON, Photographer, Caroline-street, Cardiff.

Will exchange interior background in distemper, size 8×7 feet, and good whole-plate landscape lens, for graduated background or paper ditto (exterior).—Address, FRED. C. D. HURD, Shepton Mallet.

Will exchange 10×8 rapid portrait lens, in good condition, for 10×8 Optimus rectilinear, or 9×7 Optimus euryscope. Exchange specimens of work.—Address, SMITH & Co., Photographers, Yeadon, near Leeds, Yorkshire.

Eight and a half inch square sliding body camera, in exchange for child's head-rest or grass mat; also quarter-plate camera for imitation stone boulder, to value. One single slide to each of above cameras.—Address, W. J. BENNETTS, Beacon, Camborne.

Wanted, a pair of Dallmeyer's or other good maker's stereoscopic lenses (accurately paired), in exchange for Taylor, Taylor, & Hobson's five-inch detective lens, with shutter and iris diaphragms. Cash difference arranged either way, according to lenses.—Address, M. B., c/o Anderson & Co., 97, Renfrew-street, Glasgow.

Whole-plate square camera (without lens), double backs, and tripod wanted, in exchange for half-plate International camera, double back, tripod, time shutter, Decaudin's photometer, infantry officer's sword, concert piccolo (six silver keys), and fife (four keys).—Address, J. G. MAGNESS, Warmgate House Studio, Boston, Lincolnshire.

Answers to Correspondents.

C. BANYARD.—Undoubtedly.

PRINTER.—You will have to employ a specially constructed printing frame.

R. MCCONCHIE.—A lens of the rapid rectilinear type would be the most useful for you.

Y. Z.—Opal pictures are coloured with ordinary water colours, or oil colours may be employed.

S. AFRICA.—By consulting page 794 of the ALMANAC for 1891 you will find the information you require.

OPERATOR.—The Exhibition is advertised in all the daily papers. It is open from ten to five until November 12, and the charge for admission is 1*s.*

SUN.—The address, we believe, is Arthur J. Field, Sandling Road, Maidstone.

BAY-TREE.—You will find that we deal with Mr. Henderson's demonstration in a leading article in our present number.

J. W. C.—By all means "clean the lens with care, and have it rebalsamed." But where in the ALMANAC do we recommend plaster of Paris for the latter purpose?

R. J. DUBBIN.—We do not know where paper similar to the sample forwarded is to be obtained. You should inquire of some of the wholesale stationers in and about Cannon-street, E.C.

STAFFS.—So far as we are aware there are no patents in connexion with ceramic photography still in existence. You may certainly work the dusting-on powder process, or the substitution process, with impunity.

A. SPENCER.—The fogging is doubtless due to the extra time of cooking you gave with a view to enhanced sensitiveness. If you go back to the old time and the old conditions of emulsifying, you will, or ought to, get the old quality of plate. Why not try the experiment?

PERCY VERANCE.—1. The specimens of your work are remarkably good, and we should say that you ought to experience little difficulty in securing the position you desire. By all means persevere, but do not give your accessories quite so much prominence. 2. Use a quicker plate.

POSITIVE.—We do not know of formulæ for taking positives direct by *a dry process* either on white or coloured celluloid, unless you employ thiocarbamides in the development, which will give a direct positive in the camera. Study Colonel Waterhouse's writings on the subject.

R. SIMMONS.—There is no question that a very large number of bromide-paper pictures show marked signs of deterioration; but from this it must not be assumed that the process, of necessity, yields fugitive results. If a picture which is coloured fades, the fading will, in most instances, show through the colouring, as in your case.

PONGO.—Unless you have a large quantity of residues to deal with annually, you will find it more profitable to send them to a refiner than to build a furnace and reduce them yourself. If they are collected and treated as we have so often described, before sending, you will have little cause to complain of the return made by any respectable refiner.

C. DREW.—We are not at all surprised that the optician wants a special price for making a lens of a special focus which he does not catalogue. Neither are we astonished at the price quoted, though it may appear so very high to you. Fresh curves would probably have to be calculated for your particular instrument, which is not the case with stock sizes.

PYRO inquires: "Will you inform me, through your paper, if carbon pictures can be put on gas globes to stand the heat, and also the name of a firm who make a speciality of this work?"—We doubt very much if carbon pictures, mounted on gas globes, will withstand the heat. We know no one who makes a speciality of this class of work. You might, however, communicate with the Autotype Company.

C & SONS (Dublin) say, "We are using a sample of gelatine which turns litmus paper a bright red, showing a great amount of acid present. Kindly say in your next issue what the probable effect would be on silver prints immersed therein at a temperature of 100° Fahr."—The probable effect will be that the pictures will show marked signs of deterioration within a comparatively brief period. Discard the acid gelatine, and procure a sample which is neutral, such as those supplied by Nelson, Dale, & Co.

49 writes: "In taking pinhole pictures can you give me any idea as to length of exposure? I use an eight and three-quarter inch focus, and with *f*-64, *i.e.*, ·1305 inch, with the particular make of plate I simply give four inches in full sun with deep shadows in summer. What would be about the necessary time to give under all the same conditions?"—All will depend upon the size of the "pinhole," and the distance the plate is placed from it. One or two trial plates will soon determine the necessary exposure much better than can be done by any amount of calculation.

DABBLE puts the following questions: "1. In flashlight photography, is the smoke considered to be objectionable when used in a professional studio? 2. When nitrate of silver and citric acid (thirty grains to the ounce) are made as a bath, what is the white deposit thrown down when the paper is sensitised, and how would I replace it so as to bring the bath to its original strength?"—1. Yes, unless the smoke is conducted out of the studio by a chimney. If this is not done, it condenses and settles on everything as a white powder. 2. Probably citrate of silver. Filter this out and strengthen the bath with new solution.

PRINTER asks: "Can you kindly tell me of a cure for blisters in albumenised prints? I find them come up in patches about the size of half-a-crown, and larger. I keep all my baths to about 70° Fahr. I have reduced strength of silver bath to 30 grains, and hypo to as weak as possible, and have soaked the prints in a solution of one pound of salt to one pound of water, with one drachm of ammonia, after fixing, and have fastened paper on a board and let it stand twelve hours over a tank of water in dark room before sensitising, but cannot stop the blistering. I have had to print one dozen 10×8 to get four good ones, which does not pay. If you can favour me I shall be obliged."—Instead of reducing the strength of the silver bath, we should recommend the strengthening it, as well as increasing the time of floating. All the other remedies are good. The addition of ammonia to the fixing bath is often effectual in preventing blisters. One of the most effectual remedies in obstinate cases is that of Mr. W. D. Richmond—namely, to immerse the prints in methylated spirit after they are taken from the frames and before proceeding to wash and tone.

BEGINNER writes: "Please tell me which is the most rapid lens in the market. Is there any lens to be had quicker than what are known as 'rapids' with different names?"—Yes, lenses of the Petzval type are far more rapid. Those supplied under the general name of "baby lenses" have an aperture of, approximately, *f*-2½, while those of the rapid type have an aperture of about *f*-8.

PHILADELPHIA PENNA puts the following queries: "1. Please give me directions whereby I could make albumen-coated plates for lantern slides. 2. I would like to know the reason of the curious markings which came to light after development of some plates which I exposed in my hand camera. The plates were the —— brand, backed with paper, to use in my camera, which does not require plate holders. After exposure, the plates were repacked by me in contact with paper backing. The markings were in the shape of a mottling in high lights, and the lighter half-tones. On a few plates the marking assumed the form of minute black dots, scattered in patches. Please tell me, as well as you can, without seeing the plates, what is the cause of my trouble. Do you think it was caused by chemical impurities in the paper which ruined plates by contact in packing; or could it be caused by the light striking through the paper backing during exposure of plate?"—1. The albumen process for lantern slides is described on page 680 of our volume for 1884. We cannot afford space to describe, fully, processes in this column. 2. Without seeing the negatives, it is impossible to say the cause of the markings. Such appearances may be caused by the plates not being rocked in the development, and we surmise this is the case in the present instance. It may, however, be due to the paper, if that were impure.

THE HUMOUR OF IT.

A BEAUTIFUL maiden
Reading a book;
A picturesque landscape,
A babbling brook.
A man with a Kodak
In secret prepares
To picture the maid
As she sits, unawares.

—*Wilson's Photographic Magazine.*

Her two strapping brothers
Were chancing to pass,
Saw the man with the Kodak,
And also the lass.
They rolled up their sleeves,
Threw off hat, coat, and vest,
The man pressed the button,
They did the rest.

—MITTENS WILLETS, *in The Judge.*

MESSRS. FRY'S first demonstration will be given to-night, Friday, October 16.

FALLOWFIELD'S *Remembrancer* for October contains particulars of a large number of novelties and specialities.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, October 21, *The Theory of Development*. October 28, Smoking concert and exhibition of members' pictures.

POSITIVE writes: "It has occurred to me to ask you if the Photographic Society is in such a poor state that it cannot afford to put an advertisement in the JOURNAL so that we may know what evenings the gallery is open?"

THE *Photographic Record*, the quarterly organ of the Manchester Amateur Photographic Society, is a creditable addition to photographic literature. The October part contains some practical papers by the members of the Society, and many useful hints and formulæ.

MESSRS. YORK & SON have secured the right of publishing a series of lantern slides of the Royal Naval Exhibition, Chelsea. The slides are all made from negatives authorised by the Royal Naval Exhibition authorities. The set will be accompanied with a descriptive reading.

THE HOLIDAY LAMP.—In our notice of the apparatus in connexion with the Photographic Exhibition on October 2, we stated that, according to an advertisement, the holiday lamp had become the property of Messrs. Adams & Co. We are now informed by Messrs. Benham & Froud that this is not correct, as they have not the slightest intention of disposing of their interests in the lamp.

MR. L. NIEVSKY has recently perfected a dry ferrotype process, which will assuredly meet with considerable welcome. Exposure, development, and fixation are as rapid as with gelatine negative plates, while the drying of the picture is effected by means of heat in a few seconds. Some specimens submitted to us vie with the best collodion positive work, and we have no doubt that the process will prove acceptable to the many who have long sought for such a one.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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WILL GELATINO-CHLORIDE PAPER SUPERSEDE ALBUMENISED PAPER?

In a recent issue the question was discussed as to the probability of the old method of printing on albumen paper being revived. The conclusion arrived at was in the negative, for the simple reason that the majority of the public preferred the glossy surface of modern albumen paper, and would not accept pictures with less glaze. Seeing that this class of picture will still, for some time to come, at least, remain the most popular, it may be well to consider whether the present method of producing it will not be superseded by another yielding similar results, and requiring no materially different manipulations. We allude, of course, to the gelatino-chloride emulsion printing-out process which is just now being brought prominently forward.

We need scarcely remind our readers that this process is by no means a new one, inasmuch as it has been for several years before the photographic world, though its employment, except by amateurs, has been somewhat restricted. This has been, to some extent, on account of the high price of the paper. When, however, a demand for an article is created, competition soon brings about a reduction in its price, particularly when there are no patent restrictions in the way. We could see no reason why gelatino-chloride paper should not be put upon the market at about the same price as that of the better brands of ready sensitised albumen paper, and this we are now promised. Therefore, as regards cost, the two processes may be said to compete on pretty equal terms. The operations with gelatine are precisely similar to those of ordinary printing, except that a different toning bath is employed, so that there is really no new process for the printers to learn, or methods of working to be greatly modified.

With regard to the character of the pictures. One of the principal reasons why albumen pictures have always been so popular is on account of the transparency of the shadows. How this quality is obtained, even in an enhanced degree, with gelatino-chloride paper, while the glaze may be made to range from quite a matt surface to one much more brilliant than that of the most highly albumenised paper. Hence, in these qualities, the balance of advantages may be considered in favour of the newer process. Indeed, there is very little question that those who admire albumen prints for the characteristics just referred to will like gelatine pictures quite as well, even if they do not prefer them.

Let us now consider the question of probable permanence, as the process is not yet old enough to be judged by the test of time. In the case of albumenised paper the chloride of silver is formed by double decomposition in the albumen after it has been applied to the paper. In the other process it is formed in a solution of the gelatine, and applied to the paper as an emulsion. In order, however, to obtain a good colour with chloride of silver, an organic compound of the metal is necessary. This, in the case of albumen, is supplied by the "albumenate of silver," while with gelatine an organic salt of silver, such as a citrate or tartrate, is added. The former is with difficulty removed from the picture, while the latter is readily amenable to the fixing agent. The toning of the two papers is somewhat different, as the usual alkaline bath does not yield the best results with gelatine. The one usually employed for this is the sulpho-cyanide bath, and it is a noticeable fact that about double the quantity of gold is consumed in toning gelatine to what is requisite with the gelatine. If this extra amount of gold is reduced on the image, then ought greater stability to be secured.

That a large number of prints on gelatino-chloride paper have, within an unduly brief period, turned yellow, cannot be denied. But is this due to the process, or the method of working it? In many instances it is undoubtedly the latter, and for this some of those who issue the papers must, to an extent, be held responsible. In some instructions for its use the time of immersion in the hyposulphite bath is far too short for perfect fixation. Some manufacturers too frequently, in endeavouring to make the manipulations of the materials they supply appear as simple as possible, often do so at the expense of inferior results being obtained. This may have been the case with some of the instructions given for working gelatine paper, hence the yellow prints.

Photographers do not mind the time taken to fix albumen prints, and they would certainly not begrudge the same time to the fixation of those on gelatine, if it is considered necessary, in order to obtain permanency. It is very easy for any new process to acquire a bad name without just cause, and we trust this will not happen with the gelatino-chloride process.

There is every reason to believe, if equal care be bestowed on their production, that the stability of gelatino-chloride pictures will prove quite equal to those on albumen, while the probability is that it may be greater. It is not too much to say that albumenised paper, for general work, is meeting a formidable rival in gelatino-chloride printing-out paper; but whether it will succumb remains to be seen. Photographers are conservative with regard to new processes.

CARBONATE OF SILVER.

Already we have had several inquiries and statements of difficulties in conjunction with the working of Mr. Henderson's emulsion process that induce us to pen the following remarks anent carbonate of silver.

One difficulty appears to be in connexion with the calculation of the proportions of nitrate of silver and alkaline carbonate

given; so, though this is not a matter of very great importance provided sufficient of the latter is used, we may point out that carbonate of soda $Na_2 CO_3$ being a dyad, and silver nitrate $Ag NO_3$ a monad, two atoms of the latter are required to combine with one of the former, or 340 grains of silver nitrate require 286 grains of crystallised carbonate of soda to convert it into carbonate of silver, or as nearly as possible $3\frac{1}{2} : 3$. In practice, however, no harm ensues from using a larger proportion of the carbonate. This disposes of one or two queries.

Next, we have complaints of the inconvenience of the "frothing" when the carbonate and silver are mixed, and one individual sufficiently explains the cause of his trouble when he says that having only washing soda which he used for developing purposes, but—and rightly—did not consider pure enough for emulsion, he obtained some bicarbonate such as is employed for cooking purposes. This is just where the "frothing" comes in, for the bicarbonate contains one atom of carbonic acid to each atom of soda instead of one to two, and consequently, when added to the silver nitrate, half the carbonic acid is liberated in the form of gas and causes the effervescence.

As to the best form in which to employ the carbonate, we have several queries, most of our correspondents deeming washing soda too impure, while others think it necessary to use anhydrous carbonate of soda or carbonate of potash. We may say at once that by far the most suitable and most definite salt to use is the crystallised carbonate of soda of the chemist. This is of precisely the same composition as washing soda, but *pure*, containing, like the latter, ten equivalents of water of crystallisation, and having the combining equivalent of 286. If this is properly kept, it is not in the least likely to vary from efflorescence. The anhydrous carbonate of soda is one of the worst to use, or would be if great exactitude were required, since it never remains really anhydrous long after it has been heated to redness to expel its contained water.

Carbonate of potash is not to be recommended on account of its extreme deliquescence, while carbonate of ammonia as obtained at the ordinary chemists' is a preparation of such doubtful composition, that it is better let alone. For every reason, therefore, the crystallised sodium carbonate is to be preferred.

As to precipitation and washing, though some of our correspondents make a trouble of these, there need not be the slightest. Let the solutions of carbonate of soda and of silver be made separately and poured one into the other, well stirred, and allowed to settle. Then draw off a small quantity of the clear water and test it with salt to see that all the silver is precipitated; if not, add a little more carbonate and stir up well again. When the precipitate has settled down solidly into a compact mass, pour off the water as closely as possible, and that is all that is required. There is no necessity for repeated washings, as in Monckhoven's process; the small quantity of nitrate of soda remaining will prove advantageous rather than otherwise, and the great advantage, pointed out by Mr. Henderson, is gained, that the gelatine is not subjected to the action of a soluble salt of silver at any stage.

Carbonate of silver when freshly precipitated is perfectly white, but when washed it becomes yellow, and if exposed to the light quickly blackens. It is very unstable, and discolours at a very low temperature, hence—and here is another of our complaints—it is not well to let it long remain in contact with the warm gelatine before adding the bromide. Probably little harm would result from the discolouration, but it is as well to keep the safe side.

After the addition of the warm gelatine the carbonate quickly forms a perfect emulsion, entirely free from the granularity that would exist in the case of bromide of silver, and the colour should be creamy yellow. No benefit ensues, but quite the opposite, from allowing the emulsion to rest at this stage. We have seen such an emulsion become slate colour in less than half an hour at a temperature no higher than 110°. Though the addition of a free acid, HBr or HCl, might remove all danger of fog, it is not so certain that a soluble bromide or chloride would have the same effect. Therefore we urge that the bromising should be proceeded with as quickly as possible.

SOME USES OF HYDROQUINONE.

As though by some universal agreement, the conflicting claims of "pyro" and "hydro" are now scarcely ever brought into prominence, although it is a comparatively short time since the antagonism between the respective supporters of the rival claimants to superiority was as severe as the arguments were heated. Possibly the introduction of eikonogen acted as oil on the troubled waters, and attention was turned from the old battle-field to a new one. No one but the dealers in these chemicals could say to what extent pyro has given way to quinol, but there is a strong belief that most professional photographers still employ pyro, and a large number of amateurs adopt quinol. In conversation quite recently with an amateur who spends most of his time in the fascinating art, he said he had quite given up pyro in favour of quinol, on account of the greater cleanliness of the latter. This, of itself, is a very poor reason, but it is to be assumed that the belief in the quality of its powers in other directions was taken for granted. It is not every one who will care to work in indiarubber gloves to save his fingers, and it may easily be guessed that a point would be strained in favour of hydroquinone when choice has to be made.

As a matter of fact, it would be difficult for any one to point the quinol-developed negatives out of a mixed batch, if care had been taken to keep the pyro-developed plates free from yellowness. In the actual working the general feeling is that a shorter exposure will suffice for pyro, while its rival, besides increased exposure, needs a longer time to obtain density.

When, however, the question of lantern slides comes to be discussed, the quinols would appear to be decidedly in the majority. Notwithstanding the variety of tones judicious variations in the pyro developer are capable of bringing about, the clear shadows, and the rich, bright, and engraving-like tones producible with the newer agent are so attractive and so effective on the screen, that it cannot be wondered at that quinol should be first favourite. It need scarcely be said that the use of sulphite with the latter is assumed as a matter of course; indeed, for fine tones, it is an essential, and we doubt if any one uses the chemical without sulphite. This is a strange contrast to the use of the employment of sulphite with pyro which many photographers deprecate, as they say it both injures the quality and the rapidity when used for developing.

Some time ago, during the discussion period of the introduction of hydroquinone, the results obtained by different experimenters were so discordant that it was almost impossible to explain them away. Ultimately it was strongly argued that these discrepant results could be traced to the differences in the various samples of the material itself. It is possible that the earlier production was not so pure as was afterwards the case; and, indeed, the earliest samples were not very pure;

but the substance as now procurable may be looked upon as constant and trustworthy if kept in properly secured bottles. We obtained samples of the crystalline kind, and of the white amorphous powder; but we have failed to detect any difference in their action. Similarly with pyro; there are one or two leading makes upon the market possessing distinctly different physical characteristics: we have tried each, and fail to observe any practical difference in their action.

One use of quinol, which was pointed out some time ago, has since received scant attention. We refer to its power of making a really good negative out of a plate that has been hopelessly over-exposed for a pyro developer, making a negative, we would say, without spending such an enormous time in dodging it into some sort of creditable existence that the game is not worth the candle. We have at intervals put quinol to this use, and we must say with results that have been entirely satisfactory to us. Let us take an example. A set of negatives is being developed, exposure seems to be about right; so, to save time, we start and keep on developing with a solution containing a normal amount of pyro; perhaps we have two or even three separate dishes, each with its plate. At once one of the plates shows signs of considerable over-exposure; we have been too confident, and have risked spoiling it through not using a smaller amount of ammonia. What is to be done? Simply swill the plate with water, and mix a hydroquinone developer with plenty of bromide, and at once let the plate redevelop.

It will be found that, as a rule, a perfectly good (technically speaking) negative will be obtained, and, in all probability, equal to the rest of the set developed by pyro. This appears to be a valuable property little experimented with, as far as our knowledge goes, and we cannot in conclusion do better than suggest to our readers to experiment therewith and report progress.

Our readers will see, by a letter in another column, that the Britannia Works Company offer to subscribe 100*l.* towards any fund which may be raised for Dr. R. L. Maddox, the discoverer of the gelatino-bromide process. This munificent action on the part of the Company will, we are confident, be highly appreciated by the whole of the photographic community, and will, we trust, provoke a great deal of what is said to be the sincerest form of flattery. In a short time we shall publish a list of those willing to serve on the Committee, which is being formed to take the matter in hand.

In January last Mr. Gustave Mullins received the Queen's commands for the production of a new collection of prints from Her Majesty's negatives to the number of nearly three thousand. The pictures have been executed by the carbon process, and the order, which occupied about eight months, has recently been completed. In these hard times such "lines" as this must make many a struggling photographer's mouth water.

Mr. M. Carey Lea is still continuing his researches into the properties of allotropic silver, and has recently published an interesting account of his experiments. Discussing the effect of light on dry blue allotropic silver, produced by acting with sodium hydroxide and dextrine on silver nitrate, he finds that an effect upon it analogous to the reversing or solarising phenomena observable with ordinary silver bromide is set up. Mr. Lea's experiments are directed towards establishing the precise molecular constitution of the silver subhaloids. The evidence that silver exists in its subsalts in the allotropic form seems, apparently, to him to be as yet inconclusive.

The photographer is abroad! This question recently appeared in the columns of a contemporary: "Having got a quarter-plate camera, I wish to make a bromide enlargement from quarter-plate to whole-plate. I should be glad if some brother amateur will kindly tell me how to finish it after development, and also if it will injure the lens for taking photographs afterwards. Any hints will greatly oblige." Next week, among other replies, the following was given: "It will in no way injure your lens by enlarging. After you have developed, keep it in water for half an hour, then mount it with starch." There are some amusing things which are spoilt by comment, and this is one of them.

Of the innumerable photographic "stock" phrases in common use, one in particular takes very marked prominence at this season of the year. Secretaries of societies, when reporting their lantern-night doings, seem to be agreed upon a set form of words, which is as hackneyed as it is ambiguous. Upon this point their unanimity is wonderful. A large number of beautiful slides *were "passed through the lantern,"* as the omnipresent phrase runs, has possibly a prettier sound than "were shown," or "were exhibited on the screen," but it is not so definite or correct; and, as a record of a fact, is incompletely and erroneously expressed.

Even the simple playthings of childhood's happy days are now pressed into the service of the scientific photographer. Physical observers are sending up kites with cameras attached, which, when at the desired height, can be so controlled by a cord that exposures may be made. We are told that excellent clouds and bird's-eye views have been obtained in this manner. Kite photography would certainly be cheaper than taking photographs from a balloon, and safer; and, as a reliable method for spoiling plates, should gladden the hearts of the makers!

ON THINGS IN GENERAL.

"In Memory of
A Supersensitive Iron Process,
Born in Spring, 1891.
Owing His Birth to Two Notable Persons,
He was Expected to Revolutionise Photography.
Many Anxious Inquirers Attended Him,
But He Dwelt in Secret.
An Argentous Bar Sinister
Was Found in His Ferric Lineage,
And on October II., 1891,
He Was Incontinently Throttled
By One of His Parents.
Requiescat in Pace."

What an excellen t thing it would be if a number of other impostors could be throttled as certainly. However, perhaps Mr. Varley's courageous treatment may find imitators.

There is, among notable things of the past month, one kind which I hope will not be imitated, and that is the monstrous frames that face one upon entering the Exhibition of the Photographic Society of Great Britain, now open. How a man of Mr. Ralph Robinson's undoubted ability could sanction such abortions is beyond my comprehension. Running counter to every canon of good taste, the power of a noted name will disseminate a mischievous style, which will, no doubt, animate many reproductions over the country. People are supposed "to go up to town" to see something to admire and copy. Let us hope they will not admire these. Was it not Alcibiades who cut off the tail of a beautiful dog he possessed, so that his neighbours might have something real to talk about instead of inventing libels upon himself? It might be thought that some such purpose actuated the perpetrator of the frames were it not that the photographs the frames enclose are by no means peerless. The one which gained a medal is the least meritorious of the set. The little group to our left in it is a pretty idyllic picture, but, taking the photograph as a whole, it is flat and lacking in atmosphere and contrast of tones; there is a broad sweep of grey of medium depth running right through the scene, from distance to foreground, that is fatal to all artistic effect. My own opinion is that the gem of the room was the exquisite group of four ladies by Mr. Vanderweyde. I can understand his chagrin in not obtaining a medal when he must

have felt he so fully deserved one; but he is certainly illogical in his mode of exhibiting it, which takes the form of sending in his resignation as a member because some newspaper stated this same picture had been exhibited in London before, and so was ineligible for competition. It is rather unfortunate that one of the other medalled pictures was a pinhole photograph, for so many will run away with the idea that the pinhole did it, and there is fear that we may be flooded with pinhole work for some time to come.

Taking the Exhibition as a whole, one is inclined to feel melancholy, so much is attempted that is quite beyond the range of photographic power, so much pretence and effort in a false direction. Yet, on the other hand, we need only at the proper time step into Burlington House, and there will be plenty of melancholy failure inside its portals, so that we must hope on.

I am pleased to see that the editorial on "Identifying Plates in the Dark Room" has attracted attention. I hope correspondents will keep the ball rolling until the makers comply with an obvious need. I also should like to see them make a set upon the makers to induce them to supply their plates ready backed. One ingenious correspondent linked the two requirements together. By the bye, it should be known generally that one firm of dry-plate makers, the Autotype Company, do send out ready-backed plates (at a little increase of price), when desired. This backing is of paper. I should not have thought it possible that any one could object to the use of this kind of coating, but a "Practical Photographer" from Brighton says, "It would be more trouble to us professionals than it is worth." I do not suppose he ever used a backed plate in his life, if he has even any idea of the use of a backing. His letter is simple nonsense, and, when he writes of "we professionals," I think of the three tailors of Tooley-street, who began their memorial, "We, the people of England."

It is really surprising that the backing of plates is not more resorted to than at present is the case. I suppose there is too much "you press the button, we do the rest" in photography as now practised; but, in this particular point, I for one would be well content to let "we do the rest" be done for us in the shape of plate-backing. Working two makes of plates of equal merit, I seriously say that I should at once throw overboard the firm who did not back their plates in favour of the one who did, if such a change were possible. I am afraid, however, there is not enough demand from the ranks of photographers themselves to bring about such a consummation. It is evidently just now a burning question at the London and Provincial Photographic Association. Many backings have been the subject of discussion, but the need for being able rapidly to remove the backing is lost sight of. For this, and, indeed, all purposes of backing, the "glycerine, gum, and paint" plan, published in the editorial columns of this JOURNAL some time ago, cannot be excelled for facility of manufacture, of application, and removal, and completeness of adaptation to the end in view.

At the last meeting of this Society I observed that the Chairman stated that fading was due to want of fixation, and not to want of washing, as generally supposed. This is an entire error. I knew a case of a print which had never been in the fixing solution at all, and which formed one of the ornaments of a barber's shop for several years to my knowledge, during which time it remained apparently unchanged.

FREE LANCE.

TONING DEVELOPED BROMIDE PRINTS.—I.

THE subject of the toning of developed prints has come once more into prominence, and with it has arisen, amongst other questions, that of the permanency of the image produced by means of the mercurial method. This, as affecting gelatine negatives, has exercised the mind of the photographic world for a dozen years or more, and by many it has been decided that, given proper treatment at the various stages, the mercurially intensified image is as permanent as any other. Such authorities as the late Colonel Stuart Wortley and Mr. William England have shown that collodion negatives submitted to mercurial treatment have exhibited no signs of change after twenty years, which is more than can be said for the average albumen print; and, if collodion, why not gelatine, with correspondingly careful treatment?

But it seems to me that, so far as prints are concerned, the danger is not so much in the direction of want of permanency as in loss of purity in the lights of the picture, to say nothing at present of quality of tone. I have seen, and I have made myself, during the past few years, a good many developed prints that have been subjected to an after-toning process; and, wherever the basis of the treatment has been bleaching with mercurial or other salts, no matter how pleasing—or, to put it more gently, how *passable*—the tones obtained may have been, there is always an inevitable something about such prints that singles them out from others not so treated.

The difference is not great, and an examination of a number of intensified prints by themselves would, perhaps, reveal nothing of an objectionable character; but introduce one untoned print—that is, one simply developed, fixed, and cleared in the ordinary way—and a striking difference will be at once apparent. It is not only that the shadows of the untoned print seem more transparent and contain more detail, but the lights have a brightness and purity that is altogether absent from the toned specimens; while, to compare one of the latter with a moderately good albumen print is simply to court its condemnation.

My experience with bichloride of mercury in conjunction with gelatine leads me to the opinion that this loss of purity is in no way due to want of care or insufficient washing, but simply to direct chemical action. Imperfect washing would lead, in most instances, to the formation of insoluble compounds, which, when present in only a small quantity, in the case of a negative, might not materially affect its printing qualities, though they would be fatal to the positive on paper. The chemical action I refer to is that directly of the bichloride upon the gelatine itself. Many, though perhaps not all, of my readers are aware that mercuric chloride renders gelatine insoluble, which by itself indicates some chemical change; and, considering the nature and composition of gelatine, it is scarcely possible to believe that that change is not accompanied by any visible alteration in the character of the gelatine.

I have never tried the experiment, though it is easily enough performed; but I imagine that if a film of pure, clear gelatine were submitted to the action of a solution of mercuric chloride, such as is employed for purposes of intensification, a noticeable colouration, as well as a loss of clearness, would be the result, no matter how carefully the film might be afterwards washed. If such a change be once produced, it is almost hopeless to expect to remove it by any of the means applicable to a film of gelatine; in other words, nothing short of the destruction of the gelatine itself would prove effective. Gelatine attaches itself with such astonishing tenacity to some substances that, when the latter are once formed in its pores, the strongest employable solutions of agents in which they are soluble are powerless to dislodge them. Take, for instance, the basic salt of iron that replaces an image removed by means of ferric sulphate; nothing that I have tried—and I have attempted many different styles of treatment—has the slightest effect; once on the plate, it must remain there.

Supposing such an action of the bichloride to occur—and there is little reason to doubt it—it seems hopeless to expect the highest class of result from any method in which mercury is applied to prints, for we all know how little it requires to degrade the purity of the lights of a positive. The same remarks apply equally to ferric and cupric chlorides applied in the same manner; indeed, I should think the former would be considerably worse than mercury if its action at all resembles that of ferric sulphate. Cupric chloride is not so bad, though that *it* forms some compound with gelatine would seem to be proved by the impossibility of obtaining a perfectly white image in bleaching. This is always more or less of a brown or pinky-brown shade, no matter how thoroughly the plate may have been washed before the application of the solution, and yet both chloride of silver and cuprous chloride are perfectly white, and the bleached image on a collodion film is also perfectly white.

It may be said that the colouration is due to a reducing action of the copper salt, or to the action of light upon the chloride of silver, or both combined; but, if so, why does not the same occur in the case of a collodion image?

Before leaving mercury I should like to say a word on the suggested treatment before fixing mentioned in your leading article of two or three weeks back. This has its recommendations, inasmuch as it saves at least one extra operation; but it is, I think, to be condemned as being utterly unreliable and beyond control. With the

trength of hypo required to fix the print, the colour produced must be heavy and dense in the extreme, and, in fact, formed practically instantaneously; whereas to get the best results it should be possible to watch the change proceed gradually, and stop it at the proper moment. It must also be borne in mind that the action of the hypo is twofold, reducing on the mercurial portion of the image, and solvent on the silver; and in the conflict between these two it is impossible to say what may become of the delicate high lights of the image. All who have employed cyanide and iodine or hypo and iodine for clearing or reducing negatives are aware how strong is the tendency to eat away the finer details, and I expect a somewhat similar tendency would exist in the case of strong hypo and a mercurially bleached image.

For prints, if not for negatives, I have found sodium sulphite in every way superior to all other blackening agents. Its action is more gentle and regular, the range of tones greater, and, what is of greater importance still, the deposit forming the image is of a finer and more translucent character, which adds greatly to the brilliancy of the shadows. An additional feature which should recommend it to careless workers is that, as it forms no insoluble compound with the bichloride, there is less danger at every stage of spoiling the print.

W. B. Bolton.

AMERICAN NOTES AND NEWS.

A flash of lightning, which recently killed a man in Denver, Colorado, was photographed by Mr. Buckwalter, of that city, according to the evidence of all the attendant circumstances.

S. J. Dixon, the intrepid photographer who not long ago crossed Niagara Falls in the fashion of Chevalier Blondin, has met his death by drowning in Toronto. An enormous concourse of people attended the funeral, at which the Local Photographers' Association was represented by Mr. J. G. Ramsey and others.

A suit of interest to photographers has lately been decided in Allentown, Pennsylvania, against a firm of photographers who endeavoured to collect a bill of twenty dollars for work (enlargements) which defendant claimed was not a fair representation of the originals. Moral: When working up enlargements, don't forget to retain the likeness.

An American newspaper has descovered that photographers are never progressive; they always impress you with the idea that you must not move. But photographers themselves have to move—always with the times, and sometimes with their belongings. The latter form of progression usually supervenes on the omission of the former, and, as a rule, sets in about quarter-day.

The high estimation in which Mr. Redmond Barrett's exhaustive series of articles on retouching, which appeared in this Journal some time ago, is held by the American photographic press, is evident from the complete and careful manner in which one of our Transatlantic contemporaries is reproducing them. Mr. Barrett may be congratulated on having secured such a wide circle of readers for his valuable writings.

The extensive work undertaken by the Pennsylvania Railroad in photographing its immense length of route on a large scale is progressing well, about four hundred 18 × 22 negatives having been made of many of the beautiful views along the road. Mr. Rau, the operator for the road, has, says *Anthony's Bulletin*, had also a panoramic camera built for this work, which makes an exposure on a film 8 × 42 inches. Mr. Rau's best camera is said to have cost him 1000 dollars. The accommodation furnished by the railroad company for this work is in every respect sumptuous.

Contrasting favourably the Bath Convention with that recently held in Buffalo, U.S.A., *The Beacon* says: "The Bath Convention was managed on very different lines. There was no flavour of 'shop,' no paid officers, and no medals or awards, and, while the social side was very prominent, much careful attention was also given to the art and science phases." Well, although the founders of our Convention adopted the lines laid down by their American brethren in the general conduct of theirs, it is open, as we have hinted elsewhere, for the latter to profit by the manner in which the details of ours are carried out.

The judging of photographs for competition is, it seems, sometimes conducted under peculiar difficulties in America. Miss Catherine Weed Barnes told the Society of Amateur Photographers of New York recently that at one of the exhibitions where competitors were to be known only by numbers, and the judges' names not published until after the awards were made, in spite of this effort of privacy, she was told the names of several competitors by another exhibitor, who was not supposed to know them any more than herself, and who urged her to name her own exhibit, which she declined to do. At one session, she goes on to say, the subject of awards was so sharply handled (presumably by the exhibitors who happened to be present at the time) that one set of judges resigned almost at the last moment, making it necessary to select others. We have all heard, by the tongue of rumour, of the curious doings which are alleged to have taken place during the hanging of the pictures at a certain exhibition located not a hundred miles from Charing Cross; but, happily, no whisper has reached us pointing to any interference with the judges in the discharge of their thankless office. Such a thing would not, we are sure, be tolerated for a single instant. The officials of the Society of which Miss Barnes speaks should have sent for a policeman!

From an epitomised list of the large telescopes in the United States, given by W. H. Knight in *The Sidereal Messenger*, we find that the twelve largest *refracting* telescopes are those of the Lick Observatory, with an aperture of 36 inches; Yale University, 28; U.S. Naval, 26; Leander McCormick, 26; Princeton, 23; Denver, 20; Smithsonian, 20; Dearborn, 18·5; Carleton College, 16·2; Warner, 16; Washburn, 15·5; and Harvard, 15. The largest *reflecting* telescopes are those of Harvard College, 28 inches; and Rev. Dr. John Peate, 22. Dr. Peate, who is an amateur maker, is now finishing up a 30½ inch silver-on-glass mirror, which will be presented to the Alleghany College at Meadville. When mounted, it will be the largest reflecting telescope in the country. There are numerous reflectors made by Brashear from nine to twelve inches in diameter. The Clarks are now grinding an object glass of forty inches for a telescope to be mounted in an Observatory yet to be built upon Mount Wilson, in Southern California. Though the Lick Observatory possesses the largest telescope at present, Harvard College has the best-equipped Observatory for general astronomical work in America, and one of the best in the world. In foreign countries the largest refractors are those at Pulkowa, near St. Petersburg, 30 inches; Nice, 29·75; Vienna, 26·75; Gateshead, near London, 25; and Paris, 23·6. The largest reflectors are those of Lord Rosse, in Ireland, 72 inches; Melbourne, 48; Paris, 47; Mr. Common's, in England, 37·5; another of Lord Rosse's, 36; Toulouse, 32·4; Marseilles, 31·5; Greenwich, 28; and Cambirdge, 24.

NOTES ON ALLOTROPIC SILVER.

(*American Journal of Science.*)

Relations of the Yellow to the Blue Forms.

The gold and copper-coloured forms on the one hand, and the blue, bluish-green and steel grey on the other hand, stand in close relations to each other. In previous papers there has been described a crystalline state intermediate between these active forms and ordinary silver, which intermediate condition, while retaining the bright yellow colour of the active form, is nearly as indifferent to reagents as ordinary silver. Into this intermediate state both the yellow and blue forms are capable of passing, and apparently the intermediate states of both kinds of allotropic silver are identical; *the intermediate form of blue silver is yellow*. Thus, when lumps of blue silver are heated in a test tube to about 180° C., they assume a gold colour and lustre. The same change takes place at the same temperature when films of blue silver are placed in a hot-air bath.

But relations much closer than these exist. Blue silver can be converted into yellow at ordinary temperatures, and consequently with retention of its active properties. This is accomplished through the agency of sulphuric acid. When a solution of silver is obtained by the action of sodium hydroxide and dextrine on silver nitrate,* it appears to contain the blue variety, for if allowed to precipitate spontaneously by long standing, or if precipitated by acetic acid, dilute nitric acid, or by many neutral substances, it gives a form of silver which is dark red while moist, and dries with a blue surface colour.

It is always a little difficult to characterise these substances by their colours, since the surface colour which they show when dry, either in mass or in films, is mostly complementary to their colour when wet. As the surface colour is much the more characteristic, I have adopted the course of naming them by that.

The behaviour of the red solution obtained by soda and dextrine or dilute sulphuric acid is very interesting and instructive. When 100 c.c. of solution are poured into 100 c.c. of water to which 3 c.c. of sulphuric acid have been previously added, a dark red precipitate falls, which, when dry, especially in films, is blue. The mixed liquid from which the precipitate is formed is acid. Increasing the proportion of acid to 4, 5, and 6 c.c. successively, the substance obtained has a green surface colour, becoming more yellowish-green in proportion as the acid is increased in quantity. With $7\frac{1}{2}$ c.c. the substance no longer dries green, but yellow. Increased proportions of acid produce substances drying with a coppery shade.

It will be seen that from a single solution, and using one substance only as a precipitant, we can obtain the whole range of different forms of allotropic silver by simply varying the proportions of the precipitant.

That these forms of silver should subsist in the presence of sulphuric acid is remarkable. For the most part, the presence of this acid tends to quickly convert allotropic to ordinary silver. For example, bright yellow allotropic silver obtained with ferrous tartrate was washed in a filter with water containing one-five-hundredth its volume of sulphuric acid; in two or three hours the entire mass was converted into grey ordinary silver.

It is observable that the substances precipitated with the least acid have a very splendid lustre, and that this lustre diminishes steadily as the proportion of acid is increased. Up to 6 c.c. to 100 the effect is hardly noticeable, after that it becomes more marked.

But we can also obtain the converse of this action. Just as the solution which naturally would yield the blue product can be made to yield the yellow by the presence of strong acid, so the solution which normally yields the yellow substance may be made to produce blue (or rather green) silver by adding alkali. Thus a mixture of dilute solutions of ferrous sulphate and of Rochelle salt, added to mixed solutions of silver nitrate and of Rochelle salt, results in the formation of gold-coloured silver; but, if we put a little hydroxide either to the iron solution or the silver mixture, we should get a bluish-green product, whose properties show that it belongs to the blue class, and not to the yellow. Even if a solution of the hydroxide is added immediately after the iron solution has been poured into silver, the result is the same.

There is, therefore, a well-marked tendency of acids to give rise to the formation of the yellow product, and the alkalies to the blue. But this is a tendency only. Both substances can be produced from neutral solutions, and slight changes are sufficient to alter the product formed. Thus, ferrous tartrate, in dilute solution, acting on silver tartrate, gives rise to the formation of the gold-coloured substance, but, when citrates are substituted, the blue substance is obtained.

Production of Allotropic Silver by Inorganic Substances.

For reasons which will be mentioned presently, the reduction of silver must take place gradually to produce the allotropic form, and for a time it seemed an invariable condition that an organic substance of some sort should be present. This, however, proves not to be essential. In a paper presented to the American Academy, and kindly read for me by Professor Remsen at the meeting in April last, I alluded briefly to having found a reaction depending upon inorganic agents only. It is as follows:—Sodium hypophosphite added to silver nitrate does not effect reduction; but, when hypophosphorous acid is set free by the addition of phosphoric acid, a red colouration appears, indicating the presence of allotropic silver. The colouration is transitory, no doubt because of the strong tendency of free mineral acids to convert allotropic to normal silver, but red and blue stains form on the sides of the vessel.

Phosphorous acid gives similar results, though perhaps less marked.

Action of Light on Blue Silver.

This action differs with different varieties; it was more especially examined with the form that is obtained from the soda dextrine silver solution already described, by pouring the solution into an equal bulk of water to which sulphuric acid had been added in the proportion of 3 c.c. to each one hundred c.c. of water. This form was selected because it is easy to obtain with great constancy of result, and because it is one of the forms of blue silver most sensitive to light.

Exposed to light, this substance first becomes more distinctly blue, losing a slight greenish shade. With continued exposure, it passes to a yellow-brown shade, and finally to perfectly pure golden yellow of great brilliancy and lustre. The last is the intermediate or crystalline form.

The action of light on this form of silver is remarkable in this respect, that its first effect is to *increase* the sensitiveness to reagents. This result was so unexpected and, *à priori*, so improbable, that it was subjected to the most careful verification before being accepted. The action is very easily shown by exposing a film of this substance to light, covering part of the surface with an opaque screen. After twenty or thirty minutes of exposure to strong summer sunshine, the film may be plunged into a one-per-cent. solution of potassium ferridcyanide, when the part exposed colours much sooner and more strongly than that which is covered. The effect is shown still better by placing the film in a frame, covering part with paper rendered absolutely opaque by coating it with thick tinfoil, part with translucent paper (thick writing-paper or very thin brown paper), and leaving part wholly exposed. After four or five hours' action of very strong summer sunshine, the film is to be treated with weak ferridcyanide. The part wholly exposed, having passed into the gold-coloured crystalline condition (if the exposure has been sufficient), is wholly worked upon; the part covered by the translucent paper is rapidly attacked; that wholly protected is attacked slowly. So that the portion moderately acted on by light has very markedly increased its sensitiveness thereby.

It follows that upon this form of silver *light has a reversing action*, first exalting its sensitiveness, then completely destroying it.

It is impossible to overlook the analogy which exists between this action of light and that which light exerts on silver bromide. The latter substance, though incomparably more sensitive to light, is subject to the same reversing action, first gaining in sensitiveness to reducing agents, and then, by continued exposure, becoming less sensitive than original, a change commonly known as solarisation.

Causes determining whether, in the Reduction of Silver, the Allotropic or the Normal Form should be produced.

I have examined the phenomena connected with the reduction of silver under a variety of conditions. These, for the most part, do not deserve particular mention, but seem to lead up to this generalisation, that the reduction of silver may be direct or indirect—direct when it passes from the condition of the normal salt or oxide to that of the metal, indirect when the change is first to suboxide or to a corresponding subsalt. So far as my observation has gone, when the reduction is *direct* the reduced silver always appears in its ordinary form; but, when the reduction is *indirect*, the silver presents itself in one of its allotropic states. The following reactions support this view.

Three of the principal modes of formation of allotropic silver are: (1) Reduction of silver citrate or tartrate by ferrous citrate or tartrate; (2) acting on silver nitrate or oxide by dextrine and fixed alkaline hydroxide; (3) acting on silver nitrate or carbonate by tannin and fixed alkaline carbonate. Now, if in either of these three cases we interrupt the action before it is complete by adding an excess of dilute hydrochloric acid we shall obtain a dark chestnut brown or sometimes purple brown substance which on examination proves to be a mixture of silver subchloride and photo-chloride. When, after complete removal of the excess of hydrochloric acid by thorough washing, or, better, by boiling with distilled water, the substance is treated with cold nitric acid, the portion of subchloride which is not combined with the normal chloride is broken up, and there remains photo-chloride of a very rich and intense rose colour.*

The production of silver subchloride in all these cases would seem to indicate that the reduction when the acid was added was incomplete, and that in case (1) a subsalt, and in cases (2 and 3) a suboxide was first formed as an intermediate step before complete reduction. Either of

* Forty grammes each of sodium hydroxide and of yellow or brown dextrine (not white) are dissolved in two litres of water, and twenty-eight grammes of silver nitrate in solution are added in small quantities at a time, with frequent stirring, so that several hours should elapse before the last portion is added. The solution is always slightly turbid when viewed by reflected light, by which it shows a beautiful deep green colour. By transmitted light it is deep red, and, when diluted, absolutely transparent. By diminishing the proportion of silver nitrate to one-half, a solution nearly or quite clear, by reflected as well as by transmitted light, is obtained.

* This is a very beautiful reaction and deserves more particular mention than can be given here. It is perhaps the best means of obtaining silver photo-chloride, for which purpose I have often employed it, both on account of its facility and certainty, and the very beautiful colour of the product.

substances would, of course, give rise to the formation of sub-
de when treated with hydrochloric acid. It is important to
ve that this result is to be obtained only by interrupting the reaction
e it is complete. When, for example, allotropic silver in solution is
ced by the action of sodic hydroxide and dextrine, and, after com-
reduction, hydrochloric acid is added, the liquid becomes filled with
normal silver, which presently collects to a cake. When this cake is
vashed and boiled with water, and then treated with diluted nitric
solution takes place; a trace of photo-chloride is left behind. It
een mentioned elsewhere that hydrochloric acid, though without
on ordinary silver, is capable of forming a variable quantity of
-chloride when placed in conflict with allotropic silver.
ave not met with any exception to this general principle, that, when
tion leading to the formation of allotropic silver is interrupted by
ddition of hydrochloric acid, subchloride is abundantly formed as
f the products.
all such cases the reduction is evidently indirect. The silver does
se at once the whole of its oxygen, but apparently passes through
ermediate form, probably Ag_4O, the reduction of which tends to the
ition of allotropic silver.
ese facts lead directly up to the question, Does silver exist in its sub-
n the allotropic form? There are some facts that would support
iew, especially the very rich and varied colouration of the subsalts
ponding to the almost infinite variety of colour of allotropic silver,
normal salts of silver, when formed with colourless acids, are
y colourless. On the other hand, the greater activity of allotropic
and its less specific gravity, would seem to indicate a simpler mole-
constitution than that of normal silver. M. Carey Lea.

THE LIGHT-FOG DEMON AND THE BEGINNER.

a little experience most beginners in photography are able to steer
of chemical fog, but *the light-fog demon* is one that pursues an
ur in a most exasperating way, for it hoodwinks him so completely
e blames any but the right cause of his failures. Looking over
friend's negatives, one is very much struck by the fact of the large
ity being light-fogged, and, if mention be made of this, one is
invariably told that this is due to over-exposure. However, since
excellent silver or bromide prints can be made from these negatives,
nclusion one naturally arrives at is that a small amount of light-fog
ot in any way injure the printing capabilities of a negative. More-
he brightly lit dark rooms of professional photographers certainly
o produce a little of this result; for, in looking at professional por-
egatives, one is often surprised at detecting light-fog even in these;
e quality of the prints leaves nothing to be desired. If you should
to indulge in platinotype printing, then it is that light-fog makes
felt, by producing a muddiness and want of detail, when probably
ing amateur will give up in desperation this artistic method of pro-
pictures. Eliminate, however, all the causes of light-fog from
ttempts at negative production, and one is surprised with what
ost beautiful results can be obtained; and, unless an amateur does
clude them, the probability is that in a short time he will have
led photography.
us, then, inquire when it is that this demon works his wicked will
ur plates. Taking it for granted that apparatus, camera, and slides
ht-tight, when is it that light-fogging takes place? It is either in
rk room or during the exposure.
erning the dark room, it must be *absolutely light-tight*, so that,
ifteen minutes shut up in it without a light, one can nowhere
chinks through which white light enters; if one's dark room is,
re, not perfect, work on in it at night, and do not believe the
that, because an infinitesimally small stream is well away from
te, it cannot hurt the sensitive film. It does, and will do so, when
e filling your slides, or taking out an exposed plate for transference
developing dish. Again, what sort of a lamp have you got? Is
tern made of tin, and more or less complicated in design, with a
f preventing white-light from shining on the plate? That is
where the fault lies. What we want is a lantern, which shall
y prevent white light from reaching the plate, but shall also ex-
ny such quality of light from entering the dark room, by even one
f an actinic ray. In addition, test your lantern when you are
your dark room, and, after your eyes have become as sensitive as
f a nocturnal animal, examine your lantern, top, bottom, front,
nd back, and look out for chinks or light reflected through venti-
channels. Now, I can scarcely believe that there is a lantern that
nd such a test; therefore, with putty, red cloths, and various de-
nake it as perfect as possible; or, better than that, discard the
, and get a window with a well puttied-in pane of ruby glass, not
han a half-plate, let into it, satisfying yourself that no white light
ter between chinks of the window-frame; and, as we will suppose
ark room is not perfect, work only at night with a candle or
outside your window. Do not be inveigled into using yellow
glass or tissue, for ruby glass of the most approved shade allows so much actinic light to passs through it that you will fog your plates to a certainty, even when working with a candle, especially if you go in for slow development, and most likely if you use a rapid developer. Since it is now so universally admitted that one thickness of ruby glass is not sufficient to prevent the light-fogging of gelatine plates, it is even more hopeless to try and work rapid films in such a light. To prove this, develop a plate that has been exposed for two minutes to the red light of your lantern or window, and you will be surprised by the amount of silver that has been deposited by such an exposure.

As it seems that we cannot counteract the actinic properties of even red light by quality, we must perforce try quantity; therefore, your ingenuity will suggest that a screen of red cloth or paper must be fixed before your red light—a screen such that it can be rapidly raised and lowered, so that towards the end of development you can momentarily increase your light to see how things are getting on. You are working almost in darkness, but as an amateur, and a beginner, let us say, you cannot be too careful; and you will find after a little practice that the glimpse obtained of the developing plate by the momentary raising of your curtain is sufficient to form your judgment of the amount of development attained. Always wash off the developer before holding the plate close to the red light, to judge of the density. The curtain can be raised when you want to find bottles, &c. A red light so screened will allow of your opening boxes of plates in perfect safety; even then, do this in the shadow—say, of your table. Since tin lanterns are so unsafe, a simple device is to cover them with a blackened box, having a red glass or tissue window and screened ventilating apertures.

Fogging also takes place during exposure; it occurs by reflected light reaching the plate, when the shutter is drawn through the slit in the lens tube used to insert the stop. As almost every lens is fitted with Waterhouse diaphragms, it is impossible to make them fit so perfectly that no light can enter; therefore, to prevent such an untoward circumstance, bind a long strip of black cloth round the lens tube, so that *the stop aperture shall be light-tight.* It is extraordinary how few amateurs know of this. To prove it, raise the ground glass, stop and cap the lens, and cover your head and the camera—not the stop slit—with the black cloth, and notice, when your eyes have become accustomed to the gloom, how much light really enters through this fatal slit. An innumerable number of negatives are fogged by this, and called over-exposures. Thus, how frequently one hears and reads accounts of over-exposure of half-plate landscapes with the smallest stop, having received a four-second exposure—an impossibility as regards the picture, but true enough when applied to the amount of light that reached the plate, for fogging has been going on between the moment of drawing the shutter and the removal of the cap. I have given, with half-plate rapid rectilinear lens *and f*-64 *stop* (the smallest), eight seconds to brightly lit Himalayan snows without foliage, and not found it too much; but then, though the plates were extra rapid, the negatives were produced without fog. Light-fogging also occurs when photographing towards the sun by the direct rays shining into the lens tube and if the slides are exposed to sunlight. The prevention required to neutralise those two causes is obvious.

Having eliminated all sources of light-fogging, it is wonderful how impossible, within reasonable limits, it is to over-expose; and again, with full exposure, what beautiful features a negative will possess, supposing it to be one required to show a dark foreground, distant snow-clad hills, and the delicate shading of clouds; these will appear with the requisite tone and details.

After all, what is a negative that shows no light-fog? It is one whose border is perfectly clear, and whose very deepest shadows only show clear glass. Lastly, as a beginner, fly from light-fog as you would from a loathsome disease. The experienced photographer can manipulate plates in an actinic light; but, as an amateur and a beginner, you cannot; so do not copy him till you are proficient.

—*Journal of the Photographic Society of India.*

ON THE INTENSIFICATION AND REDUCTION OF GELATINE NEGATIVES.

[Read before the North Middlesex Photographic Society.]

I suppose that every photographer in this room has, at some time or other, found it necessary to reduce or intensify his negatives, so as to make them printable; or, at any rate, so as to cause them to yield better prints, and the best means of bringing about the desired result in the best possible manner has, no doubt, been with some of you a matter of difficulty. And necessarily so, for intensifying and reducing, even in the most experienced hands, are far from being certain processes. They require a considerable amount of care and watchfulness to make them result as they should do; and even then there may be effects brought about which are different to what were intended. As a rule these processes are looked upon as nuisances, especially amongst professionals who have not much time to devote to them, and consequently the negatives requiring such treatment are put by until some time when they can be conveniently attended to. As soon as a lull in the general rush of business occurs, they are hurriedly despatched. In the case of mercury intensifying, the negative is first plunged into water for a few minutes, and

then into a solution of mercuric chloride, without having any regard to the perfect elimination of hypo. When the surface looks sufficiently white, the negative is slightly washed in water, and then immersed in a solution of ammonia, until it is blackened all over. Then, after a few moments' washing, it is stood up to dry. The result of such treatment most frequently is a yellow stain, which nothing will remove, and so a negative is spoilt which might otherwise have been made to yield a good print. If success is to be obtained in these processes, it is only to be got by care and attention—haste is fatal to it. I do not wish to imply that you are all guilty of such neglect, for I know there are some very careful photographers among you; but there is, nevertheless, a great deal of carelessness, and trusting to chance with many who should know better. It is to these I most especially address the remarks contained in this paper. I do not presume to be able to teach you anything that is new or original; neither shall I introduce any fresh formula to your notice, other than those that have appeared in the various photographic papers from time to time. I shall simply call to notice what is most required of an intensifier or reducer, and how far we can get it. I have said how far we can get it. I ought rather to have said how little we can get it, for it is remarkable in these processes, as in most photographic things, we generally require a great deal more than we are ever likely to get; therefore it is wise not to expect too much. Yet, nevertheless, this desire for the unattainable is by no means to be condemned, for it frequently causes us to stretch forth an effort which we should not otherwise do were it not for this desire.

Every photographer, professional or amateur, should thoroughly understand the ins and outs of intensifying and reducing, as by their aid he has at his hand a means whereby he can give additional merit to his pictures, and can often save a negative which might otherwise be lost. For instance, where a plate has been over-exposed, it is very frequently a good plan to develop it until the detail is out, stopping development before it begins to fog, and making up its want of density by intensification. A better result is often obtained by so doing, if skilfully done, than if development had been continued in the usual way. Sometimes, however, you have not the chance to stop development before the plate begins to fog, and so you will say such a treatment is then impossible, but even here I have before now grappled with the difficulty, by first reducing the negative with ozone bleach, which reduces the thickness of the film, and then intensifying it again with mercury, the result being a more brilliant negative, owing to the fact that the chief of the half-tone or the fog lies on the surface of the film, whereas the denser parts penetrate to a greater depth; the bleach taking off the upper surface of the film and the half-tone upon it leaves the darker portions to be strengthened by the intensifier. Another plan of mine has been to varnish the negative all over, except where the strong parts have been, as in the case of interiors, and then to reduce the dense portions with some suitable reducer, so as to neutralise the contrast. This can be very effectually brought about where a window is too dense, and the surroundings are in deep shadow. The varnish is applied very carefully with a brush, and the reduction effected with potash-ferricyanide. By this method I have even gone so far as to take out the background from a portrait negative, leaving the head upon a clear glass; but it requires very carefully doing.

Now, before we go on to formulæ, it is best that we should know what is the most that is required of an intensifier and a reducer. An ideal intensifier should fulfil these requirements:—1. It should intensify the high lights more in proportion to the half-tones, such as would be necessary in an over-exposed plate where there is plenty of detail but not enough density. 2. It should intensify the half-tones more in proportion to the high lights, as in the case of a negative slightly under-exposed, where the high lights are about the right density, but the half-tone is weak. 3. It should intensify all parts in equal proportion, as in the case of a negative which is too weak generally. These same remarks apply with equal weight to the ideal reducer. The ideal reducer should act in such a manner that:—1. It should attack the high lights more in proportion to the half-tones, as when a negative is under-exposed, and the high lights are consequently too strong. This would be gradually assisted when the intensifier strengthens the half-tones more than the lights, and the two could be used consecutively. 2. It should reduce the half-tone more in proportion to the high lights, so that an over-exposed negative could be thinned down in its half-tones to give the high lights more value. 3. It should reduce the negative in equal proportions generally, so that a negative which is so thick that printing takes too long can be thinned down generally, and printing be thus facilitated. The permanency of the negative should not in any way be affected by the treatment.

With regard to the permanency of negatives after treatment with any of the known reducing formulæ, I believe they are not affected in any way whatever, and that a negative which has been carefully reduced, and proper attention given to the washing, will stand as long as if it had not been reduced. But this, unfortunately, cannot be said about all the intensifiers at present in use. The experience of many of you will no doubt bring to mind the fading of many a valuable negative which had been strengthened by intensification. Yet here again I believe the fault has been due more to insufficient care in washing than to the shortcomings of the intensifier. As for the relative value of an intensified negative, Captain Abney has proved, I believe, beyond the shadow of a doubt that the half-tones are strengthened more in proportion to the high lights, and therefore there is generally less detail in the higher lights of an intensified negative than in the same negative before the treatment. I myself have often noticed the want of detail which an intensified negative gives in the resulting print in the high lights to what had appeared in the same negative before strengthening. It should be said however, that I had used the same formula as Abney had used. The same rule may not be applicable to other formula. Before reducing, and especially before intensifying, the plate must be entirely freed from all traces of the fixing agent. Want of attention to this rule is almost the only cause of stains, and is also a great cause of fading. To free the plate from hypo nothing is better than placing it in a solution of hydrogen peroxide. The method of using it is as follows. The plate is first washed under the tap, and then is placed in the following solution:—

Hydrogen peroxide	½ drachm.
Water	2½ ounces.

In this it remains for a few minutes, and is again washed so as to free it from the peroxide. The plate can then be intensified or reduced in the usual way. Another way of clearing the plate from hypo is also stated to be very effectual. An ounce of glacial acetic acid is added to four ounces of water. To this is added, little by little, one ounce of barium dioxide finely powdered. When this is dissolved, the plate is soaked in it for a few minutes, and then slightly washed. For the efficacy of this method I am unable to express any opinion, as I have not yet tried it, though, as far as I can see, there is no reason why it should not be as good as the peroxide of hydrogen, which chemical forms part of its composition, and it is no doubt cheaper. Personally, I use nothing but a saturated solution of alum for ridding negatives from hypo, giving each negative half an hour's washing in several changes of water, and then placing it in the alum for about twenty minutes afterwards, letting the plate remain in running water for about ten minutes. Whilst I was writing these lines, I notice that, according to Dr. Stolze, the alum bath should not be used until the fixing solution has been removed by washing, otherwise sulphur may be deposited in the film and cause fading. Certainly, I am aware that hyposulphite of sodium and alum decompose one another; but, as far as my own experience goes, I have never found any bad results to come from the method last described.

There is one more opinion I should like to mention. There seems to be a difference of opinion existing as regards the best time to intensify a negative, some saying it is best to let the plate dry first, while others prefer to treat it before the film has lost its first moisture. As to the best time to intensify, if a negative partly dry and partly wet is used where the film is wet, it becomes denser than where it is dry. Therefore, to take advantage of this difference, it is best to let the plate dry if it is not required to strengthen it to the fullest extent, and to treat it before it becomes dry when the greatest intensity is required. The cause of this is owing to the difference in the porosity of the gelatine film before and after drying. When a plate has been exposed and developed, it contains a certain amount of unreduced silver bromide surrounded with gelatine, which is dissolved out from the gelatine by the fixing agent. When this is fixed out, it being a solid substance, it naturally leaves a number of pores, which finally become filled with water. When the plate is placed in the intensifying solution, these pores rapidly become filled by it by exosmose action. For this reason the intensifier has greater action on the silver than if the plate was dried first, because the water evaporating out of the film allows the pores to become closed up, and as they do not open again to the same extent on being placed in water the second time, the gelatine acts to a certain degree as a barrier to the action of the intensifier.

Having made these preliminary remarks, I will now proceed to describe the various methods employed for increasing or reducing the printing density of a plate, and, as there is less to say about the latter than the former, I will treat upon that subject first. Reduction of density can be effected in two principal ways, the film can be reduced in thickness by mechanical means, or by solution, or the silver forming the image can be changed into some substance which can be dissolved by a solvent. For reducing by the first of these methods, Mr. Debenham recommended the use of ozone bleach. After the plate has been immersed in a solution of chrome alum—about one ounce to the pint—it is placed in a solution of ozone bleach of the strength of about one to six of water. Holme's ozone bleach is a substance which is used by laundresses for bleaching purposes, and can be obtained either at the oil-shops or at several of the photographic chemists, and is very cheap. In the place of ozone bleach, a saturated solution of chloride of lime can be used in the some manner; but a substance which I like better than either of these is the hypochlorite of potash, otherwise known as *Eau de Javelle*. To prepare this, dissolve one ounce of chloride of lime in fifteen ounces of water, and two ounces of carbonate of potash in five ounces of water. These are mixed, boiled, and filtered, and, when cold, are diluted, one of the solution to five of water being the strength I most generally use.

All these methods act very much in the same manner—viz., by dissolving the upper part of the film away. If reduction is to be carried to a great extent, the plate is placed in hypo, which dissolves out the silver that has been converted to the chloride. To reduce locally, a stronger solution is poured on the parts to be thinned the most, and, if necessary, these parts can be rubbed with the finger, or, better still, with a piece of cotton wool, until the required reduction is produced. Great care must be exercised in using these solutions. Do not handle the plate more

than can be helped, or frilling may result. Keep the plate gently rocking, or the reduction will not be even. Do not rock too violently, or the edges of the film will be eaten away. Do not have the solution too strong, or blisters will occur; and, finally, let the tap be gently running, so that the solution can be thrown off, and the plate be immediately washed, without draining, or streaks and honeycomb markings will show themselves all over the plate.

Local reduction can be very well brought about by rubbing the parts to be reduced with a piece of wool dipped in strong alcohol, and, if carefully done, the result is very good. I have also heard of an operator who used to reduce locally with a mixture of very fine emery powder and some greasy material, such as lard, applied to the parts with a leather stump, but only very small places can be properly reduced by this means for obvious reasons. The grease is removed by a piece of rag dipped in turpentine. The chemical method of reducing is done either with ferric chloride or potassium ferridcyanide. For the first of these make a solution of ferric chloride, one drachm to six ounces of water. The plate, on being immersed in this, has some of its silver converted to silver chloride, which is dissolved out with hypo. The method with potassium ferridcyanide, which was, I believe, introduced by the Polytechnic School of Photography, and which I prefer to all others, is as follows:—A solution of red prussiate of potash (potassium ferridcyanide) is prepared. Some hyposulphite fixing solution is taken, and the prussiate added to it until it assumes a bright yellow colour. The plate is simply taken from the fixing bath and transferred direct to this, where it is kept gently rocking until reduction is complete. The beauty of this reducer is, no washing is required after fixing, and also you can be certain to what extent reduction will go. If the plate is to be reduced locally, it should be dried first if the parts have a sharp outline. The solution can then be applied with a camel's-hair brush, or, as before stated, the negative can be varnished all over except in those parts to be reduced, and the plate immersed in the solution until thinned down enough. The chemical change which takes place with this reducer is, the silver, directly it is touched by the potassium ferridcyanide, is dissolved out by the hypo. One word more. As the ferridcyanide solution will not keep when mixed with the hypo, it must be made up a little while before using; and, further, if reduction is to be carried to a great extent, the solution should be rendered highly alkaline with ammonia, to prevent the negative turning yellow. So much, then, for reducing. I will now proceed to treat upon the process of intensifying.

ROLAND WHITING.

(To be continued.)

PHOTOGRAPHIC CHEMISTRY.

III.

THE photo-chemical studies which have been dwelt upon in the last lecture lead up to the consideration of the silver compounds, which must, of course, receive special treatment on account of their present importance in photographic processes. The broad facts, that silver nitrate darkens on exposure to light when in contact with organic matter, that the silver haloids become coloured when exposed under suitable conditions, and that other salts of silver, both inorganic and organic, also darken on exposure, will form the experimental basis from which the student may be led to the further consideration of the subject. At the outset of this work, it is desirable to point out that our knowledge respecting the action of light on the silver compounds is in a different position to that concerning the simpler cases of photo-chemical decomposition which have hitherto been discussed. In the latter, the chemical change is definite enough to be represented by ordinary equations, the composition of the final product being, in most instances, known. In the case of silver salts we possess no such accurate knowledge, and the nature of the products is still surrounded by mystery.

When light falls on the silver haloids, chemical decomposition takes place, accompanied by a change in colour. In order that this statement may be properly realised, let it be shown that there really is decomposition, and that the chloride and bromide under these circumstances give off a gass which blues starch and potassium iodide paper.* The iodide does not undergo decomposition on exposure, except in the presence of an iodine absorbent, *i.e.*, a sensitiser. From these facts a good lesson can be conveyed concerning the general nature of the action of sensitisers. Passing on to the action of light on films of the haloids, it is possible, by means of a few simple experiments, to demonstrate many important properties of these compounds with which the student should be familiar. For this purpose, sheets of paper, well coated with the pure haloids free from excess of silver nitrate, and a few ordinary reagents, are the only requisites. By one operation it can be shown that with the same exposure the chloride becomes darker than the bromide, and the latter darker than the iodide, and at the same time that reducing agents and halogen absorbents accelerate, while oxidising agents retard, the decomposition. Thus three strips, coated respectively with the three haloids, may be painted with stripes of solutions of (1) sodium nitrate, (2) sodium sulphite, (3) silver nitrate, (4), mercuric nitrate, (5) potassium dichromate. After exposing these strips simultaneously to the action of light, the stripes 1 and 2 will be darker than the ground colour, showing the accelerating action of the reducing agents, 3 will also be darker than the ground colour, showing that a halogen absorbent may also act as an accelerator without necessarily being a reducing agent, while 4 and 5 will retain the original colour of the haloid, showing the retarding action of oxidising agents. A comparison of the ground colour in the three strips will also serve to show the different colours of the products of photo-chemical decomposition.

Such demonstrations as these cannot fail to impress the mind that the action of light on the silver haloids is a distinct case of photo-chemical decomposition, but it is necessary at this stage to issue a caution. The action is in these cases continued up to the point of visible darkening, whereas in the photographic film the exposure is so short that no directly visible effect is produced. It must be enforced, therefore, that in associating the photographic image with these darkened products we are drawing largely upon arguments from analogy, and, although I personally am inclined to the opinion that the products are the same in both cases, this view cannot be taught as a dogmatic truth in the present state of knowledge, for, however probable it may appear from analogy, it must not be forgotten that in the way of direct proof there is still a gap which must be bridged over before the identity of the products can be taught as an established fact. But the full consideration of this question is better deferred till the photographic film itself comes to be dealt with. The point that will now present itself is the actual composition of the darkened products; and here it may at once be pointed out to the student that our knowledge respecting these compounds is in precisely the same state as that concerning the coloured haloids dealt with in the last lecture. In the case of the darkened chloride, it has been proved that this product contains a little less chlorine than the normal chloride. In all three haloids, no matter how long the exposure may be, the final product always contains an enormous excess of unaltered haloid. It may safely be asserted that these products are not chemical compounds in the ordinary acceptation of the term, since they are not composed of the haloid combined with the coloured product of photo-chemical decomposition in definite molecular proportions.* Neither can the "photo-salts" be classed with the definite "molecular compounds" of modern chemistry, since the latter also consist of substances combined in definite molecular proportions, and can be more or less readily resolved into their constituent molecules by appropriate treatment. But the "photo-salt" cannot be resolved by any such treatment, since all solvents which dissolve the normal haloid appear to decompose the darkened product, leaving only a trace of metallic silver. On the other hand, metallic silver cannot be extracted from the "photo-salt" by any of the ordinary methods.

In answer to the question which the inquiring student would naturally put, What is the photo-salt? it can only be said that these products must be regarded as indefinite molecular compounds of the silver haloids, with coloured, unstable products of photo-chemical decomposition, the composition of the latter being as yet unknown. That the coloured products are unstable appears from the fact that they cannot exist apart from an excess of the normal haloid. In the same way that a solvent will take up a solid till the point of saturation is reached, so the silver haloid, on exposure to light, becomes decomposed up to a certain point, *i.e.*, the point when the haloid is saturated with the coloured product of photo-decomposition.† Beyond this point the action of light produces no further effect, unless a reducing agent is present capable of combining with the liberated halogen as fast as the latter is liberated. It is advisable to let the student observe for himself that silver iodide, prepared with excess of potassium iodide, undergoes no change of colour on exposure to light, but that, in the presence of silver nitrate or reducing agents, darkening occurs. Let him observe also that the darkened chloride yields no appreciable quantity of silver to dilute nitric acid, but that in the presence of a strong reducing agent, even when the latter is gaseous, such as hydrogen, the reduction may proceed up to the complete liberation of the metallic silver. This last point can be demonstrated very conveniently by placing some finely divided silver chloride (prepared by precipitation) into a glass tube, through which a current of moist hydrogen is kept passing, the gas being made to bubble through a solution of silver nitrate containing free nitric acid. On exposing the contents of the tube for some time to strong light, silver chloride is precipitated from the solution of the nitrate, the chloride in the tube (which should be shaken from time to time in order to expose fresh portions) gradually becoming dark coloured. An equal quantity of the chloride may be exposed in air at the same time for comparison. The two lots of darkened chloride are then treated with equal quantities of dilute nitric acid, the clear solution filtered off, and the filtrates tested for silver. If the experiment has been properly conducted, the solution from the chloride darkened in hydrogen will be found to contain distinct traces,

* *Chemistry of Photography*, pp 65, 66

* It must be recognised that the definite character of molecular componnds passes into the indefinite when we have $\frac{1}{2}H_2O$, $\frac{1}{2}C_2^{\cdot\cdot}H_4O_2$, $\frac{1}{2}CH_4O$, &c., in crystalline products.

† The analogy between a photo-salt and a saturated solution was indicated in a lecture delivered last year at the Royal Institution (*Proc. Roy. Inst.*, vol. xiii., p. 143). The idea of a "solid solution" may appear somewhat strained, and I am glad, therefore, of the present opportunity of calling attention to a similar idea which has occurred to others in connexion with a totally different branch of chemistry, viz., the affinity of colouring matters for fabrics. This notion has been expressed by Dr. E. Knecht (*Jour. Soc. Dyers and Colourists*, 1889, p. 77), and recently it has been extended with considerable force to the theory of dyeing by my friend Dr. Otto N. Witt (*Färber-Zeitung*, 1890-91, part i.).

hile that from the chloride darkened in air will be free from silver. It hardly necessary to point out that the chloride used in this experiment ould be free from excess of silver nitrate, *i.e.*, prepared with an excess f a soluble chloride, or chlorhydric acid.*

Having arrived at the conclusion that the silver haloids, when exposed o light under suitable conditions, lose a small quantity of their halogen, nd become converted into coloured compounds, the course of instruction ill here naturally diverge along two lines:—

(1.) The nature of the coloured product combined with the excess of naltered haloid; and

(2.) The part played by the associated substance or sensitiser.

With regard to the first, it must be pointed out that, although we have o positive information of a conclusive character, many views have been dvanced, which are more or less worthy of consfderation; and an excel- nt exercise in the use of scientific judgment might be given to the dvanced student, by submitting the current notions respecting the com- osition of these products, and requesting him to prepare a critical essay mbodying his own views. Although no definite conclusion might be rrived at, the exercise cannot fail to be of value as an educational test, ot only by compelling the student to refer to original papers, but also as alculated to bring out any originality he may possess in the way of evising new crucial experiments—the highest criterion of competence as technologist. Respecting the view that these compounds contain netallic silver, the fact that that the chloride darkens under nitric acid nay be taken as evidence to the contrary.† The discussion of the possi- ility that sub-haloids are present, will link this part of the subject on to he purely chemical considerations dealt with in the last lecture. The ossibility of the coloured products containing oxygen, *i.e.*, being of the ature of oxyhaloids, is also worthy of being entertained.† In favour of his view is the analogy of cuprous chloride, which darkens only in media vhich can supply oxygen, and which, under these circumstances, ap- arently forms an oxychloride. In the same sense may be interpreted the istinct sensitising action of water already referred to. On the other and, it may be pointed out, that the chloride darkens in a high vacuum *i.e.*, in the presence of mercury vapour), and under liquids such as pure enzene, petroleum, and carbon tetrachloride, which contain no oxygen, nd which have previously been dried by chemical methods. The question hus assumes the form, whether the nature of the coloured products may ot vary in different media; whether, in easily halogenised liquids, such s benzene, the reduction might not be analogous to that which occurs in ydrogen; whether, in other cases, the unsaturated silver haloid residue nay not form a coloured compound with the organic product; and so orth. It may be pointed out that such questions as these open a wide nd interesting field for experimental investigation.

With regard to the second point, the action of the substance associated ith the silver haloid, it is legitimate to connect this action with the rdinary chemical processes with which the student has been familiarised. Ie has been taught that reduction and oxidation are concurrent in ordi- ary chemical reactions, such as when a silver salt is reduced by a ferrous alt. The principle can now be extended to photo-chemical reactions. Vith the exception of a few cases of pure dissociation (such as the reso- ution of gold oxide into metal oxygen under the influence of light), which ave no direct bearing on photographic processes, the photo-chemical hanges with which the photographic chemist has to concern himself may ll be considered from the same point of view as those which have been nade use of by way of special illustrations. There is no fundamental ifference in principle between the action of light on a mixture of ferric hloride and oxalic acid, or mercuric chloride and ammonium oxalate, and ts action on a silver haloid mixed with water, silver nitrate, sodium sul- phite, gelatine, or any other organic compound capable of being oxidised or halogenised. The only differences are in the relative velocities of chemical change, and in the circumstance that in the case of such metals as iron and mercury the products are definite and known, while in the case of silver the products are indefinite and unknown. The student will thus be led, without a break, from ordinary chemistry to photo-chemistry, and from the latter to the chemistry of photographic processes. He will now realise that the photographic film is to be looked upon as a system of chemical compounds capable of undergoing atomic rearrangement under the influence of the external energy of light. He will grasp the full meaning of the term "sensitiser," and he will see that the function of the latter is quite as important as that of the silver haloid itself.

From this point the practical study of photographic methods, the preparation of emulsions and films, the uses of collodion and gelatine as vehicles, the action of preservatives, and all the technical details of modern processes can be taken up or resumed. Then in natural sequence will follow the consideration of the nature of the photographic image and its connexion with the coloured products resulting from the prolonged action of light on the silver haloids. At this stage, again, caution is necessary, and dogmatic statements must be avoided. The action of light on the sensitive films in use in photography, including all the films employed for producing pictures in the camera, from the iodised silver plate of Daguerre to the gelatino-bromide plate of modern times, gives rise to no visible product of photo-chemical decomposition. Is it, therefore, legitimate to conclude that the short exposure necessary to give a developable picture produces any photo-chemical decomposition at all? It must be pointed out that there is here another gap in the way of direct proof, but that the indirect evidence is all in favour of there being such a chemical change. Of the nature of the material composing the invisible image we know no more than we do of the composition of the coloured products of photo-chemical decomposition, or of the photo-salts. They may be identical or not; but that the image is the result of a true chemical change can be made to appear highly probable to the student by a few well-chosen demonstrations. Let us consider the evidence as it stands.

The invisible image is either the product of chemical decomposition or it is not. If it is not, then some other explanation must be invoked. The only other view is that the energy of light is not at first used up in doing chemical work, but that before true chemical decomposition occurs there is an intermediate stage, during which the energy is engaged in loosening the affinity between the atoms of the halogen and the silver. This would be analogous to Bunsen and Roscoe's "photo-chemical induction." According to this view, we should have to regard the first action of light on the sensitive film as a purely physical action, resulting in the formation of an unstable modification of the silver haloid, more easily reducible than the ordinary modification. It might be thought that such a physical modification would be easily producible by the limited action of light on the pure silver haloid, but, as far as my own experiments have gone, this does not appear to be the case. By exposing pure, dry silver bromide films, obtained by the method already described, for sufficient time to produce a well-defined developable image on a photographic plate, no difference in the reducibility of the exposed and unexposed parts could be detected. In fact, the films of the pure haloid are so insensitive that an exposure to bright sunlight of sufficient duration to completely solarise the slowest of modern dry plates, showed no difference in reducibility by potassio-ferrous oxalate or alkaline pyrogallol, between the exposed and unexposed portions of the surface. The conclusion to be drawn from these experiments is that, in this form, the silver haloid cannot be converted into a more easily reducible physical modification by any moderate exposure to light—certainly not by an exposure considerably greater than that necessary to impress an image on a gelatino-bromide plate.

At this point the question of molecular aggregation comes into consideration. Is it not possible that in the iodide film of the old collodion process, or in the gelatino-bromide emulsion, the silver haloid is in a different and more highly sensitive state of molecular aggregation? Is there, in fact, a more unstable condition of the haloid than that resulting from the action of the halogen on a silver mirror on glass? In consider- ing this part of the subject, attention may be called to the experiments which the student has already been recommended to make in connexion with the modifications of the haloids. His experience in the preparation and ripening of emulsions will also render good service in enabling him to fairly consider the evidence. It is possible that some weight—how much it is not yet possible to decide—may have to be given to the state of aggregation as a factor in determining the extreme sensitiveness of the photographic film. At the same time it must be pointed out that no experimenter has ever yet succeeded in preparing a film of silver haloid in any state of aggregation free from every suspicion of a sensitiser, and capable of receiving an invisible and developable impression in the same time as an ordinary photographic plate.*

—*Journal of the Society of Arts.* R. Meldola, F.R.S.

(*To be continued.*)

* The above experiment is a modification of one described by Robert Hunt (*Researches on Light*, second edition, page 78). This method has recently been applied by t. Hitchcock (*American Chemical Journal*, xi., page 474), for determining quantitatively the loss of weight in films of silver chloride, exposed to light in an atmosphere f hydrogen. The author considers that his experiments prove that oxygen does not nter into the composition of the darkened product, *i.e.*, that they disprove the oxychloride theory. But since water vapour was present, and was, indeed, found to be ndispensable for the photo-decomposition, this inference cannot be allowed much veight. Moreover, since hydrogen is known to reduce the chloride to silver under the conditions of the experiment, the darkened product may have a different composition o that formed in air; it may consist of redneed silver, mixed with unaltered chloride. See also C. H. Bothamley, in British Journal of Photography, April 4, 1890.) Hitchcock's films were prepared by allowing finely divided silver chloride, obtained by precipitation, to subside on glass. (Herschel and Hunt's method.) After being washed and dried under a desiccator, the films were but slightly darkened in dry air, even after an hour's exposnre to bright sunlight. The introduction of water rapidly increased the rate of darkening, thus furnishing another illustration of the very familiar fact that water acts as a sensitiser. This point was illustrated during the ecture by two experiments, conducted simnltaneously. Strips of paper, coated with he chloride and bromide respectively, were partly screened by black paper, the exposed portions being partly wetted with distilled water. The chloride paper was allowed to remain exposed to the electric light till visibly coloured; the bromide paper vas withdrawn after a few seconds, and developed with weak ferrous oxalate developer. In both strips the portion wetted with water was distinctly darker than the exposed dry part of the coated paper.

† Ostwald unhesitatingly affirms, both with respect to the wet-collodion and gelatino-bromide emulsion processes, that traces of metallic silver are liberated by the action of light. (*Grundriss der allgemeinen Chemie*, pp. 282-263.)

† According to a recent research by Dr. A Richardson (*Journal of the Chemical Society*, vol. lix., p. 536), the chloride darkened under water does not contain oxygen. I learn, however, from Mr. H. B. Baker, of Dulwich College, that he has come to an opposite conclusion. His experiments are not yet completed, but he considers that the evidence in favour of the view that the darkened chloride contains oxygen is quite conclusive. He has measured the oxygen absorbed and the oxygen evolved by the action of chlorine on the darkened product.

* According to Stas, the third (granular) modification of AgBr (both the white and yellow forms) are extremely sensitive to light. He states that on boiling (with water?) in a glass flask they become darkened in two or three seconds by the blue flame of a Bunsen burner. It is not clear from the description whether he attributes the darkening to the light of the burner alone, but the conditions are obviously very different from those which exist in a photographic film. It would be of interest and importance to reinvestigate this modification of AgBr from the photographic point of view. With reference to the production of an invisible image on a film of AgI on

THE AUTOMATIC PHOTOGRAPH COMPANY.

Expected Revelations.

We need not go over the collapse of the Automatic Photographic Company, or tell again the story how the machines refused to work, and, when they *did* work, produced results which simply appalled the sitter. What we are principally concerned with now is the report which the Committee of Investigation is preparing, and which, we presume, will, in a very short time, be put before the shareholders. It has been discovered that 16,500 shares in the Automatic Photographic Company were applied for by bogus applicants. At the statutory meeting Lord Kilmorey, the chairman of the Company, stated that all the shares had been applied for. It turns out, however, that the allotments just mentioned were of a bogus character.

Another interesting piece of information has also been unearthed. Two of the directors, whose qualification was the holding each of shares to the value of 200*l.*, had never paid a farthing for their shares. This little fact, however, has not prevented each gentleman from drawing his fees. All the directors, indeed, seem to have been commendably anxious on this point, and nearly 1300*l.* went into their pockets during the few months the Company was—we will not say at work.

The figures disclose one of the most disgraceful series of misapplication of shareholders' money we have heard of for a long time. The capital was 100,000*l.* Of this, 60,000*l.* went half in cash and half in shares to the purchase of this miserable patent. Who had the bulk of this 30,000*l.* hard cash we cannot say, but we are not far wrong in assuming that a large portion went into the coffers of the National Debenture and Assets Corporation. Out of the 40,000*l.* left, 15,000*l.* was pledged to Messrs. Salter, who had a contract to supply 500 machines at 30*l.* a piece. 5000*l.* was to go for the supply of plaques, leaving 20,000*l.* nominal working capital. With 20,000*l.* the Company—always allowing that the machines could be worked—would have had ample funds. But, in view of the fact that 16,500*l.* represented by the bogus allotments had no existence, the capital upon which the Company commenced to do business was 3500*l.* only. The Company was supposed to have begun business in April, 1891, and some idea of its prospects may be gathered when we say that the total receipts of the machines which had been previously put up only yielded up to March 31 the magnificent sum of 3*l.*, or thereabouts!

If these statements of figures which we have just made public be correct—and of their correctness we, at least, have no shadow of doubt—the shareholders will be justified in taking some very stringent course with regard not only to the promoters, but the directors who allowed themselves to be the tools of the promoters.

—*Financial World.*

Our Editorial Table.

Gotz's Descriptive Catalogue of Objectives, Apparatus, and Materials.

Mr. J. R. Gotz, of 19, Buckingham-street, Strand, has issued a very neat catalogue, which is embellished with a collotype frontispiece by Thévoz, of Geneva. It contains a complete list of the lenses of Suter, of Basle, for which, as is well known, Mr. Gotz is the agent. His Volute shutter, his portable camera and stand, his changing box for films and new film-carriers are all described. Several films, plates, and other sensitive surfaces for which he is agent also find place in this elegant catalogue.

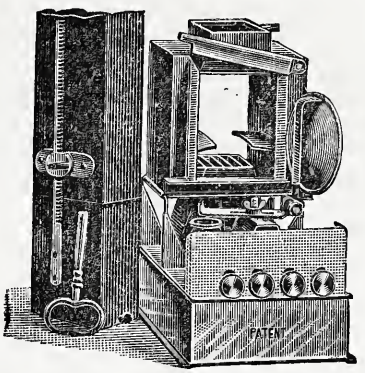
"Sun Artists."—No. 8.

Kegan Paul, Trench, Trübner, & Co.

Mr. F. M. Sutcliffe supplies the theme of *Sun Artists* this quarter. Those of his works which are reproduced are *Water Rats, Excitement, Sunshine and Shower* and *At Dinner Time*, all of which will be recognised by the frequenters of the various exhibitions. The descriptive essay is by Mr. C. Noel Armfield, from whom we learn that the artist whose works form the *raison-d'être* of this number is the son of the late Mr. Tom Sutcliffe, a member of the Institute of Painters in Water Colours, hence it may be said that the son has inherited the talents of the father. The essayist, speaking from a personal knowledge of Mr. Sutcliffe, describes him as an excellent draughtsman, no mean hand with the brush and palette, and possessed of a fund of kindly, genial humour, which, like his father's, never becomes vulgar or offensive; an artist's eye for selection, and a trained power of composition which enables him to catch a picture from the happiest point at the happiest moment. Mr. Armfield follows with an appreciative criticism of the pictures above enumerated. The photogravures are executed in the high-class style which has characterised the previous numbers of *Sun Artists*.

Stocks' Lantern Lamp.

Mr. W. Stocks, Rye, Sussex, has devised a modified form of lamp for lantern projection and enlarging, which, he claims, gives a more intense and purer light than any others. Without introducing any invidious comparisons between it and these others, we may say that, upon trial, we find that it really does give a light that is both very pure and intense. This doubtless arises from the fact, that its construction is such that the whole of the flame, from base to top, is open to the condensers, and, more particularly, owing to the construction of the chimney, which in its normal or collapsed state is long, but which an ingenious rack-and-pinion appliance enables to be lengthened to a considerably greater extent, by which a magnificent draught is created, highly conducive to perfect combustion. In fact, the chimney, as well as the rackwork of the wicks (of which there are four), may be made to serve as a consumer of the smoke simply by racking it up and increasing the draught. In the above cut the reflector is turned aside to show the interior of the wick chamber, and the chimney, with its rackwork, is placed alongside. It is well made, and deserves success.



Die Photographischen Objective.

(Von Dr. Joseph Maria Eder. Halle: Wilhelm Knapp.)

This work, which is printed in the German language, is embellished with three heliogravure portraits, respectively of A. Steinheil, Petzval, and Voigtlander. It contains descriptions of various lenses, with drawings (some of them of the mounts only, however). Among these we find a caricature of Goddard's double periscopic lens—we say a "caricature," because of the exaggerated curves given to the drawing. What purports, too, to be Ross's Universal objective is singularly inaccurate. It represents something that, to our knowledge, never emanated from that firm, one of them (there are two) showing a portrait combination, having its front lens formed as an equi-double convex, the crown behind the flint, its back lens being equally wrong; the other, a landscape, is also shown as a double convex, its crown element to the front. Dr. Eder has placed too much faith in imperfectly informed journals or serials. Wherever the talented author has done us the honour to reproduce what has first appeared in The British Journal of Photography (of which, however, there is no acknowledgment of the source), he is invariably correct. The work contains a good compendium of lenses, especially those made on the Continent.

We have the September and October numbers of *Figaro Illustré* (Boussod, Valadon & Co.) before us. The phototypes therein are well up to the high average attained by this firm, notably the 12 × 10 plates of an Egyptian caravan, and that of a cat found in the act of devouring a piece of liver evidently before its owner had paid for same. These are splendid specimens of this kind of work. As to the coloured work, the covers of both numbers are far and away the best, being bright, vigorous, and effective. There is a very pretty picture of a group of kittens, two having taken possession of the cage of a parrot, the owner being obliged to locate himself on the roof. This is delicate in tone, and, indeed, a charming picture. The

glass, opinions are divided (compare Abney, *Treatise on Photography*, fifth edition, p. 25, and Eder, *Handbuch*, part ii., pp. 11 and 20). The authority for the statement that such an image can be produced is Carey Lea. In order to submit the question to the test of experiment, I have made, with the co-operation of Mr. T. H. Norris, some further experiments with iodised silver mirrors on glass. The results with alkaline developers are the same as those with the brominated mirrors; there is no difference in reducibility between the exposed and the unexposed portions of the film. With an acid developer, however, a developable image is produced. A plate was half covered by a black screen and the uncovered portion exposed for five minutes to the light of the electric arc. The developer was the ordinary pyrogallol solution with acetic acid as a restrainer and a few drops of AgNO solution. The silver deposit formed on the exposed portion long before the unexposed half was attacked. This confirms Carey Lea's results, and at the same time opens up a very wide question, viz., whether photo-chemical decomposition is necessary for development by accretion as distinguished from development by reduction. It may be that photo-physical change is competent to give an image capable of accretional development. It is known that the silver haloid when crystalline is susceptible of photo-physical change (Schultz-Sellack, *Pogg. Ann.*, vol. cxliii., p. 439).

large portraits are good as far as production is concerned, but we do not think they lend themselves so well to this class of production. We have never had the experience of seeing a gentleman kiss a lady's shoulder (in a conservatory), and cannot approve of the way in which one of the illustrations depicts it.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17, 351.—"Improvements in Apparatus for forming Oxy-calcium Lights." Complete specification. G. R. Prowse.—*Dated October* 12, 1891.

No. 17,368.—"An Improvement in the Production of Oxygen." Communicated by Ernst Fahrig. G. B. Mee.—*Dated October* 12, 1891.

No. 17,408.—"A New or Improved Holder or Stand for Displaying Multiple Photographs and the like." W. Tylar.—*Dated October* 13, 1891.

No. 17,516.—"Improvements in Shutters for Photographic Cameras." J. E. Thornton and E. Pickard.—*Dated October* 14, 1891.

PATENTS COMPLETED.

Improvements in Detective Cameras.

(Communicated by Fredrich August Fichtner, 6, Elisenstrasse, Dresden, Germany.)

No. 12,218. Newnham Browne, 73 Cheapside, London.—*September* 26, 1891.

This detective camera is constructed with a plate-changing arrangement, enabling plates of relatively large size to be employed with economy of space without rendering it necessary to make the camera of greater internal width than the dimensions of the plates employed. It is further provided with a double controlling device, showing what plates (according to the sequence of the numbers) have been changed and what plates are ready for exposure.

A further improvement in the camera consists in enabling the iris diaphragm inside the camera to be adjusted from the exterior as required.

The camera is further provided with a lens stop of simple construction relatively to the diagram.

(Details of construction are given in the specification.)

Improvements in Apparatus for Cutting Glass.

No. 17,900. James William Thomas Cadett, Ashtead, Surrey.—*September* 26, 1891.

This invention more particularly relates to cutting glass for photographic purposes, and has for its object to facilitate the operation, and to ensure greater certainty therein, thus avoiding waste of material.

My improved cutting apparatus consists of a movable arm furnished with a double hinge whereby it is attached transversely to a cutting board. The hinge is fitted with a coiled or other spring which imparts a spring motion to the arm. Mounted on the latter is a sliding carriage furnished with a holder carrying a diamond, and also with an adjustable bracket. The holder has a vertical movement and is fitted with a spring that keeps the movable arm clear of the glass until it is depressed, and, when so depressed, regulates the pressure of the diamond on the plate. The bracket is furnished with a suitable stop and with a small roller.

The glass having been placed in position, the sliding carriage is drawn forward until the stop comes against the glass, thus arresting the movement of the carriage, which is then depressed, thereby depressing the bracket, and bringing the roller in contact with the glass; in so doing the bracket is raised, and the stop carried clear of the glass, thus leaving the carriage free to be again moved forward. On downward pressure being applied thereto, the diamond comes in contact with the glass, thus raising the holder. By this means the downward pressure of the holder spring is brought into play, and, on drawing the sliding carriage over the glass, it is severed.

To ensure dividing the plate exactly in half, I fit the cutting board with two slides, which are connected by lazy tongs so arranged that the slides approach or recede from each other at a uniform speed. The glass being placed between such slides, they are operated until they both clip the glass, and hold it in position so that the diamond, on being drawn across it in the manner above described, divides the plate exactly in half. Such slides may, however, be dispensed with when such accuracy of division is unnecessary.

Impovements in Lantern Microscopes, Forming an Instrument that can be used on the Magic Lantern or as a Table Microscope.

No. 18,120. Robert George Mason, 69, Clapham Park-road, Clapham, Surrey.—*September* 26, 1891.

The objcct of my invention is to enable the magic lantern or projection microscope, as it is often called, to be used for two purposes—that is, for demonstrating to a number of persons at once, or, by the use of my Improvements, to alter the same instrument into a microscope, such as is used on the table in the ordinary way, or *vice versâ*. This, to my belief, has never been done before, the two instruments having been until now separate and distinct instruments for each purpose. My method of doing this I now proceed to describe. I use existing forms of microscope stages known as the "plain" and "mechanical." At the underneath side of the lower plate I fix, by means of screws or other methods as occasion may require, two dovetail pieces of brass or other durable metal, so forming guides as holding means. I arrange two dovetail plates to fit firmly into the aforesaid dovetailed pieces on the stage plate; one of these dovetailed plates has fixed to it the tubes containing the optical system of lenses for use with the magic lantern or projection form of instrument, the other plate has fixed to it the one half of an ordinary joint, such as is used to incline the upper portion of microscopes at any angle. These plates are stopped from sliding right through by a small stop on the main plate, or by means of screws screwed into the main plate where required, so that the removable parts—that is, the two plates, one attached to the tubes containing the optical system of lenses as before mentioned, and the other fixed to the joint of the table stand—are exactly central to the optical axis of the instrument when pushed into or secured in their respective positions under the main stage plate. The plate carrying the optical system of lenses is provided with a screw at or near the end of the outer tube for screwing into the front of a magic lantern.

Secondly. On the upper surface of the main stage plate is fixed the arm or limb that carries the coarse adjustment provided with a rack and pinion, also the usual fine screw adjustment. On the slide of the coarse adjustment is fixed a tube; this tube is made to carry either the brass tube or body for the table-stand form, or a small short tube carrying the "objective" in the lantern or projection form of instrument; the main stage, being removable from the smaller plates, enables the subcondenser lenses to be easily changed if circumstances require.

What is claimed is the combination of the parts of a microscope so as to form an instrument that can be used both on the magic lantern for projecting purposes, or as a table microscope substantially as and for the purpose herein set forth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 26	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 27	Great Britain (Technical).....	50, Great Russell-st., Bloomsbury.
,, 28	Burnley	Bank Chambers, Hargreaves-street.
,, 28	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 28	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 29	Halifax Photographic Club	Mechanics' Hall.
,, 29	Liverpool Amateur.....	Crescent Chambers, 3, Lord-street.
,, 29	Oldham	The Lyceum, Union-st., Oldham.
,, 29	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 15,—Mr. F. A. Bridge in the chair.

Results of the Hampstead outing were exhibited by Messrs. T. E. Freshwater and G. W. Atkins.

Mr. Henderson produced a stereoscopic negative by Mr. York of the gambling room at the Casino of Monaco, and pointed out that some parts of it were fuzzy and others sharp. He inquired if an explanation could be given.

Several members suggested that lens damp might have produced the effect, but Mr. Henderson was indisposed to accept the explanation.

Mr. York, however, who was present, upon being asked to state the circumstances under which the picture was taken, explained that the room was heated on the occasion, and that the cold lenses induced a condensation of moisture, which threw the picture out of focus.

The Chairman said he frequently took pictures in the Kew conservatories, and always uncapped the lens at once, and by waiting ten minutes or so the moisture that settles on it goes off.

Mr. Henderson also passed round two negatives, which he had shown on a former occasion. In one, he said, distinct traces of a reversal of the image were to be seen; in the other, the result was neither negative nor positive. He thought the former effect was caused by the saline matter in the sea atmosphere, and the remedy he employed was a bath of lithium carbonate before development.

Mr. Cowan was quite unable to see any traces of reversal in the negative referred to, and disputed the assumed property given to lithium carbonate by Mr. Henderson. It was well known, he said, that such results as those before him were produced by under-exposure and forced development. Bathing the plate in an alkaline solution before development was a well-known remedy for under-exposure.

Mr. Teape had, since the last meeting, resumed his reversal experiments, and, as suggested, had increased the exposures. Burning sixty inches of ribbon, and using a similar developer, the results were of the same character as the negatives exposed to thirty inches, while using ten feet of ribbon the results did not differ from the foregoing, except that the development was slower. With the ten-feet exposure a delicate positive image was plainly visible by both reflected and transmitted light—it had printed out, in fact; but after the developer had been on the plate for five minutes, the picture entirely disappeared; in another five minutes the negative picture began to appear. He had been asked how much wire should be burnt in order to get a developed positive, and he had said half an inch. He produced a positive which had been exposed to a quarter of an inch, twelve inches off. It was, as they could see, under-exposed, and took twenty-five minutes to develop. He thought, therefore, that half an inch would have given a fully exposed picture. The above exposures, then, on this basis, came out 120, 240, 480 times what was required to produce a positive. The developer he used was Thomas's hydroquinone, taking eleven drams of the hydroquinone solution to five of the hydrate, and adding two grains of bromide per ounce when the image appeared. Mr. Teape alluded to some recent writings of Mr. W. K. Burton's on the subject, in which that gentleman spoke of prolonging the exposure "millions of times." He (Mr. Teape) had exposed two halves of a plate to thirty inches of magnesium, and, with Mr. Burton's developer, failed to produce any sign of a reversal in fifteen minutes. With his own developer (hydroquinone), development was complete in twelve minutes.

This being a lantern night, a large number of slides were shown, in order that the members might decide which were worthy of representing the work of the Association at its forthcoming lantern night at the exhibition gallery by invitation of the Photographic Society of Great Britain. Afterwards a selection of Mr. Henderson's Monaco slides was shown, and the meeting closed. The attendance was a large one and included Mr. George Mason (Glasgow), Mr. W. H. Seaman (Chesterfield), and others.

CAMERA CLUB.

MONDAY, October 12.—Lantern exhibition. Slides were shown by Messrs. Ferrero, Matthews, Fitz-Payne, Chang, Bridger, Barton, Aby, Dr. Patterson, Major Tagart, and Major Lysaght.

On Thursday an address was delivered by Mr. Andrew Pringle, the subject being *Bacteria Photographed*. Rev. F. C. Lambert occupied the chair. Mr. PRINGLE gave a brief and popular account of bacteriology and its classifications, and illustrated his subject throughout with a large number of masterly slides.

A discussion followed, in which Dr. Patterson, Messrs. Mills, Charters White, Elder, and the Chairman took part.

On Monday, October 26, lantern slides will be shown, and on Thursday, October 29, Dr. Patterson will read a paper entitled, *Animal Photography with a Hand Camera*, illustrated with lantern slides.

THE PHOTOGRAPHIC CLUB.

ARRANGEMENTS FOR WINTER SEASON, 1891–92.—1891: October 28, Smoking Concert and Exhibition of Members' Pictures. November 4, Annual Meeting. 11, *Impurities in Photographic Chemicals*, Mr. Adolphe M. Levy. 18, Annual Dinner. 25, Monthly Lantern Meeting. December 2, *The Ferrous Oxalate Developer*. 9, *Architectural Photography*, Mr. A. G. Tagliaferro. 16, *Toning Bromide Prints*. 23, *Washing Prints*. 30, Monthly Lantern Meeting. 1892: January 6, *Photo Micrography*, Mr. T. Charters White. 13, *Glass Amongst the Ancients*, Mr. H. E. Davis. 20, *Stereoscopic Photography*, Mr. J. Nesbit. 27, Lantern and Musical Entertainment (Ladies' Night). February 3, *The Various Applications of Film Negatives*. 10, *Glass Blowing for the Laboratory*, Mr. A. Haddon. 17, *Public Exhibitions*, Mr. F. P. Cembrano, jun. 24, Monthly Lantern Meeting. March 2, *Halation*. 9, *The Oxyhydrogen Microscope*, Mr. T. E. Freshwater. 16, *Shutters*, Mr. A. S. Newman. 23, *The Quality of the Negative as Affecting the Tone of the Resulting Silver Print*. 30, Last Monthly Lantern Meeting of the Season. April 6, *Dark-room Appliances*. 13, *The Choice of Lenses*, Mr. J. Traill Taylor. 20, *Masking, Vignetting, and Printing in Clouds*. 27, *The Use and Abuse of Coloured Screens in Orthochromatic Photography*.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 6,—Mr. J. Traill Taylor (President) in the chair.

Mr. Coventon exhibited some of the late Mr. H. Cooper's prints from 1869. These were greatly admired by the members, and showed very little signs of fading.

Mr. MACKIE then gave a most exhaustive lecture on *Silver Printing on Albumenised Paper*, the history of the process, the kinds of paper used, and its preparation. The albumenising and sensitising of the paper were fully gone into. The chemical changes which take place when the paper is sensitised were graphically described on the blackboard. Mr. Mackie gave the following formulæ for salting and sensitising plain paper :—

Nelson's gelatine, No. 1	20 grains.
Chloride of ammonium..	60 ,,
Water	20 ounces.

Brushed over the paper.

Sensitising Bath.

Nitrate of silver	60 grains.
Water	1 ounce.

Liquid ammonia added drop by drop until a precipitate is formed, and then redissolved. Make this up into two parts, to one part add a few drops of nitric acid, and then mix. The after processes are the same as for albumenised paper. Mr. Mackie stated that he believed it was hardly known to what degree the character of the negative affected the tones of the finished print. In making up the toning bath it is necessary to add to the bath something which will absorb chlorine, so that the gold may be deposited upon the print or in it by the process of substitution. Most of the weak alkaline salts will effect this. It is necessary to bring the gold salt into as unstable equilibrium as possible, so that the slightest cause will make it deposit. If it is wished to use the bath directly after preparation, heat should be used to bring it in a proper condition in a short time. In mixing add two grains of gold to two ounces of hot water. A change will take place in the colour of the water. Then add the acetate, phosphate, or borax. Keep it at about seventy degrees, and dilute with the required quantity of water. Carbonate of soda must be added after diluting. Put the darkest print in the bath first, as the toning of the first is sure to be unsatisfactory. The gold, if deposited slowly, will give red tones; if quickly, blue tones. It is impossible to secure uniformity of one in a number of prints, unless the same process is carried out with all. They should be washed for the same time, and in the same quantity of water. If blue tones are required, do not wash too much; if brown tones, wash more. The fixing of the prints is more open to fault than any other process. As to permanency, a sufficiently strong bath should be used, and used for long enough. The prints should be fixed in one bath, and finished off in a fresh bath. If the prints are sufficiently fixed, so that nothing but hyposulphite of silver is left in them, then a moderate amount of washing only is necessary. Mr. Mackie then made allusion to the old sulphur toning bath, in which no gold was used.

The PRESIDENT stated that kept and fermented albumen doubtless produces a glossy surface, but a bad smell is acquired. However, Mr. Hart, in the course of his experiments, found that it is best to use only fresh albumen. The prints are more permanent, equally brilliant, and there is no smell, though the smell can be got rid of by treating the paper with a fine charcoal powder; but this was a patent process. To keep the paper, wash fairly after sensitising. It is then always ready, though insensitive. To fume it, it must be fumed. The pads of the printing frame must be saturated with ammonia. This paper gives a much richer tone after fixing, and prints a deep purple black, toning readily. In floating paper, of course no two sheets of paper are treated exactly alike, but the addition of nitrate of soda produces brilliant results with a weak silver bath. The following is a good plan for making up a carbonate toning bath :—Add the gold to full quantity of water. Stir well. Put small strip of litmus paper on the water. Add, by slow degrees, a solution of bicarbonate of soda until the litmus paper turns blue. Warm it afterwards, as it weakens, and the gold can be used up to the last atom. The heat must be kept up to the same point, or even increased as the bath weakens. Toning can be effected with this bath after fixing. An over-printed proof can be reduced in the hypo, then thoroughly washed before toning. A good test for a thoroughly fixed print is to pour boiling water upon it, when, if under-fixed, it will immediately assume a horribly, sickly, dirty yellow tint. Four ounces of hypo to the pint is a good strength for the fixing bath. The bath should be made alkaline, and a weak fixing bath is a mistake.

Mr. MACKIE gave the following good lime bath :—One grain of gold to each ounce of lime water. Place the bottle in water and bring up to boiling point. Eight ounces of water, four grains of carbonate of soda to each ounce of solution. The prints must not be washed much before toning.

The SECRETARY asked for a good plan for testing the silver strength of the combined silver and nitrate of soda bath.

The PRESIDENT said this could only be done by the volumetric process, of which he would give a demonstration another evening.

BRIXTON AND CLAPHAM CAMERA CLUB.

OCTOBER 15.—After a number of contributed slides were exhibited, Mr. Goldby, one of the members, also exhibited some slides from photographs taken with a hand camera last August in Switzerland during a walking tour. Some of the mountain and gorge scenes were magnificent. The next meeting will be held on Thursday, November 5.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

OCTOBER 16,—The President in the chair. It was the first lantern night of the season, and a selection of over 200 slides was exhibited.

ENFIELD CAMERA CLUB.

OCTOBER 14.—The new biunial lantern recently purchased for the Club was used for the first time, and several hundred slides brought by the members were exhibited.

At the next meeting, on the 28th inst., Mr. W. H. Trewartha James will read a paper on *Hand Cameras*.

PUTNEY PHOTOGRAPHIC SOCIETY.

OCTOBER 15,—Rev. L. Macdona in the chair.

Mr. T. C. HEPWORTH, F.C.S., read a paper on *Illustrated Journalism*. The lecturer commenced by explaining the production of a daily newspaper, and the important part played by photography in the production of illustrations. The pictures thrown upon the screen, which were the work of the lecturer, and to which full justice was done by the fine triple lantern lent by Mr. Steward, were heartily applauded, the first being of a two-column paper, published in December, 1679, called the *Domestick Intelligence;* another, that of *Nelson's Funeral Car*, *Times*, 1806; another, of a paper giving an account of a murder done by one Daniel Good, a resident of Putney. He then spoke of the modern wood engraving, taken from the weekly *Graphic*, describing the entire manufacture of paper—hand and machine made—from the collection of rags, esparto grass, straw, wood, &c., through the numerous stages, to the production of the finished article. He next showed views of the large paper mills at Swanley, Kent. He then described the printing and publishing of the *Daily Graphic*, showing pictures of the two types of printing machines, capable of turning out 10,000 copies per hour, drums of paper three and a half miles in length passing through which occupied but fourteen minutes, and finally traced the progress of journalism down to the present day, showing sketches received from war correspondents during the late siege of Paris and the Soudan War.

At the conclusion of this most interesting lecture a hearty vote of thanks was proposed by Dr. W. J. Sheppard, seconded by Mr. E. W. Purcell.

Mr. Steward's representative then exhibited some fine slides, amongst which *The Wreck*, with lightning effect, *Westminster Abbey*, and *Bridge of Sighs*, with day, night, and moonlight effects, call for special comment.

The "Club" single lantern and other apparatus was on view.

Next meeting, Saturday, October 31, *Bromide Demonstration*, Fry Manufacturing Co.

RICHMOND CAMERA CLUB.

THE Annual General Meeting took place on the 16th inst. Mr. F. P. Cembrano, jun., in the chair.

The usual business with regard to passing the balance-sheet, &c., was transacted, and the following officers were duly elected for the ensuing year :—*President :* F. P. Cembrano, jun.—*Committee :* R. L. Kidd, C. H. Davis, E. G. Richardson, Arthur C. Hunter, C. E. Hodgkin.—*Hon. Librarian :* G. Ardaseer.—*Hon. Secretary :* P. Ennis, 28, Halford-road, Richmond, Surrey.

A vote of thanks was unanimously accorded to the late Secretary (Mr. E. G. Richardson) for his valuable services during the past year.

ANNUAL REPORT.

The Committee have pleasure in presenting this, the first Annual Report of the Club. The Club was formed on July 7, 1890, under the name of "The Richmond Amateur Photographic Society," which at a Special General Meeting was altered to "The Richmond Camera Club," and the rule excluding professional photographers was rescinded. The meetings of the Club, which were formerly held fortnightly, are now held regularly every week, having a

fair average attendance. Demonstrations of several photographic processes and appliances have taken place at intervals, as well as exhibitions of lantern slides, and we also have to report that the lecture given by the President of the Club (Major J. Fortuné Nott) in aid of the funds of the Richmond Hospital resulted in a net balance of 4*l*. It is proposed to hold the first annual dinner on Monday, November 23, at the Greyhound Hotel, Richmond, and a conversazione early in 1892. The Committee think that, in the general interests of the Club, members should volunteer to read papers or give demonstrations. Fortnightly outings were held during the season, but the attendance was meagre, due perhaps to the unfavourable weather.

The meeting was then converted into a Special General Meeting to consider various alterations in the rules, but was adjourned until October 30.

PRESTON CAMERA CLUB.

At the monthly meeting, held on Thursday last, Mr. Worden read a short paper on *Development*, comparing the qualities of pyro in relation to other developers. He strongly recommended adhesion to pyro, and showed a quantity of pyro-developed negatives, which were considered very clear and free from stain. After the discussion, a few plates, which had been exposed at the Club outing on the previous Saturday afternoon, were developed satisfactorily.

At the next monthly meeting a paper will be read on *Printing and Toning*.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

October 16,—Mr. H. M. Smith, of the Eastman Company, gave a demonstration and exhibition of lantern slides made from Kodak negatives. The lecturer began by describing the Kodak camera, which the Company are now making to take 7 × 5 pictures. The camera is so simple in mechanism as to be worked by the merest tyro, and, withal, so light to carry and manipulate as to be largely used by ladies. The slides were then exhibited, and shown to be equal in merit to any taken from glass negatives.

MIDLAND CAMERA CLUB.

October 16,—Dr. Hall Edwards in the chair.

The rules drafted out by the Provisional Committee were adopted. The election of officers resulted as follows :—*President :* Hall Edwards, L.R.C.P.—*Vice-President :* Rev. J. Henry, F.R.G.S.—*Committee :* Messrs. H. R. Leech, M.R.C.S., W. W. J. Nicol, D.Sc., Edward Morton, Dr. Ratcliffe, and Rowland White.—*Hon. Treasurer :* S. G. Mason.—*Hon. Secretary :* Walter D. Welford. At present the rooms are not fully furnished, the dark room requires filling up, &c., but by means of a private loan fund which has been inaugurated the Committee will be able to very quickly get everything into thorough working order without trenching upon the current year's receipts. The rooms, however, are open at all hours to the inspection or for the use of members.

TORQUAY PHOTOGRAPHIC ASSOCIATION.

Second annual meeting held Tuesday, October 20, for election of officers and Committee. No. of members, 53. Meeting nights arranged for the third Wednesday of the month. Hon. Secretary's address, George Edwards, Walnut Lodge, Adelston, Torquay.

AMATEUR PHOTOGRAPHERS' ASSOCIATION FOR ABERDEENSHIRE.

On Tuesday, October 13, a meeting of amateur photographers was held in Aberdeen with a view to forming an Association. A Society of amateurs did exist in the city some years ago, but somehow it went suddenly out. Since then the number of amateurs in Aberdeen has largely increased, and for a considerable time the want of an Association has been greatly felt. Smaller towns, containing fewer amateurs, having thriving Associations, it was recognised that, if a Society was but once thoroughly organized and set going in Aberdeen, a prosperous and useful career would, under present conditions, be ensured to it. Tuesday week night's meeting was in every respect a most promising one. Despite the inclemency of the weather, there was a large attendance, and the formation of the Society was heartily goine into. It was resolved that the Society should be called "The Aberdeenshire Amateur Photographers' Society," and the annual subscription was fixed at 2*s*. 6*d*. It was brought under notice that there were many lady amateurs in the city and county, and it was unanimously agreed that they should be cordially invited to join the Society. Mr. G. Brodie, 2, Powis-terrace, who has taken a leading part in the movement for the establishment of the Society, was appointed Secretary and Treasurer, and Messrs. James Main, James Clark, W. G. Lindsay, and Alexander Mackilligan were appointed a Committee to frame the objects of the Society, and generally to indicate on what lines it should be worked. It was decided that the Society should meet once a month in the meantime, it being understood, however, that the formal business meetings should be varied by social entertainments, in which the resources of photography would be brought into play, and that in the summer season numerous outings should be arranged. It is also in view to hold various interesting competitions, and in every way possible to stimulate progress in photographic art.

Correspondence.

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

THE DISCOVERER OF THE GELATINO-BROMIDE PROCESS.

To the Editor.

Sir,—No one can recognise more fully than ourselves the credit due to Dr. Maddox as the pioneer of our present-day photography, and we desire to place on record, in a most practical way, our appreciation of his great merits. We therefore hold a cheque for 100*l*., at the disposal of any committee that may be formed to raise the proposed testimonial.

We are in the habit of raising statues and stained windows to our dead worthies, but to us it seems much more praiseworthy and practical to offer to any one a substantial recognition of his merits whilst he is still with us. Such a course is always most gratifying and acceptable to the recipient, and in Dr. Maddox's case will be doubly so. Therefore, we hope to see a subscription list worthy of its object.—We are, yours, &c.,

The Britannia Works Company.

Ilford, London, E., October 16, 1891.

MR. HENDERSON'S DEMONSTRATION.

To the Editor.

Sir,—In reply to your correspondents' letters, which appeared in your last issue *re* "demonstration formulæ," I may mention that my remarks were more intended to enunciate a principle than to give a definite formula. A definite formula may be very indefinite to some workers, yet quite sufficient to a plate-maker. Regarding the amount of bromide, it is well known that the equivalent is sufficient, but an excess is always recommended. In all my experiments I have found that three parts of bromide potassium to four of silver is a good proportion. Of course, if the bromide contained a large admixture of, say, carbonate of potassium, the above proportions might not be sufficient; it is well to err on the safe side. The same rule will hold good with regard to the amount of carbonate of potassium; but we must bear in mind that it contains a large and variable percentage of water. A good plan is to make a solution of carbonate of potassium, and add it slowly to the silver solution, until it ceases to precipitate carbonate of silver; then the whole can be mixed to gelatino-bromide minus iodide. When the bromide is formed add one grain of iodide of potassium to every 100 of nitrate of silver used, dissolved in a small quantity of water. The quantity of iodide may be increased to meet the requirements of work.

It is quite impossible for me to lay down a hard-and-fast rule regarding the amount of water required to melt gelatine. A gelatine of medium hardness will take up six times its weight in water, and it can easily be melted with that quantity. I have not found any difficulty in coating plates with a non-alcoholic emulsion. Much depends on the state of the glass. A good plan is to lubricate the cleaned glass with a solution containing—

Glycerine	1 part.
Alcohol	50 parts.
Water	50 ,,

This has to be rubbed off, which will leave a homœopathic quantity on the surface, which, if the emulsion is not too hot, should flow like collodion. I formerly used a spoon for coating. After a little time I abandoned its use; a little practice soon made me pretty perfect without the measure. The nitrate of potassium, bromide, and alum need not be added; but, if greater speed and density is required, it may be obtained by its addition. I presume your readers understand that it is to the finished emulsion that these substances are added. Nelson's No. 1 gelatine may be used, as surmised by your correspondent; it is a good, pure gelatine. The more rapid the bromide of silver, the more easily it is affected by light, air, or damp. If these conditions are carefully excluded, there is no reason why plates should not keep indefinitely. My idea is that bromide of silver, in its more exalted or sensitive form, is on the verge of, shall I say, oxidation; and, if any substance be added which will prevent this, we make a decided advance. Free bromide and nitrate of ammonia will effect this. I have frequently, and in my practice, added large quantities of nitrate of ammonia (needle crystals) to the emulsion when ripening it, and I have boiled emulsion with large quantities of carbonate of ammonia with very successful results. Substances should be added which will help to destroy the gelatine before the fogging stage is reached. Of course, I am now alluding to the old or boiling method, or where the maker has not got a centrifugal separator.

Had I the inclination to write my experiences, extending over something like ten years' hard labour, I could fill your pages weekly with how not to do it.—I am, yours, &c., A. L. Henderson.

Lewisham High-road, S.E., October 17, 1891.

A REMARKABLE PHOTOGRAPH.

To the Editor.

Sir,—I am in posseesion of a curiosity which may interest you, so am taking the liberty of sending you a description of it, hoping it may be of some service to the scientific world.

The curiosity is an ordinary fixed glass (binocular), on one of the lenses of which is a photograph representing a mountain, at the foot of which it was found, and where it had evidently been lost some months previously. The following is an account of the find :—

Some four years ago a picnic party visited the "Fadanna Falls," near the "Great Winterberg," in the Parka District, Cape Colony. While roaming about, one of the party, a young lady, trod on the glass, and, on picking it up, was amazed to find a perfect picture of the mountain portrayed on the glass, the only difference being that the picture showed the mountain as covered with snow. The preceding winter had been a very

severe one, and the mountain had been covered with snow, off and on, for three months, during which time the glass had evidently been lying facing the mountain, as the leather covering was all rotted off, and the wooden thumb piece for adjusting the focus was cracked.

All who have seen the photograph and know the mountain are agreed that it is a perfect likeness of the mountain.

The upper part of the photograph is somewhat faded now, and only shows the outline of the mountain. This the owner attributes to the glass having been inadvertently left out in a thunderstorm one night and in the blazing sun of a hot summer's day following. Atmospheric causes evidently impressed the likeness of the mountain on the lens, and the same causes may have partially obliterated it.

I have been induced by a friend who is an amateur photographer to write you this description, as he thinks it may be the means of throwing some light on the difficulty of photographing colours.

Should it be desirable to have the glass for examination, I have it in my possession, and have the permission of the owner to make any use of it I can, provided it is ultimately returned to her.

Hoping that you will favour me with your opinion on the supposed "wonder,"—I am, yours, &c., E. Ross Townsend.

Deeds Office, Vryburg, British Bechuanaland, September 28, 1891.

THE PHOTOGRAPHIC EXHIBITION.

To the Editor.

Sir,—May I ask the favour of being permitted to correct an error that has crept into the criticism of my marine pictures in the Exhibition, Pall Mall, and appearing in your issue of to-day.

On page 664, the following appears: No. 194, W. Clement-Williams. Three *Carbon Enlargements, &c.* The pictures in question, *are not enlargements*, but are from *direct untouched negatives*, 20 × 16. That your reviewer should have fallen into such a mistake is quite pardonable; indeed, it would not have surprised me if he had missed seeing them altogether, being placed as they are near the floor. I cannot help thinking it would be much kinder to exhibitors, if there is not proper wall space for all, to omit some of the works. I would willingly have paid the shilling a foot charged to have been absent than as it is.—I am, yours, &c., W. Clement-Williams.

Halifax, York, Oct. 16, 1891.

THE PHOTOGRAPHIC CLUB.

To the Editor.

Sir,—As an old member of the club, I should like to suggest to the Committee that, as through force of circumstances I am seldom if ever able to attend any of the weekly meetings, the publication of a report in the photographic journals of what takes place at those meetings would be a great boon, which would probably be much appreciated by many others as well as myself. As things stand at present, one has to wait until the end of the year, when the report is published, to know what has been said on the many interesting subjects which are discussed, and this, I think, is a hardship to the absentees. But, besides the absentee members of the Club, photographers and photography generally would, I am sure, be greatly benefited by the undoubtedly good and practical discussions which take place. Hoping that the Club will see fit to effect this change, which I believe would be greatly welcome to a large majority of the members,—I am, yours, &c., A Suburban Member of the

London, W., October 17, 1891. Photographic Club.

ABOLITION OF HYPO.

To the Editor.

Sir,—In a leading article of your paper of October 16, you give expression to what is the universal wish of all photographers, the abolition of hypo for fixing prints. In your last Photographic Almanac (p. 719) it is mentioned that Liesegang had discovered that chloride of magnesium may be employed with advantage in fixing prints instead of hypo. Has any attempt been made to utilise this discovery? The price of magnesium chloride is, I believe, much higher than hypo, but not sufficient to prevent its use by those who wish to produce permanent pictures, and it probably might be produced cheaper if there was a demand. Would not some of your chemical readers investigate the matter and render a service to those who still have a liking for silver prints but would like them more permanent?—I am, yours, &c.,

Morristown Lattin, Naas, October 18, 1891. G. Mansfield.

MEDICAL PHOTOGRAPHY.

To the Editor.

Sir,—Two years ago Dr. Johnston, of Birkenhead, asked me to visit the Children's Hospital, to photograph some interesting cases that appeared in that institution. I did this as an amateur, but felt the work had its drawback, and gave it up for more genial work. Nevertheless, I felt it ought to be pursued in the cause of poor, suffering humanity. Immediately after this I got a note from Dr. Paul, of Liverpool, who, along with Dr. Banks, has made the Royal Infirmary of Liverpool one of the best appointed institutions, in a surgical point of view, in this country, if not the world, for I speak with the authority of Dr. William Gardner, of Adelaide, that such is undoubtedly the fact. Dr. Gardner was sent by the Australian Government to visit and report the condition and state of the hospitals of India, and is now visiting the various hospitals of Scotland, England, and the Continent of Europe.

From an interview I had with him he also urges the necessity of establishing a system of surgical photography. Dr. Paul, of Liverpool, is a practical photographer of no mean repute. He thinks, like many others, that every hospital should possess a dark room. This may be all very well in his case; but such is the absorbing nature of the medical profession that it leaves no time for the prosecution of the ever-expanding help which photography presents.

My plan to meet this difficulty is to look for a hand camera of great *illuminative power*, with *thorough* control over the focussing, that the operator may come within five feet of his object. To my mind, the hand camera with the twin lenses meets this requirement, as made by Ross & Co., London. Sharpness of definition is of paramount importance in this case, because medical men would only have to expose and hand the result to a professional photographer to get a print and a slide, so as to convey to the medical world the best mode of grappling with disease and overcoming or alleviating its baneful effects.—I am, yours, &c.,

October 20, 1891. James Alexander Forrest.

Exchange Column.

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

Studio camera, eight and a half inches square, sliding body, and one single slide with carrier; will exchange for grass mat, child's head-rest. or studio table—Address, W. J. Bennetts, Beacon, Camborne.

Answers to Correspondents.

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to "*The Editor,*" 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

*** *Communications relating to Advertisements and general business affairs must be addressed to "*H. Greenwood & Co.,*" 2, York-street, Covent Garden, London, W.C.*

Photograph Registered:—

John Williams, Rhyl.—*Photograph of banner of Rhyl Church Congress*, 1891.

Artist.—Moisten the surface of the prints.

F. J. A.—Thanks; but it is hardly suitable for our columns.

B. O.—Iodide of potassium is practically insoluble in alcohol.

J. R. G.—Too weak alcohol or an unsuitable pyroxyline would cause the crapy markings on the slide sent.

X. L.—In our opinion, so long as you pay the rent of the studio you are within your rights in keeping it closed for a time.

An Amateur.—Such a variety of "flare" is not due to the lens, but in all probability to light on the plate before exposure.

Mora.—We do not know of any electrician who makes a speciality of fitting studios with electric light for photographic purposes.

Amateur (Exeter).—We cannot refer you to any publication in which is described the way to make an efficient camera and three dark slides for fifteen shillings, including a good lens.

S. Giles.—We are glad we have helped you out of a difficulty. Such common things, in every-day practice, as the inside of the lens tube and the camera getting polished by constant cleaning, is often overlooked.

Science.—Carbutt's flexible films are supplied either on transparent or matt-surface celluloid. The latter are doubtless what you require. They are sold by the London Stereoscopic Company. In ordering, specify that the matt-surface ones are required.

Y. Z.—Better send us a few examples of the colouring you refer to. If it is, as you infer, foreign work, we possibly have not seen it. Photographs may be tinted with some of the coal-tar colours, and this may be the case with the pictures to which you refer.

P. O'BRIAN.—For expedition, combined with cheapness, in making enlargements, there is nothing that will compare with bromide paper. With care, the results will be practically permanent, though they cannot be said to be as stable as those in platinum or carbon. If, however, they are carelessly produced, they may get yellow in a comparatively short time, particularly if kept under adverse conditions.

J. C. writes: "A few days ago I purchased a large cloud negative, from which I have taken only one print, It is evidently waxed or greased in some way, and this the print absorbed. There are now several opaque marks on the negative, so that it is practically useless. I have tried ironing it with a hot iron without any effect. I shall feel much obliged if you can inform me, through the JOURNAL, how I must proceed to restore the negative."—Not knowing how the negative was made transparent, or by what method it was produced, or by whom, we regret we can afford no assistance beyond recommending that our correspondent should communicate with the producer.

R. S. says, "I have orthochromatised several lots of plates by different formulæ, and dried them in my dark room, the window of which I consider perfectly safe. On using the plates they show more or less fog—more with those dried opposite the window, and less with those more shielded from it. The window is perfectly safe with the most rapid plates to be obtained. Is a different light required for orthochromatic plates than ordinary?"—If the plates are rendered sensitive to the yellow or red rays, then they should not be subjected to such light. The best plan in future, after the plates are treated, will be to make the room perfectly dark while they are drying, and in the development to subject them to as little light, whatever be its character, as possible until the image is well out.

C. WILKINSON says, "Last month I made some varnish with methylated spirit shellac (white) and gum elemi. This latter I added to destroy the brittleness of the shellac, and I used one-third of elemi to two-thirds of the lac. It gave a beautiful surface, but with some very dense negatives, put in the sun to print, the paper in every case stuck and cannot be removed without tearing off the gelatine film. What is the cause of the sticking, and can the negatives be saved?"—In reply, elemi is a very undesirable resin to add to varnish, inasmuch as it easily softens by heat, and is in itself, when hardened, very brittle. Probably the negatives may be saved by soaking them in methylated spirit for an hour or two, and cautiously separating the paper, and then washing off the softened varnish with fresh spirit.

H. T. AUSTIN says: "As a twenty-six years' subscriber and reader of your esteemed JOURNAL, I write, for the first time, to ask your advice, for which I shall be thankful, and shall anxiously wait for next Friday's JOURNAL, as I know it is against your rules to answer by post, In the middle of August last I advertised in the BRITISH JOURNAL OF PHOTOGRAPHY for a half-plate camera. Of several offers I chose one from ——, of Holloway. I enclose three letters from him. I think the letters will explain how matters stand. Although I sent good references, I was induced to send 20s. on account. Since then I have written three times, and can get neither camera, cash, nor answer; yet his letters seem all straightforward. Will you kindly advise me what to do?"—Communicate with the local superintendent of police.

LANCELOT L. HASLOPE asks: "Can you give me any information on 'travelling photography?' I am going in January for a six months' tour in Italy, returning home through France, principally for the purpose of photographing with a twin lens artist's camera. The points I want information about are: Custom-houses, and how to deal with them; how to manage the developer and developing; what is the most convenient developer to use (I use hydroquinone at home)—I shall only develop occasionally just to be sure of my exposures; how best to pack and carry the exposed plates; cost of the use of dark rooms, and of developing; best method of changing plates; general hints on subjects, &c.; where permission to photograph is required. I think an article on the subject, written by some one who is used to photographing abroad, giving his practical experience, would be highly interesting to a good many besides myself."

ETHEL MAY writes: "I have had some serious difficulties lately with aristotype and Obernetter papers, and should be glad of your advice. The papers I have are about eighteen months old, and, although slightly browned, give very good prints; but it has been impossible to me to finish them off with the high gloss by drying them on the usual polished metal plate. They invariably stick to it, and, far from dropping off when dry, as I am told in books they will, they stick so tight that it is impossible to pull them off, except in shreds. Can you tell me the reason of this, and can it come from the age of the paper? The prints were toned and fixed in the usual sulphocyanide and gold bath, and well washed afterwards. I remember, on first using the aristotype and Obernetter papers, their detachment from the metal or talced glass was perfectly easy and successful. If you could suggest a remedy, I should be much obliged."—A weak solution of wax in benzine, rubbed over the plate and allowed to dry, will ensure the prints leaving the plate.

CHAS. PICKFORD (Cawnpore).—There are different combination printing frames now in the market that will fulfil your requirements. These have all been described in our columns as they have been introduced. Messrs. Marion & Co. supply Cowan's form, Mr. Prestwich also has a combination printing frame for transparencies or opals. Either of these may be, with a little modification, utilised for your purpose. Various methods of combination printing, and making negatives from combined transparencies, have also been fully described in our paper. We regret we cannot afford space in this column to reproduce articles that may be found by referring to the last volume or two. With regard to direct enlargements always being referred to as on bromide paper only, "as if this was the only method by which they can be obtained," the reply is that they can also be made on albumenised paper, or carbon tissue if the solar camera be employed. This can well be done in India, although the light is too variable here. Enlarging through coloured glass would much prolong the exposure, without any compensating advantage.

J. POTTS says: "I have an optical lantern with four-inch condenser of two plano convex lenses and objective of six and a half inches equivalent focus (Petzval form); would you kindly tell me what size and focus of meniscus lens I could put between the lime jet and condenser to improve the illumination on screen."—Try a plano-convex of three and a half inches diameter and about eight inches focus.

THE LANTERN SOCIETY.—Next meeting, October 26, at eight p.m. New oil lamp, by Mr. Stocks.

HASTINGS AND ST. LEONARDS' PHOTOGRAPHIC SOCIETY.—Friday, October 30, demonstration by Mr. Howson, of the Britannia Works Company, *On Printing Out Paper and Lantern Slides.*

THE PHOTOGRAPHIC CLUB.—Wednesday, October 28, smoking concert and exhibition of members' pictures, to inaugurate their new rooms. November 4, Annual General Meeting.

HACKNEY PHOTOGRAPHIC SOCIETY.—Sir Charles Russell opened the exhibition of this Society on Wednesday last. Up to the moment of going to press the Judges' awards have not been issued. The exhibition is a large and interesting one.

IN our notice of the Glasgow Photographic Exhibition we referred to frames 82 and 83 as containing six cabinet pictures mounted in optical contact. Mr. G. Comrie Smith, the exhibitor, desires us to state that they are enamelled prints done in the usual way. We willingly make the required correction.

COMMENCING to-night, Friday, the 23rd inst., Mr. J. P. Gibson delivers a series of lantern lectures in the Art Gallery, Newcastle-on-Tyne, the subject of the first being *Northumberland, the Castled Shire. The Tyne and Tyneside* will form the subject of the second, on November 6, and the *Roman Wall* of the third, on November 20. Upwards of 120 pictures will be shown on each occasion.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The following are the lantern arrangements at the Society's exhibition, 5A Pall Mall East, for the coming week:—October 24, Mr. B. Edwards, on a *Tour in New Zealand.* 26, Lantern display, by the Field Club. 28, Mr. J. R. Wright, on *Our Village.* 29, Lantern slides, by Messrs. E. G. Lee and J. T. Field. 31, Lantern display, by the Photographic Club. The next technical meeting will be held at the Gallery on Tuesday, October 27, at eight p.m., when the apparatus in the exhibition will be explained.

PAISLEY PHOTOGRAPHIC SOCIETY.—Fixtures for November: Tuesday, 3, *Lantern Demonstration;* particulars in separate circular. *Course of Lessons on Photography,* by Mr. James Mure:—Tuesday, 10, Negative Making—Tools Used—Lens, Camera, and Plates (Quick and Slow)—Qualities and Defects—Lighting the Subject—Focussing, Rising and Falling Fronts—Exposing the Plate—Stops, &c. Tuesday, 17, Chemicals Used—Pyro—Alkali—Bromide—Their Powers in the Developer—Other Developers. Illustrated practically. Tuesday, 24, Intensifying—Reducing—Varnishing—Getting the Negative Ready for Printing by Means of Retouching—Painting Out Spots—Blocking Out Skies, &c.

MR. SCHOFIELD'S intensification formula, given before the members of the Manchester Photographic Society on October 8, should read as follows:—"Soak the plate in a saturated solution of alum to which had been added about ten drops of saturated solution of citric acid (three-quarters of an ounce acid, water one ounce) to the ounce of solution required. Let this remain on the plate about ten minutes, then add two grains of pyro and ten drops of a solution of silver 100 grains to the ounce, adding more silver and acid as required. The solution will go a clear red and negatives appear stained and dirty, but will come out right after washing and fixing." The lantern was supplied by Mr. Chapman at a nominal charge. The Treasurer's name should be W. G. Coote; the brass tubular lime box was brought to the meeting by Mr. Wrigley, and not by Mr. "Whiteley." The name of Mr. J. T. Hughes should be substituted for that of Mr. Woolley in the lantern section. Will Secretaries of Societies always endeavour to write plainly?

OUR FORTHCOMING ALMANAC.

The Editor will feel obliged to those friends who intend contributing from their practical experience, research, or experiments to the ALMANAC, *and, through it, to their brethren all over the world, and who have not yet sent them in, if they would kindly forward their articles or hints, no matter how brief, by the 30th inst.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1643. Vol. XXXVIII.—OCTOBER 30, 1891.

COATING GELATINE PLATES WITHOUT ALCOHOL.

, as seems not improbable, the recently promulgated "order" ating to methylated spirit is to deprive emulsion-makers of e services of that hitherto useful ally, it behoves them, no s than photographers generally, to bestir themselves to find neans of filling the gap thus made. It is not worth arguing re whether the "new" spirit is applicable to emulsion pur-ses or not. Without trying it, the probabilities are so dead ainst it that its non-utility may be accepted as a foregone nclusion. Nor need we seriously consider the point as to ether alcohol is or is not a necessary addition to the ulsion, since, while some practical workers dispense with its e, others equally experienced prefer to avail themselves of natever advantages it may confer.

As a matter of fact, so far as the spreading of the emulsion glass is concerned, the use of alcohol may be altogether dis-nsed with if the necessary manipulative skill is possessed; t, on the other hand, setting entirely aside the mechanical vantages in coating ensuing upon its employment, many ulsion-workers of experience claim that alcohol confers certain alities on the sensitive film that the latter does not possess thout it. For instance, going as far back as seventeen or hteen years ago, it was claimed by one of the earliest experi-ntalists with the gelatino-bromide process that, by the addi-n of a certain proportion of alcohol, a much finer condition of ulsification was obtained, and other later workers have eged that greater density and clearness were obtained by its than without it. The improvements and modifications in e methods of working that have been introduced of late years ve, no doubt, so much altered the conditions that these vantages have ceased to exist as such, and, chemically speak-, we may consider ourselves independent of alcohol.

But, besides the effect the alcohol has on the fluent proper-s of the emulsion, there is another which must not be over-ked; that is, its accelerating action on the drying of the n after coating. To the large manufacturers, especially those o use machinery for coating, with the concomitant aids to id setting and drying, the advantages derivable from the of alcohol in this, as in other respects, are negligeable ns; but not so to the amateur or professional photographer o prepares his own plates on a small scale, and whose c ing and drying arrangements are not of the highest order. him ease and rapidity of coating, but more especially r dity and uniformity of drying, are of the utmost import-a e, as, in the majority of cases, the coating has to be done in o moments snatched at slack intervals, or "after the day's w k is done;" while the plates so coated are, perhaps, ex-p ed to be ready to do duty when required on the following n ning. Despatch, and, above all, reliability are, therefore, t qualities to be sought after.

As has been already stated, the coating may be performed without the assistance of alcohol at all, but it requires the skill attained by experience; and, moreover, both emulsion and glass must be in the most favourable condition, or the loss of time and material will be considerable. To the old collodion hand the operation of coating gelatine plates, though at first more trying, does not present the difficulties it does to the beginner at coating. The hand and eye are already trained to the job, and have only to accustom themselves to the vagaries of a less fluent menstruum than they have hitherto been used to. The emulsion must be at the proper temperature—neither too high nor too low—and the glass just sufficiently warmed to prevent chilling the emulsion, and so causing it to thicken prematurely. If the emulsion be too hot, it possesses a mercurial fluency that causes it to dodge about in all directions on the slightest movement of the plate; while, if the temperature be too low, the gelatine, already nearly at the setting point, will be further chilled by contact with the atmosphere, and refuse to flow from sheer over-viscosity.

Under such circumstances any devices, either mechanical or chemical, that will help to make the gelatine "take" the glass and flow easily and smoothly must be welcomed even by the expert, and in commercial establishments, where hand coating still prevails, such expedients are always kept at hand, though they may be comparatively seldom used. With the practice gained in the commercial coating-room a good hand will work at the rate of six or seven dozen whole plates in an hour with scarcely the loss of a drop of emulsion, or the use of glass rod, or any other help. Indeed, the exigencies of time will permit of neither.

The amateur, or small worker, is fortunately not compelled to labour at such high pressure. It will suffice for him if he can coat two or three dozen plates in the hour if they are well done. For him the glass rod constitutes all the aid needful if he possess a reasonable amount of coating skill and the working conditions are satisfactory. To pour the emulsion on to the glass, and, by means of the rod, to coax it over those parts where it shows a reluctance to flow, is a process soon learnt; and, though the handling of the rod is a considerable hindrance to rapidity of coating, it is probable that the beginner will find he can complete a far greater task of work in a given time by its aid than without. With a little method, too, the loss of time need amount to very little.

It is a good plan, adopted by many, to coat from one vessel and to drain the surplus emulsion into a second one, to be re-filtered before being again applied to the plates. In such circumstances the surplus emulsion vessel becomes the natural resting-place for the rod when not in actual use, and it is but one operation to put down the coating vessel and take up the rod, which is returned to its resting-place while the plate is

being drained. Some employ a straight rod, but it will be found far more convenient if an inch or two from the end it is bent at an angle of about 30° with what may be termed the handle portion. Some operators employ a piece of glass rod or tube bent in the form of a triangle, but we fail utterly in recognising the advantage or even the convenience of this. Others, who use a spoon for the purpose of measuring the quantity of emulsion to be applied to the plate, naturally employ the same means for spreading it; while, personally, we never resort to any more artificial means than the tip of the finger when necessary, but it must be clean. This has the advantage over the rod that it has not to be picked up and laid down again each time it is required for use.

Another class of expedients consists in preparing the surface of the glass in order to make the emulsion flow smoothly, but these possess the obvious disadvantage of involving a separate operation, while the application to the glass of any preliminary coating opens the way to, if it does not actually increase, the chance of markings and irregularities of the film.

On the Continent, a preliminary coating of water, glass, or silicate of potash has been used, it is said, with advantage whilst among other simpler applications is a solution of loaf sugar. A better seems to be that mentioned by Mr. Henderson last week, composed of glycerine, alcohol, and water, though in the not distant future it will have to be simply glycerine and water. How far such treatment may affect the cohesion of the film to the glass we are unable to say, never having used such methods; but there seems a risk of lessening the adhesion, and so promoting frilling or blistering.

The trouble of the extra operation is reduced to a minimum in another class of methods by passing the glass the moment before coating over a roller or straight edge covered with flannel or other absorbent material saturated with any of the solutions employed for the purpose, or, better still, with the emulsion itself, in any case, of course, only the thinnest possible layer of the preliminary coating being left. Breathing on the plate is another plan that has been recommended; but, unfortunately, it is difficult to cover a *warm* plate with an even layer of vapour and to keep it there until it has served its purpose; and, moreover, the breath or vapour clears away from the *edges* of the glass first, the very portions where its good services are most required.

With regard to the replacing of alcohol in its capacity of a drier of the film, we fear little that is practical can be suggested, except, of course, the adoption of more perfect ventilating arrangements. The proportion of water in the emulsion may, it is true, in many cases be reduced to a slight extent; but beyond a certain point the increased difficulties in coating would more than counterbalance any slight gain in rapidity of drying, and, at the same time, the evenness and quality of the film would stand little chance of improvement.

If the new "order" is to be indeed vigorously enforced, it will be in every sense advisable, on the part of those who are now taking part in the "revival" in emulsion-making, to form their plans accordingly, either by learning to dispense with alcohol altogether, or by the adoption of one or other of the methods sketched above.

PERSPECTIVE AND THE PHOTOGRAPH.

In a lecture on this subject given recently at the Polytechnic, Mr. W. E. Debenham put forward views which will undoubtedly be regarded as heretical by most artists and by many photographers; yet we must acknowledge that the difficulties of arguing the case, so as to bring it outside the lecturer's conten tions, seem to become increasingly difficult as the subject i more thoroughly examined.

Mr. Debenham took as the text of his discourse a representa tion of a vase, as shown in a photograph of a drawing-room the photograph having been taken so as to include a wide angl Subjoined (fig. 1) is an outline of the vase as represented i the photograph, which Mr. Debenham projected upon the screen. The two straight lines show the position of the vase in relation to the course of the picture. He then proceeded to discuss the figure by which an ordinary non-distorting lens will represent a sphere, and he showed that such a lens will only represent a sphere by a figure having a circular outline when the sphere is in the axial line of the objective. By a non-distorting lens is to be understood an instrument which will correctly copy a map or plan; and, for our present purposes, we may regard a pin-hole as the equivalent of such a lens.

Fig 1.

In fig. 2, let A, B, and C be three spheres looked at by an ey or by a pin-hole, at E, and such rays from these spheres as c reach the eye at E form three conical groups, shown by t

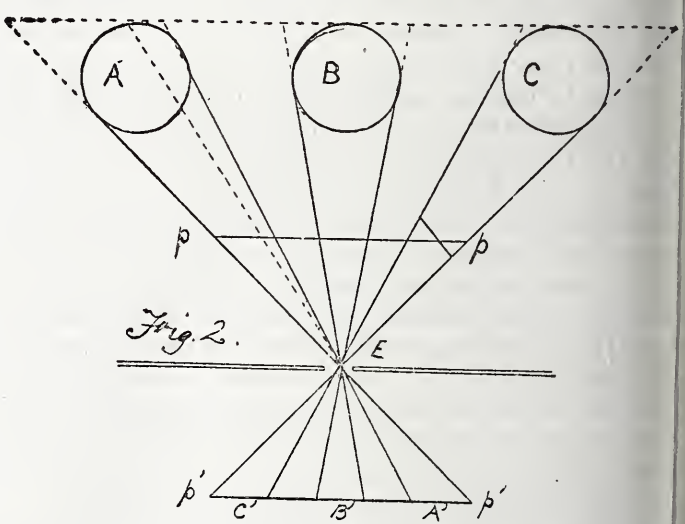
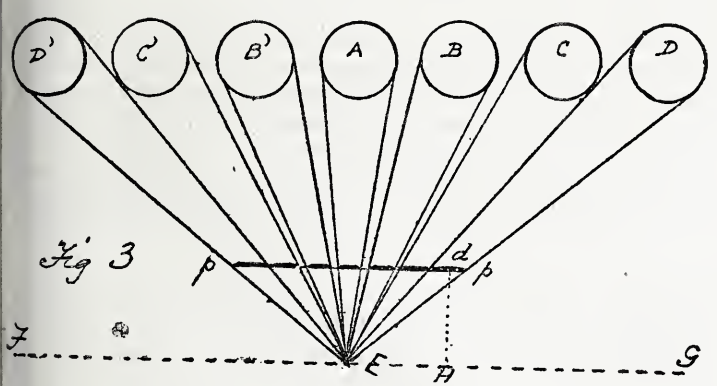


Fig. 2.

solid lines. The conical group from B is cut by the pict e plane $p\ p$ (or by the sensitive plate $p'p'$) at right angles to s axis, and the image formed will consequently have a ro d outline. In the case, however, of the rays from the margi l spheres A and C, the cones are cut obliquely by the perspect e picture plane $p\ p$ and by the plate $p'p'$, so that the section ll be an ellipse.

Mr. Debenham pointed out that artists have a frequ t habit—indeed, the practice is general—of so altering the p r-spective as to show all of a row of spheres parallel to the c ture plane as round and of the same size. To do this certai y must involve the incorrect drawing of some part of the ba k-ground, a matter Mr. Debenham illustrated by showin a photograph of a number of spheres set on a background, is background being ruled in squares. Our diagram (fig. 2) illustrates this matter, and for the present we will consi er

the horizontal element only. Considering, therefore, a horizontal section, we may point out that, if the representation of the sphere A be reduced so as to correspond to that of B, some of the background which is altogether invisible to the eye at E, and which could not possibly be represented on the photographic plate $p'p'$, must be shown, this being illustrated by the dotted line. If, on the other hand, the central sphere is shown as corresponding in size to the marginal spheres, much of the background visible to the eye will be covered. Perhaps, for the purpose of illustrating the above point, it may be well to assume that A, B, and C, in fig. 2, represent cylindrical, or nearly cylindrical columns, as those of a Grecian temple, while the row of dots behind them may represent the background. It then becomes quite obvious that, unless the side columns are represented in the picture as wider than the central column, some falseness must be introduced into the background; and, as a further illustration, one may suppose the columns of a temple standing rather close together, and it will now be found that, owing to the widening of the marginal columns on the picture plane, a certain distance from the middle positions will be arrived at where no background will be seen between the columns, as, for example, between



and D, or C′ and D′; or, if the circles in fig. 3 be taken as representing spheres, the representation of D must be an ellipse with a major axis nearly one-third longer than the minor axis, at any rate if the background is to be shown as the eye situated at E would see it. When an artist represents a row of spheres, and shows each as having a circular outline, he loses grip of the central idea of perspective—vision from a definite point—and he shows the spheres as they would be successively seen by a spectator passing in front of the scene along the dotted line F G.

It may, perhaps, be contended that the representation of a sphere by a figure with an eliptical outline is an absurdity, but a little consideration will show this not to be the case if the ellipse on the canvas is regarded along the correct line of vision. Regarding D (fig. 3) as a sphere, and $p\,p$ as the canvas, the ellipse described at d will appear as a true circle if looked at from E, or, indeed, from any point involving the same angle of vision. Still, E is the only point from which *the whole picture* can be seen as true, although lines of vision can be found along which *any part* can be seen singly in true form.

We now come to Mr. Debenham's central contention, which is substantially that the perspective of any photographs taken with a rectilinear lens or pin-hole must be absolutely and invariably correct; but the whole photograph can only be seen as true from one definite and fixed point of sight. Now, let this be applied to the vase (fig. 1), which, as shown in our sketch, is distorted in the same sense as the representation d (fig. 3), would be if regarded from the point H instead of from the true point of sight E. Our representation of the vase (fig. 1), looked at by itself, and with the paper held, as it naturally would be, at right angles to the line of sight, appears unnatural and distorted, just as the ellipse would appear a distorted representation of the sphere if H (fig. 3) is taken as the point of sight. But it must be remembered that the vase forms an object in one corner of a picture including a wide angle, and when the eye is placed opposite the centre of the picture, and at the correct distance, the vase is represented on a plane which crosses the line of sight obliquely, just as d (fig. 3) is situated in relation to the eye at E. To find the correct point of sight for the vase, let the reader look at the sketch with one eye only, and that eye opposite a point on the sheet ten inches to the left of the sketch, and about five inches above it, the eye being situated at a distance of about six inches from the spot. The vase will now appear circular and symmetrical, being viewed from the true point of sight.

Here, then, we have the base and ground of Mr. Debenham's contention. He emphatically states that there is nothing false or even strained about the perspective of a wide-angle photograph, but to see it truly it must be viewed from the correct point of vision, this latter being indeed a universal condition applicable to every photograph and every picture in true perspective, although the need is more obvious, when a wide angle is included, than when the angle of vision is more limited.

In concluding his address Mr. Debenham pointed out how a study of the true perspective, as found in the photograph, has already had a beneficial influence on the representative arts of the time, and is gradually influencing the public to look for that which they see in nature rather than what they have been accustomed to see in such pictures as violate the fundamentals of perspective. He emphatically pointed out that, when a photograph shows a difference from the perspective generally adopted by artists, the perspective of the photograph is and must be right, and not in this alone is the instructive influence of photography now felt. Photography is indeed destined to teach other lessons to the art-world, lessons quite as important as those it has already taught.

The Kaiser has shaved; and photographers innumerable may again breathe freely. It appears that the Kaiserin preferred his Majesty without the recently cultivated beard, and so it has been removed, to the joy, as well as of the photographers, of some of the Berlin bust-makers, who had accumulated large stocks of busts made before the growth of the Imperial facial adornment.

We observe that at the last meeting of the London and Provincial Photographic Association a resolution was carried recommending the plate-makers to use a more suitable substance than paper for packing plates. Without inquiring as to the likelihood of any notice being paid to this particular recommendation, we may pause to remark the very useful hint here given to Societies hard up for lectures and subjects for discussion. There are, possibly, innumerable other departments of their business in which the manufacturers can be thus obliquely lectured. It is true they may not derive any profit therefrom, but it is tolerably certain they will be amused; and as the public may also be entertained, and the members of the Societies will have something comparatively new to talk about, we are inclined to hope that the idea will not end where it began.

A correspondent sends us a cutting from an evening contemporary that devotes a column to "Notes and Queries," in which it is stated that the copyright in a photograph is vested, not in the man who takes it, but in the one who employs him to do so. This shows how

misleading replies may be when given by those unacquainted with the subject with which they are dealing. The remark applies equally as well to many replies which appear in some technical journals, photographic not excepted, that open their correspondence columns to indiscriminate replies.

Our readers are tolerably well aware that the copyright in a photograph is vested in the author of the work, and in no one else. In the well-known case which settled this point—Nottage and another *versus* Jackson, tried in the Court of Queen's Bench in June, 1883—the plaintiffs sued for damages for the infringement of their supposed copyright in a photograph of the Australian cricketers. The picture was taken by an operator, and the learned Judge ruled that, as he was the author of the work, the copyright was vested in him, and not in his employers. This judgment, although it was appealed against, was upheld in the Court of Appeal, and has never since been overruled. We once more direct attention to this fact, because the reply that appeared in the paper referred to might possibly mislead those who were unaware of the facts. There is no question that the existing copyright law is very unsatisfactory, and there seems to be but little prospect of any immediate alteration being made.

The only way, at present, for an employer to secure the copyright in the work of an *employé* is to register it in the name of the latter; then for him to assign the copyright to his principal. This assignment must be in writing.

The question has before now been raised as to what should be considered life size in a portrait, namely, what seems so to the eye, or what is actually so by measurement. This subject was forcibly called to our mind a few days ago while at a professional friend's, when a couple of pictures were received from a firm of enlargers to the trade. They were of two gentlemen, and, as they had to be framed and hung side by side, they were intended to match in size, but one appeared to be much larger than the other. One portrait represented a man with long and thin features, with a high but somewhat retreating forehead, and it had been taken three-quarter face. The other depicted very full features, with a large jowl and a somewhat prominent forehead, and it had been taken nearly in profile. The order was given to make the heads five and a half inches, yet one looked to be from three-quarters to an inch larger than the other; but, on measuring from the top of the heads—which, by the way, was devoid of hair in each case—to the bottom of the chins, it was found that the enlargers had kept strictly to their instructions. The discrepancy, however, seemed so great that one of the enlargements had to be made to match the other in apparent size.

The large number of faded and fading photographs mounted in optical contact with glass—"opalines"—to be seen almost everywhere, is continually bringing us queries as to the cause. The general idea appears to be that, as the pictures are hermetically sealed from the atmosphere and any pernicious matters it may contain, they ought to be the most permanent of all, instead of being amongst the most fugitive. In the majority of instances, as we have pointed out on one or two previous occasions, the cause is not far to seek. The mountant almost universally used for opalines is gelatine, and the kind generally selected for the purpose, on account of its whiteness and transparency, is either of French or German manufacture. These are almost invariably acid. Now, it will be readily seen that, if a deleterious material be used for mounting the picture on glass, it will prove more injurious than if it were employed to attach it to cardboard, inasmuch as, in the former case, the mountant is in contact with the image itself, while in the latter the paper supporting it intervenes. A pernicious mountant is frequently worse than a pernicious mount.

Some persons appear to imagine that the severest test of the stability or otherwise of silver prints is to expose them to light for a lengthened period, and if they undergo no change to take it as a proof of permanence. This, we need not say, is a fallacy; for, if some prints be kept for a time in a warm and damp atmosphere, even in the dark, they will change far more rapidly than they would if exposed for a similar period to sunlight in dryer air. Damp is the severest trial to which a silver print can be subjected, particularly if noxious vapours are present. Light, however, is a test in some respects. If the prints, for example, contain any sensitive salt, from imperfect fixation, it will in time become darker, and assume a pucey hue in the lights. When the paper is tinted with a fugitive colour, it will lose its roseate hue, and often become a dirty yellow in the lights. Again, if the paper itself be made of wood fibre, or "esparto," it will darken when long exposed to a strong light. These changes will not, however, take place when the prints are kept in an album or portfolio, or even when exposed to the light of an ordinary room.

In addition to the Britannia Works Company's offer, several promises of contributions to the Maddox Testimonial Fund have during the past week been received. Mr. James Glaisher, F.R.S., President of the Photographic Society of Great Britain, has undertaken to act as chairman of the committee; and Captain Abney, Messrs. A. H. Harman, F. York, and Sir H. Trueman Wood have been constituted a provisional committee, with power to add to their number. Mr. Andrew Pringle will perform the duties of secretary *pro tem.*, and Mr. Francis Cobb, who is Treasurer of the Society of Arts, will act as treasurer. It is hoped that the full committee will be formed, and an appeal issued through the medium of the photographic press, in the course of a few days.

A further development of the mystery attaching to the new rapid "iron" printing process, with which the names of Messrs. F. H. Varley and Friese Greene have been associated for some months past, is reached this week by the publication, in our columns, of a letter from the latter gentleman, emphatically denying "all knowledge of the presence of silver in the paper he gave Mr. Varley." In face of Mr. Varley's statement that a portion of the paper, on analysis, betrayed the presence of silver bromide, it would be interesting to know by whom the paper was prepared.

In explaining his ingenious glass-plate cutting machine at the technical meeting of the Photographic Society of Great Britain, on Tuesday, Mr. W. J. Wilson incidentally remarked that the great popularity of the hand camera had necessitated a more accurate cutting of plates than had hitherto been required. If the hand camera is only instrumental in achieving this result, it will have more than justified its presence among us. Hitherto there has been considerable room for improvement in the cutting of plates, as most photographers know to their cost.

TONING DEVELOPED BROMIDE PRINTS.—II.

Turning to chloride of copper as the bleaching agent, we must look in other directions for the means of reducing the bleached image. Hypo is then entirely out of the question, as even in the very weakest solution it removes instead of reduces the image, the copper portion of which, as well as the silver, is completely soluble in it. This was discovered years ago, when, for the sake of economy, a combined gold and copper toning bath was recommended for prints; the result was all that could be desired up to fixing, when the copper portion of the tone disappeared altogether, leaving the prints many shades redder than they should have been. For the same reason I anticipate, though I have not tried, that sodium sulphite would be ineligible with copper; its strong resemblance to hypo in its solvent action upon silver chloride would lead to the expectation that it resembles it also in its action on the copper salt. The alkaline sulphides might probably answer, but they would have to be used with the greatest of care on account of their excessively heavy action in even moderately strong solutions.

For bleaching the copper image it seems to me we shall have to rely upon redevelopment proper, either with pyro, hydroquinone, eikonogen, or ferrous oxalate, when a very great variety of tone can be got by varying the strength of the solution. It must not, however, be imagined that we possess the same power of control over copper-produced image as is the case when the deposit consist

of pure silver chloride. The presence of the copper greatly confines the radius within which we can work, whereas with the pure silver image it is merely a matter of length of exposure and weakness of developer to produce almost any desired tone.

If the best results and complete command of tone are to be secured in the treatment of bromide prints—and there is no reason why they should not—we shall have, I think, to relinquish mercurial and other metallic-bleaching agents, and fall back upon an image of pure silver chloride, and that will place us on a level with "alpha" paper, which claims the full command of tone. Ten or twelve years ago, when Dr. Eder sent over his specimens of tones obtained upon pure chloride films by variations of exposure and development, I attempted to imitate them for lantern-slide purposes by means of bleached images, thus hoping to combine the sensitiveness of the bromide plate with the range of tone of the chloride. I soon found, however, that the presence of metals other than silver altogether upset the calculation, and it was there that I first substituted for the solution of copper or mercury very weak *aqua regia*, or, better, bichromate of potash and hydrochloric acid, either of which leaves an image composed of perfectly pure silver chloride.

So far as the production of tone in almost any variety is concerned, there is, then, not the slightest difficulty, as can be readily proved with collodion plates; but the difficulty with me at that time was to get films of gelatine that would stand the acid treatment. In later years that difficulty, so far as concerns plates, was removed, and it only rests now to see if our bromide papers will stand it without blistering and dissolving.

The bichromate solution is the more uniform of the two in its action, so I shall say nothing of the *aqua regia* beyond this, that any one who desires to try it may do so, practically, by making a strong solution of common salt and dropping in nitric acid until it shows decided bleaching properties when poured on to a negative. For use, dilute it sufficiently to prevent it blistering, and, as it grows weak in bleaching power, a drop or two of acid will restore it, there being always a plentiful supply of chlorine.

The other solution may be made by dropping into a solution of bichromate of potash sufficient hydrochloric acid to give it bleaching power. The strength of the bichromate is immaterial so long as it is not strong enough to permanently stain the gelatine or paper. The energy of the solution depends upon the quantity of acid employed, and this can be removed as the solution becomes weaker by use. A five-grain solution of bichromate will do to start with, and dilute hydrochloric acid can be added until it bleaches pretty freely without softening the film. A little chrome alum added to the solution will do no harm. I am sorry I can give no more definite quantities, but I have described the plan I adopt myself.

The image after bleaching by either of these solutions only requires to be washed to remove the free acid and bichromate. There are no bye-products left to be reduced by the developer and so cause fog or degradation of the lights; if any slight yellow tint remain from the bichromate, which is unlikely, a solution of meta-bisulphite of potash will soon remove it. When well washed, a brief exposure to daylight and a weak developer will enable almost any tone from bright red to deep black to be produced—on glass plates, at any rate, for my experience is mostly with those and not paper. The red tones are further amenable to treatment with gold, platinum, or the alkaline sulphides. In fact, the treatment is precisely that of "alpha" paper.

I have said nothing about the advisability of such an apparently round-about method of procedure, but clearly, if prints exist that are worth toning and useless otherwise, this supplies a means.

W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

Good *Moniteur*, forgive us for pointing out that some of the information on your title-page is, to say the least of it, not up to date. "Major" Waterhouse became "Lieutenant-Colonel" some time ago; while the editorial *personnel* of two of our contemporaries which you name has undergone some changes.

The *Photographische Notizen* recommends a solution of cellulose in amyl acetate for coating dishes, plate-holders, &c., as the layer of cellulose so deposited is unaffected by acids, alkalies, or alcohol. Doubtless it would be very successful, but we rather imagine that the use of this solution is infringing patent rights.

We have to report the recent death of Dr. Theodor Stein, of Frankfurt, in his fifty-second year. The deceased gentleman was equally celebrated for his medical and photographic researches, and was the author of the well-known work, *Das Licht im Dienste der wissenschaftliche Forschung* (Light in the Service of Scientific Research).

The *Naturwissenschaftliche Rundschau* describes some decidedly valuable "zootropic" researches by Herr Demenz. His experiments were directed to analysing the movements of the mouth in speaking, in a manner similar to that applied by Anschütz and Muybridge to men and animals in motion. The instantaneous impressions were arranged in a zootrope in the usual way. They were shown to a deaf mute who was practised in the art of deciphering words spoken by observing the movements of the lips. He was successful in making out all the vowels, diphthongs, and lip consonants. He was not, however, able to make out whole words, owing, probably, to the fact that the movements of the tongue had not been simultaneously photographed. We understand that Herr Demenz is continuing his experiments with a view of also recording these latter, if possible.

The thirteenth International Library and Artistic Congress has just been held at Neufchâtel. Messieurs Davanne and Bulloz represented photographic interests. During the sittings, the Congress, on the initiative of M. Bulloz, formerly claimed for photographs the same legal protection and privileges possessed by other works of arts as to copyright, &c. M. Bulloz contributes a report on the subject to one of our contemporaries, in which he pleads for a uniform application of the third paragraph of the Berne Convention, and incidentally states a somewhat damaging case against the peculiarities of American copyright law.

The new American law obliges an author to deposit two copies of a photograph sought to be protected at Washington, but the pictures must have been printed from negatives taken in America or on American-made plates. M. Bulloz sarcastically inquires how a photographer is to take, on American territory, views, say, of Mont Blanc, St. Peter's at Rome, and so forth; and, if the plate be made in Europe or Asia, whether before publication he is to hurry off to the States, reproduce the negatives on American plates with American chemicals and in the presence of American witnesses? The law practically prohibits the importation of photographs of works of art which cannot be moved to America and photographed there, and therefore deserves to be called by the hard name which Mr. Bumble applied to it on a memorable occasion.

Development in daylight has been exercising the mind of *Helios*. The idea has been canvassed of late in America. It is not new, by a matter of ten years or more. It rests on two bases, as our contemporary points out, namely, the inferiority in sensitiveness of a wet gelatine plate compared with a dry one, and the inactivity of the rays which traverse a red liquid. Cochineal in the developer is recommended as the colouring agent—years ago it was simply an ordinary ferrous-oxalate developer. Why not this latter now, which, we believe, is sufficiently non-actinic for candle-light, at any rate? As to "daylight" development, much, if not all, depends on the power of the light, and where development is conducted. "Development without artificial light" would perhaps be a more accurate rendering of the phrase.

The Imperial School of Photography in Vienna, which is under the direction of Dr. Eder, is an institution to which we in this country can produce no parallel. The pupils are first taught the elements of free-hand drawing, geometrical design, perspective, chemistry, physics as applied to photography, and figure-drawing. The practical course comprises work in the laboratory and the studio, collodion, gelatine, and orthochromatic work, emulsion-making, retouching, enlarging, micrography, photo-mechanical processes, &c. Dr. Eder

has a museum attached to the school, in which he possesses apparatus of every imaginable kind, from the days of Niépce downwards. The fees are exceedingly moderate. In the home scheme of Technical Education, which is at present in an inchoate state, let us hope that photography will be as well cared for as it appears to be in Vienna.

At the Congress of the French Association for the Advancement of Science, held at Marseilles a few weeks ago, M. Berget, of the Sorbonne Laboratory, exhibited the results of some of M. Lippman's experiments in direct colour photography. The solar spectrum on a Taupenot plate is said to have earned the warm applause of a numerous audience. A similar greeting from the *savants* of this country awaits that coloured film—when it arrives here. In this respect it will enjoy a more agreeable reception than the so-called photograph in natural colours which was on view in the Photographic Society's rooms a little while ago.

Photography in natural colours is a topic which excites far more interest among our Continental brethren than among the inhabitants of these islands. The French photographic papers, for months past, have teemed with innumerable articles upon the topic. It is worth while noting that from the days of Becquerel downwards most of the experimental work in connexion with this photographic "philosopher's stone" has been accomplished by Frenchmen and (latterly) Germans, so that here, possibly, may lurk the explanation of the hold which the subject has upon the imaginations of our Continental brethren. It is also worthy of notice that in very recent times some of the experimentalists who have been loudest in claiming to have unlocked the greatest secret of science have possessed little or no knowledge of photography, theoretical, practical, or historical. An acquaintance with all that has been attempted and the little that has been accomplished in natural colour photography during the last half century is, we fear, none too common among these self-styled modern discoverers.

THE PRINTING PROCESS OF THE FUTURE.

IV.

We now arrive at a very important stage in the process of gelatino-chloride of silver emulsion paper. We have considered the methods of obtaining with this process prints remarkable for their brilliant and glossy surface. Many complain, however, that the chief drawback to this process is the loss of this brilliancy sustained in mounting them to suitable supports. It is my intention, therefore, to show that this is not necessary, and that they may be attached with the brilliant surface intact without the slightest difficulty.

Gelatine is peculiarly susceptible to moisture, and with our polished surface prints the effect is easily seen. If we lay a piece of dampened blotting-paper over it, it will be noticed that the brilliancy of the surface gradually disappears. Now, it will be obvious that this effect is what we must avoid in applying the mountant, and that it must be done in such a manner that the solution or moisture from the solution does not affect the gelatine film. If we apply an ordinary starch or flour paste to the back, the moisture penetrates at once through the paper support to the image film, and the latter becomes dull in many cases before we have time to attach it to the mountant. What we require, then, is a mountant with as little moisture as possible. This we can obtain with a solution of gelatine and alcohol. By dissolving an ounce of gelatine in as much water as it absorbs when thoroughly soaked, and adding alcohol until the required consistency is obtained, we get the quality of medium required. It should be made as thick as possible, and while hot applied rapidly to the back of the print with a stiff brush. The print is then quickly adjusted in the correct position on the mount, and the whole laid on one side to dry. Do not place one print upon another, or under any weight, but allow them to rest face upwards in a warm room. This mountant sets very rapidly, before, in fact, it has time to penetrate the paper, so that the gloss of the print remains uninjured. After laying the print on the mount a piece of clean paper is laid over it, and it is then pressed down evenly all over.

A very favourite method of mounting these prints is to apply the mountant to the edges of the print only. The solution is put on with a small brush to the extent of an eighth of an inch all round. A good plan is to cut a piece of stiff paper smaller than the print itself by about a quarter of an inch each way; this is then laid over the prin and the mounting solution put on, giving a clear edging all roun If prints are mounted in this manner, however, it is important t note that they must not be too dry; otherwise, if carried to an atm sphere somewhat moister, they will expand, and, consequently, th centre picture unattached to the cardboard will swell out and for creases and lines. The prints should, therefore, be laid for a fe minutes in the cellar or other cool portion of the house befo mounting, and when in a dry atmosphere the paper contracts slightl causing the print to become quite flat and taut.

The mountant employed when only the edges are treated often composed of indiarubber dissolved in benzole, but this has i drawbacks, however, as the indiarubber becomes hard after a tim crumbling away, when the print naturally becomes detached fro the support.

A common and mostly employed method of mounting is with cu out mounts. Here, of course, no loss of brilliancy is possible, as n visible portion of the image is treated at the back with the solutio The print is attached behind the cut-out opening by running a litt mountant round the edge of the face of the print. The same rema applies to the print as in mounting round the edges, only, as befo described, namely, that the print must be very slightly moist befo mounting to allow for contraction afterwards. There is no dou that with a well selected cut-out mount with bevelled edges the prin show up better than by any other means.

We now come to another method of mounting these kinds of print so that the gloss is not injured in any way. This is by means of protective backing attached to the prints before removing from th glass. When on the glass, and before they are perfectly dry, a pie of thickish waterproof paper is pasted on to the back. This wate proof paper, usually white on one side, and coated with a black other coloured waterproof substance or the other, can be obtained nearly every stationer's shop. This is cut to sizes a little smaller tha the prints, and somewhat larger than the required print is to be, that the prints must not be trimmed before laying on the glass, as done by some operators. The mounting solution is laid on the whi side of the waterproof paper, and thus attached to the prints on th glass. When dry, the two come away from the glass together, an can be trimmed to size, and mounted with any kind of adhesive past as the waterproof paper effectually prevents any moisture fro attacking the print. This method is also very effectual when th prints are to be kept unmounted, as it strengthens them, and allow of their being handled without injury. Another similar method is coat the back of the print while upon the glass with an alcoholic sol tion of shellac or varnish, so as to afford a waterproof backing in pla of the paper. A varnish must, however, be chosen that does not sin in and stain the surface of the print on the other side.

Another method of mounting is one that is often practised, b which requires a certain amount of skill and experience, is the follow ing:—

The parts after washing are dried spontaneously, and the trimmed to the required size. After squeegeeing to the glass an removing all superfluous moisture, the mountant is applied to th back. Care must be taken in doing this; the solution must be put o all round up to the edges, but on no account over. If any get on the glass, it must be carefully removed with a clean cloth. Th mount is now laid on a flat surface, and the glass plate, with th print attached to it, is then laid on to the mount. It will not difficult, the glass being transparent, to lay the print into corre position on the support. The card is then well pressed down, and heavy weight laid over it. After a little time the pressure removed, and the whole allowed to dry. With the card attached the print the drying operation will naturally be considerably prolonge At least twenty-four hours should be allowed, and then artifici heat applied. After thoroughly warming it through, a sharp pe knife is drawn all round the print, between it and the glass, and th whole should then come away, with the print attached to the mou and with the beautiful glass quite perfect.

We have now been through the whole process, and I ha endeavoured to show, so far as lies in my power, the difficulties th are likely to be met with, and the results of my experience wi them.

I should certainly like to see this process more universal. That is superior to the old-fashioned albumen paper process, I think I ha succeeded in showing. It may be a little while before professiona come to see its advantages, and the benefit they are likely to re by its employment. I know it is very difficult to get employees take up anything new or to depart from the ordinary routine to whi they are accustomed.

An important consideration is permanency. Albumenate of silver

doubtedly a very unstable and erratic compound. By careful tests ade some years ago, I succeeded in proving that these parts were doubtedly more permanent than albumen pictures. Gelatine loride prints may be found, in some of the old photographic nanacs, quite perfect in colour, while albumen prints of the same e have completely faded away.

The process, be it remembered, is not by any means a new one. It as first introduced, I believe, by G. Wharton Simpson, but, from me hitherto unexplained reason, the process was not generally taken . It has recently been reintroduced, however, and considerably proved. From all accounts I believe there will be a number of pers placed on the market this season, so that the photographer will ve no difficulty in obtaining it and giving it a fair trial. I would ggest, however, that a careful and just trial be made. Many are t to test a new theory, and, because they do not succeed the first two three times, give the whole thing up as being useless. Failures are doubtedly certain, but these, I hope, my remarks will tend to lessen. t some future period I intend to give the results of some experiments ith this paper to obtain special and entirely out-of-the-way sults.

WALTER E. WOODBURY.

LIGHT AND ITS ACTION UPON THE HALOID SALTS.

[A Communication to the Holborn Camera Club.]

s a preface to this subject, I may say that my reason in coming before u and treating on this section of photographic chemistry is due to the ct that there are a very large number of our practical workers who, I ink, are rather careless about the fundamental principles upon nich their art or craft depends. It is my intention, as far as my pabilities will permit, to make this paper of special interest to our rking photographers, using this definition as a boundary between that our experimental and theoretical photographers. It is not my intention introduce any new theories, or to bring before you all the various gical or practical matter that has been published; but only to introduce you some of the theories that have gained the support of a large pro-rtion of photographers.

In Section I. I intend to treat of the conditions and materials necessary r receiving the latent image, and in Section II. of the action of light on ese substances; while, as an Appendix, I will make note of a few brief periments, which will confirm the theories of which I am about to eak. It must be understood that that which is made with one of the logen salts may be applied to the other halogens. After these few efatory remarks, I will enter into the practical details.

SECTION I.

Daguerre in 1839 made known to the world a process of reproducing ages by the action of light. His process was very simple, from a emical point of view, compared to that of making a gelatine emulsion of day. A brief outline of the process is as follows: A flat piece of pure ver, very carefully cleaned and polished, is exposed to the vapour of line (or bromine), varying in time from five minutes to half an hour, cording to the season of the year. It will be at once apparent to all that this means he obtained a very pure film of silver iodide $Ag_2 + I_2 = 2\,Ag\,I$. ie exposure in the camera varied from two to thirty minutes. The emical tension, which is produced in the film by the action of light, adually runs down in the dark, and the de-iodinised portion of the film re-iodinised, and the latent image is obliterated. For this reason the guerre plate had to be developed within a short time of the exposure. ith regard to the wet-plate process, we have a glass plate covered with lodion, in which is contained the halogen iodine. The plate is dipped o a solution of silver nitrate, and immediately some of the silver nitrate converted into silver iodine by double decomposition.

Silver nitrate, Cadmium iodine, Silver iodine, Cadmium nitrate.

$$Ag\ NO_3 + Cd\ I = Ag\ I + Cd\ NO_3$$

so leaving an excess of silver nitrate to act as an absorbent of the iodine, ich is given off during exposure, as the collodion has no halogen ab-bent power. In the gelatino-bromide process we have a film of gelatine which is held in suspension bromide of silver, which is obtained by ible decomposition,—

Silver nitrate, Ammon. bromide, Silver bromide, Ammon. nitrate.

$$Ag\ NO_3 + (NH_4)\ Br = Ag\ Br + (NH_4)\ NO_3$$

ammonium nitrate being precipitated before the plate is coated. It l be at once perceived that here we have no free nitrate of silver, which uld be at once fatal and result in fog. In gelatine emulsions the haloid st be in excess. In silver paper we have paper coated with albumen taining the chloride. The paper is then floated in a solution of nitrate silver, which results in the formation of two sensitive salts: firstly, oride of silver, and secondly, albuminate of silver. Here, also, as in wet-plate process, we have an excess of nitrate of silver, which acts as absorbent of the free chlorine given off during exposure. The collodion cess is similar to wet process up to the sensitising. If the collodion film were allowed to dry after sensitising, the nitrate of silver would crystallise, so that in order to use the collodion sensitive film dry, we have to first wash out the free silver nitrate. In doing this we at once remove our sensitiser, or absorbent of the liberated halogen. To render the plate sensitive we have, therefore, to coat our plate with some form of halogen absorbent. These substances are technically called preservatives. This also protects the film from exposure to the air. The following are a few of the substances which are used as preservatives:—Beer, gum arabic, tannin, sugar, coffee, albumen, &c. Preservatives which retain a slight moisture are better for this purpose, as water is in itself a sensitiser.

SECTION II.

In dealing with the action of light on the substances dealt with in Section I., perhaps it will be well to consider in the first place, Is the action of light on the haloids chemical or physical? As an example of the physical power of light on substances sensitive to the same, I may mention selenium, which, under ordinary circumstances, is a very bad conductor of electricity. The action of light upon it is to at once increase its conductivity, but it falls off again in the dark. The first matter for our consideration, in studying the action of light on the silver haloid, is to try and ascertain the difference in silver bromide before and after exposure to light. I think the general opinion on the action of light is rather favourable to what is known as the sub-haloid theory. The following is a brief review of the same:—By the action of light one atom of bromine is dissociated from each molecule of silver bromide, the reduced salt being sub-bromide of silver. The following are some of the reasons for the above supposition:—Firstly, the latent image is not metallic silver, because it is insoluble in nitric acid; secondly, if dry plates are exposed to light, a distinct smell of bromide can be detected; thirdly, a bromide of silver emulsion in collodion, which, when pure, is almost an absolutely neutral substance if exposed when dry, is only sensitive to a certain extent; but if a bromine absorbent be added to the film, its sensitiveness is at once increased. This proof is a very strong argument against the proposition of a physical change. It will be readily seen by the above statements that the sub-bromide theory has a very good foundation. C. J. Leaper points to the formation by the action of light of an oxy-bromide $Ag_2O\ 2\,AgBr$. He assumes that on the liberation of bromine, oxygen is at the same time absorbed. Hunt, in his *Researches on Light*, proves that silver chloride will only darken in the presence of oxygen. This points somewhat to the formation of an oxy-halogen of silver. Meldola found that silver chloride darkens in a Crooksian vacuum, but became white again in the dark. From these we may draw the following conclusions:—That chlorine may be given off without the presence of an absorbent, but the result is not of a permanent nature, owing to the fact that the chlorine that has been given off during the exposure to light is not absorbed; and, as there is no oxygen present to take the place of the chlorine to form an oxy-chloride of silver, when the vacuum tube is placed in the dark the molecules begin to slow down. The affinity for chlorine is again set up, and, no free chloride being in the tube, the perfect or white silver chloride is again formed. This experiment is analogous to the Daguerreotype. It must be distinctly understood that light of itself cannot separate the bromine from the bromide of silver. Light, on reaching the film of silver bromide, gives the molecular structure a shock. This shock weakens the affinity of the haloid for the silver, which results in the halogen absorbent becoming the stronger power, and immediately a part of the halogen is transferred from the molecule of silver bromide to the absorbent. This accounts for the fact that if no haloid be present, light does not affect a latent image. A brief glance at the causes of various sensitiveness in the haloid salts will not, I think, be out of place. As you are all aware, extreme sensitiveness in a gelatine emulsion is either obtained by boiling or by the addition of ammonia, technically called ripening. This ripening action in an emulsion is a purely physical one, and consists of an increase in size of the particles of silver bromide. The cause is possibly that as silver bromide is only very slightly soluble in hot water, but much more so in water containing soluble bromide. During the boiling some portions of the silver bromide are dissolved and reprecipitated on the coarser particles, other portions of the fine bromide being taken up, and in their turn deposited. The ripening of an emulsion with ammonia is very much the same as that just described, silver bromide being soluble in ammonia, and, on diluting the ammoniacal solution with water, or expelling the same by heat, the dissolved silver bromide is reprecipitated. The increase of size in the particles of silver bromide is not the only cause of extra sensitiveness in a gelatino-bromide emulsion. As I stated before, the gelatine is also a great aid to extra sensitiveness in acting as a bromine absorbent, the facility being greatly increased by the fact of the intimate contact between the gelatine and the silver bromide. The heating process can only be carried on to a certain extent. If the ripening is continued for too long a period, the particles of silver bromide still grow, but chemical fog begins to set in, and produces an emulsion, which can be reduced to metallic silver without the aid of light. It will be at once observed by this brief review of the action of light in the formation of the latent image that the various high authorities are far from being unanimous. But I think that, when our field of knowledge of molecular action is of a more defined and trustworthy nature, we may then look forward for a satisfactory answer as to how the latent image is formed.

Appendix.

1. Place some moist silver chloride in one limb of a bent tube, the other end of which dips into a beaker containing distilled water; the whole is then exposed to daylight for about one week. The water is then tested for chlorine by dropping a little powdered metallic silver into the water, when, if chlorine is present, there will be a white precipitate of chloride of silver. 2. Take a piece of ordinary sensitised paper and wash out the free nitrate of silver, dry the same and place under a part of a negative in a printing frame; then cover the other part of the negative with a piece of sensitised paper that has not been washed. The piece that has been washed will be found to print very much slower than the other piece. 3. Take two test tubes, place a little distilled water in both tubes; place two grains of silver nitrate in each and dissolve. Then place a little gelatine, or any organic matter, into one of the tubes. If both tubes are exposed to daylight, the tube containing the organic matter will be found to contain a precipitate. The solution in the other tube will remain quite clear. The following is one of the many experiments that may be performed to show that fine division in substances promotes rapid chemical action. Take an ordinary Seidlitz powder, mix both packets well together on a piece of paper, place the powder in a tall beaker or glass, half fill with water and stir well. Hold a lighted match about one inch from the surface of the water, and the match will be found to be extinguished owing to the carbonic gas being set free. Water here plays a physical action in dividing the substances very fine. This promotes the rapid decomposition of the powders, with the result that the gas is given off in a large volume. Ernest Benest.

LEACH'S LANTERN MICROSCOPE.

[A Paper read before the Royal Microscopical Society.]

In lantern microscope projection three things are essential. The first is brilliant illumination; the second, large amplification; and the third, clear display of detail. But brilliant illumination does not mean a dazzling display of light upon a large white screen, showing the dark patchy outline of an object without detail; objects shown in this way are far inferior to enlarged woodcuts.

The light must be made to enter the object so as to present all the details of its structure to the eye of the observer, but no amount of light will bring out this detail if its dimensions are too small for the crystalline lens to form an image of it upon the retina.

With high-power objectives the light on the screen must, in the very nature of things, be greatly subdued.

Still, a large image, moderately but properly lighted, can often be far better observed than a small one many times brighter. An object may, in fact, be too powerfully illuminated.

If rays of great angle are too powerfully converged upon an object, the image becomes almost as bright as the other parts of the screen which represent nothing but clear glass, and in this case the image appears "flat" and without contrast—like an over-exposed photograph. The image may, therefore, be too bright for the screen, or it may be too dark; and the best results are those obtained with the mean, showing all detail without destroying contrast.

A lantern microscope to be of any satisfactory use must define, for instance, such objects as stellate hairs of *Deutsia*, the minute lace-like structure of spine of *Echinus*, the matted structure of the heirs of reindeer, the lancet of male flea, its sucking tube, &c.; the stomata of leaves are very easy to show. *Foraminifera* of the smallest sizes should be exhibited to from seven to ten inches diameter with all their varied beauty of form and shading. The tongue of the bee should have all its structure clearly displayed to audiences of three or four hundred people. For this purpose it must be magnified to above twenty feet long, then the bulb at the tip of the fleshy cone should be shown with the hairs standing out from the trunk and circling round it, apparently marking off its various parts as if they were joined to each other in telescopic articulations, the muscles of the trunk and the apparently and, no doubt, really central air tube all to be well defined; and what has been said regarding these objects applies equally to all kinds of animal and vegetable structure.

It is not claimed for the lantern microscope that *every* object, however delicate, can be shown as perfectly as in the ordinary table microscope, or that photo-micrographs are henceforth unnecessary. But it is, notwithstanding, absolutely certain that the lantern microscope now takes rank amongst the scientific instruments of the day, and can no more be dispensed with than the optical lantern itself.

It is claimed that by the Leach lantern microscope all we have said can be done, and a very great deal more, though to say that anybody can do it perfectly on a first trial would be as wild a statement as to say that anybody who buys a camera and lens can at once produce beautiful photographs, or to guarantee the man who buys a piano to be able to play it to the best advantage.

The Leach microscope can be applied to any oxyhydrogen lantern. It is screwed on the front, in place of the ordinary lantern objective, the size of flange required being two and a half inches. When the lantern objective flange is larger than this, an adaptor must be provided; and when the draw tube of the lantern is rickety a rigid lengthening tube may be adapted. The lantern condenser should be about four inches or four and a half inches diameter, and of the triple form. Ordinary lantern condensers are usually of the double form, then a third lens can be supplied for a few shillings.

The stage of the microscope is open at both sides and also at the top. It serves for all classes of objects, whether ordinary microscopic slides or polariscope crystals, shown with either narrow-angle rays or by the convergent system of lenses. The stage being so constructed, it is extremely accessible for the introduction of sub-condensers, with which the instrument is provided, and permits, with the greatest convenience, the introduction and manipulation of the polarising prism, which latter may be entirely rotated, so that all the phenomena of polarised light may be exhibited to the greatest perfection.

The object-holder is quite a novel idea, the principal mechanism of it is placed under the stage (to be out of the way); two arms passing through slots in the bottom of the stage, actuated by a spring and manipulated by a milled head, serve to hold the objects flat against the inside surface of the front of the stage.

The diaphragms, or compound wheel of diaphragms, and the mechanism in connexion with it are unique. The wheel of diaphragms is rotative on a pivot attached to the plate-arm in such a manner that the whole may be raised out of the field altogether, and dropped into it again, in an instant, or just as required, and when the compound wheel of diaphragms is raised a spring catch holds it in position, and prevents it dropping by its own weight. When in this position, the whole field of the microscope can be utilised for showing objects up to one and a half inch in diameter; thus, this compound wheel of diaphragms of two and a half inches in diameter yields just as large a field as can be obtained by one of the ordinary form of five inches in diameter. When, as in using polarised light, it is desired not to be incommoded with the diaphragms, the detachable plate carrying the compound wheel can be instantly removed from the stage, and, when again required, it can be as quickly restored.

The arms of the object-holder projecting through the bottom of the stage have sufficient lateral movement to admit any zoophyte trough, or wooden frame, or combination of wooden frames, up to one inch in thickness. Thus the advantages of this arrangement are clearly manifest.

The two sub-condensers with which the instrument is provided, are found to give the utmost satisfaction with all objectives of from 2½ to $\frac{1}{10}$ inch focus, and the simplicity with which these sub-condensers are changed is another feature of novelty in the instrument. All that is necessary to make the change is to take out one and push the other in its place; thus the exhibition or demonstration may proceed without a moment's delay, neither object, objective, nor diaphragm being disturbed.

When the light has been properly concentrated, as is the case with Leach's microscope, high powers can be used, and with ample illumination for showing all necessary detail, either for class-room instruction or lecture-hall demonstrations. It should also be observed that, when high powers are used, the front lens of the objective is open to the view of the manipulator, a great convenience when inserting the object, by enabling it to be immediately adjusted within the area of the lens, so that its image may at once be seen in the field, without the tiresome "groping" for it, a method which is usually resorted to with some lantern microscopes. The advantages of this arrangement will be at once apparent, especially when using, say, a $\frac{1}{12}$ inch, or higher power for photo-micrography.

When polarised light is to be used, the polarising prism must be pushed into the rotating tube of the instrument by removing the concave lens at the back, and, after inserting the prism, this concave lens may be replaced in an instant.

To do this when ordinary lanterns are used, the usual draw tube carrying the microscope must be removed for the purpose; but with a Chadwick optical lantern the microscope need not be disturbed, all that is necessary is to disconnect the bellows attached to the lantern front, and the back of the microscope is at once accessible for the removal of the concave lens and insertion of the prism, &c., and this may be done in less time than it takes to describe the operation; thus the change from common to polarised light can be made in a few seconds.

The rotating tube will be found an immense advantage over fixed tubes, as the polarising prism can by this arrangement be placed in any desired azimuth which best suits the object, the analyser, or the screen.

The convergent system of lenses for use with polarised light, in transmitting rays through biaxial crystals, is a system of lenses worked out by Mr. Leach with great patience. It gives powerful illumination, and includes an angle of 170°. The front focussing arrangement was in-

troduced by Mr. Leach in 1883. Before that time several supplementary lenses had to be kept in readiness for use, as different classes of crystals were placed in the polariscope.

Mr. Leach discovered how these supplementary lenses might be dispensed with, and fitted up his system accordingly, and now all makers of first-class polariscopes attach to their instruments this great improvement.

The concave field-lens with which the instrument is provided is absolutely necessary when the polarising prism is in use. It is useful also with low powers when using common light. With all powers it enlarges the field, and equalises the distribution of illumination; but, when a small field only is desired, with the illumination in the centre, it may be used or dispensed with at pleasure.

The three objective adaptors with which the instrument is provided admit of the use of any microscope power with the standard screw. They are made to slide in the front tube of the microscope, which is provided with a rack and pinion, and also a fine screw movement, capable of the most delicate adjustment.

Thus, by having the various powers already screwed into the adaptors, one may be changed for another almost instantaneously. And into the front or tube portion of these adaptors the tube of the amplifier is made to slide.

Amplifiers, usually supplied with lantern microscopes, are simply uncorrected lenses, perfectly worthless for the purpose for which they are intended.

The amplifier with which Leach's microscope is provided is a Barlow lens, and, being achromatic, it not only does not destroy, but very much enhances, the aplanatic qualities of the objective, and is far superior to so-called "projection eye-pieces."

It has been most inconsistently asserted by persons who ought to know better "that high powers cannot be used in the lantern microscope; that it is unable to exhibit fine detail upon the screen, and that no alum trough is required." No doubt this is all true, so far as applied to inefficient instruments and "jim-crack" arrangements. But the microscope now before us *does* require an alum trough, because, where great light is concentrated from the oxyhydrogen luminant, great heat must, from the very nature of the means employed, be concentrated with it, and the alum trough is the only practical thing which can be used to absorb the heat rays.

Of course, where there is no light there is no heat, and therefore no necessity for an alum trough, and instruments which do not require one are self-condemned.

The alum trough provided for the Leach microscope is of large size, and is used in the ordinary slide stage of the lantern. W. I CHADWICK.

HACKNEY PHOTOGRAPHIC EXHIBITION.

THIS was the first exhibition held on a large scale by this society. It was opened by Sir Charles Russell, Q.C., M.P., and he was supported on the occasion by all the leading local men. Sir Albert Rollitt, LL.D., M.P., was also present, and he proposed a very cordial vote of thanks to Sir Charles Russell for his coming to open the show.

The hall was very prettily draped and fairy lamps were suspended all round, and the platform was one mass of flowers. Among the members the pick of the pictures were the following:—In Class A, Mr. J. A. Sinclair showed some very pretty pictures of Belgium; Mr. Beckett, portraits of the President, Miss Daisy Frost; Mr. Barton, the assistant secretary, has some very artistic pictures of Scotland; Mr. Grant, with *Winter* and *Baby*, attracted considerable attention. The pictures of Messrs. Hensler, Pearce, and Dr. Roland Smith were very passable. The best, however, in this class was undoubtedly a *View near Buttermere*, by Mr. A. Barker, though Mr. Hubert's pictures of *The Saint* and *The Sinner* were good.

In Class B some fair pictures were shown by Messrs. Augustus W. Wilson, Grant, Hensler, W. L. Barker, Carpenter, Wesson, and Dr. Roland Smith.

Class C was not nearly so well represented, owing, no doubt, to its being the "Excursion Class;" but the pick of them was *Young Lovers*, by Mr. W. L. Barker; *Dorking*, Mr. Grant; *On the Thames*, Mr. W. Fenton Jones; and *Whipps Cross*, by the President.

In the Open Class the pictures were very fine. The pictures by Messrs. Pagliaferro, Byrne, Wilson, Gottlieb, Auckhorn, Evans, were good; but, if anything, those by Mr. Pattison Gibson, *Loitering Lovers* and *On the River Allen*, Mr. Warneuke's *Moorish Girl*, John Stuart's *Drawing Room and Hall at Cairndhu*, Miss Bowen's *Canadian Scenery* and *Two Young Disciples of Isaac Walton*, J. G. Pratt's *Jenny's Tale*, were, perhaps, among the best.

We must not forget to notice the grand pictures by A. R. Dresser and Ralph W. Robinson, the former with *On the Rocks at Hastings* and *Ploughing* being well to the front. The latter had four good pictures in *The Dying Day*, *The Trysting Place*, *It was a Lover and his Lass*, and *Peep Bo*.

For lantern slides, Mr. Taverner took first place both in the Members' and the Open Class, though Mr. Carpenter was a very good second. Messrs. Auckhorn, Austin, Dore, Edwards, Mummery, Sinclair, and Barton deserved mention.

The awards were as follows:—

Class A (Members).—Silver medal, Messrs. Barton, Sinclair, Hensler, and Beckett. Championship gold medal, Mr. A. Barker.

Class B.—Gold medal, Mr. A. W. Wilson. Silver, W. Wesson. Bronze, S. H. Barton.

Class C.—Silver, W. L. Barker. Bronze, W. F. Jones.

Stereoscopic Class.—W. Taverner (a pair of lens presented by Mr. H. Crouch).

Members' Lantern Slides.—Silver, Mr. Taverner. Bronze, Mr. Dando.

Open Class.—Silver, Mr. Taverner. Bronze, Mr. J. E. Austin.

The prizes were presented on Thursday by Captain Abney, who complimented the members on the quality of their work, and on the success of their exhibition. He was very pleased to be there that evening, and, in response to an invitation from the Hon. Secretary, hoped to be there on some future occasion. A vote of thanks to him was very heartily carried on the proposition of the Treasurer, Mr. Grant, seconded by the Hon. Secretary, Mr. W. Fenton Jones, who spoke of the very great honour done to the Society by Captain Abney.

In the trade section, Messrs. Watson & Sons showed some very fine cameras and apparatus generally; Messrs. Mawson & Swan, lantern slides and Hume's cantilever, enlarging apparatus; Mr. Park and Messrs. Platt & Witte showed bamboo stands and accessories respectively; Mr. Wormald exhibited some of his well-known lantern sundries; Messrs. B. J. Edwards, transparencies; Mr. Hart, background stand and lantern-screen holder; Messrs. Davenport, dark rooms (at a very low figure); Platinotye Company, Autocopyist Company, &c.

That the exhibition was a very great success goes without saying, as it was never dull a single moment, for the proceedings were continually being enlivened by organ recitals and concerts. In the singing part Mr. Bridge, Mr. Roland Henry, and Miss Page were appreciated by a very large audience. The members of the Hackney Society have every reason to be pleased with their exhibition, as it reflects the greatest credit on all those who managed the undertaking.

ELECTRIC CURRENTS IN DEVELOPMENT.

THE annexed record of some rough experiments made in the laboratory of the Photographic Society of Great Britain and elsewhere during my stay in Europe may be of interest. These experiments place the existence of electrical currents during development beyond all doubt, though it still remains to be seen to what action the currents observed are really due, and what part they take in the production of the developed image. They also clearly show that the currents are in some way intimately connected with the action of the developer on the altered silver bromide, and are not merely due to the decomposition of the developer. It seems probable, too, that they may in some measure be due to action between the moistening fluid and the developer. I hope to be able to go more fully into the question after my return to India.

September 28.—Photographic Society's Laboratory.

1. Edwards' ferrous oxalate developer. Sky and foreground subject. Thomas's landscape films. Current $\frac{1}{10}$ volt towards the foreground or less exposed end of the film.

2. Same film and subject. Developer: 2 grains pyro with sulphite, 2 grains bromide, 2 minims ammonia to the ounce. The current went up very slowly to about $\frac{1}{80}$ volt towards the sky end of the film.

3. Same film, half exposed and half unexposed, in the same developer, gave about half the above current in the direction of the exposed side.

4. Same film, more exposed than before, gave a current about double (2), or $\frac{1}{40}$ volt, towards the exposed side, The poles were then reversed, and the current was slightly stronger, and still towards the exposed side, though on the other side of 0 on the scale.

5. Another strip of same film as last in fresh ferrous oxalate developer gave a current of about $\frac{1}{60}$ volt towards the exposed side.

6. Another strip of same film in Edwards' hydroquinone developer. The current was at first small in the direction of the unexposed side, about $\frac{1}{120}$ volt, but after exposure of the film to the air the needle took a strong impetus in the same direction, and showed a reading of about $\frac{1}{27}$ volt. On changing poles, the current remained still in the direction of the unexposed side. When the silver plates were dipped in the developer there was only very slight current.

7. Another slip of same film as Nos. 1 and 2—sky and foreground—in same hydroquinone developer. The needle at once showed a reading of $\frac{1}{20}$ volt towards the sky side, and remained steady during the first stage of development. After exposure to the air, and more development, the needle went back to about $\frac{1}{40}$ volt, and then remained steady. Further exposure to the air took the needle forward again rather beyond its first point, but it went slowly back. When the foreground side was lowered

further into the developer, the needle went back towards that side. There was a good deal of deposit over the foreground side of the film.

8. Thomas's extra-rapid film, half exposed and half unexposed, in same developer. The needle remained quiescent at 0 for some time; but after the film had been exposed to the air, it marked about $\frac{1}{20}$ volt towards the unexposed side; but afterwards went back, and showed a slight current towards the exposed side. Lowering the exposed side further into the developer sent the needle on in that direction. Lowering the unexposed side reversed the current again very markedly. The final current was about $\frac{1}{80}$ volt in the direction of the exposed side.

9. Another slip of the same film in ferrous oxalate developer. Before developing, there was a polarisation current of about $\frac{1}{30}$ volt towards the exposed side; but, on immersion, the current indicated was about $\frac{1}{20}$ volt in the same direction, but went back to about $\frac{1}{40}$ volt.

10. Another slip of the film used for No. 1, with sky and dark foreground, in the same developer. The current slowly went in the direction of the foreground or less exposed side till it indicated about $\frac{1}{20}$ volt, and remained steady for some minutes. The sky side being lowered into the developer brought back the needle in that direction.

11. Obernetter film—made by Perutz, of Munich—half exposed and half unexposed, in ferrous oxalate developer. The current showed at first about $\frac{1}{27}$ volt towards the unexposed side; then, when the development had proceeded, it turned about as much towards the exposed side, afterwards decreasing to about $\frac{1}{40}$ volt.

12. Thomas's extra-rapid film, half exposed and half unexposed, in Edwards's pyro-potash developer. Developed very slowly, and there was no indication of current for a long time, but after exposure to the air, and movement in the developer, the needle read about $\frac{1}{30}$ volt towards the exposed side.

13. Similar film, in fresh ferrous oxalate developer of ordinary strength (3 : 1), slightly acidified, with acetic acid, and about five drops of a ten per cent. solution of potassium bromide per ounce. The current was about $\frac{1}{80}$ volt in the direction of the exposed side. Lowering the exposed side into the devoloper did not produce much effect; but when the unexposed side was lowered, the needle went off in that direction, and remained steady at about $\frac{1}{20}$ volt.

In all these experiments continuous slips of ordinary celluloid dry plate film were used, the ends of the film being held by silver clips, which were not allowed to touch the developer, and the films were moistened before development by immersion in a solution of potassium bromide at five per cent. The exposed side of the films was always towards the right, and the unexposed towards the left of the observer, and of the 0 point of the galvanometer. The galvanometer employed was a "unit" instrument, by Edelmann, of Munich, which reads from ·005 to 1 volt, with a resistance of 10,000 ohms.

29th September.—Same general conditions as on 28th.

1. Thomas's landscape film, unexposed, in ferrous oxalate developer, same as for No. 13 of 28th. The polarity of the moistened film was slightly towards the left of 0. On putting the film into the developer there was a very small current towards the right. On taking the film out of the solution the needle went to the left; but, putting it back into the developer, it came back to its first position, and remained steady there. The film fogged over during development; the yellow light may have been too strong.

2. Same film, half exposed and half unexposed, in same developer. There was first a slight current ($\frac{1}{200}$ volt) towards the unexposed side; but the needle went back to 0, although a strong developing action went on, and the unexposed side remained quite clear. As the deposit formed on the unexposed side, the tendency of the needle was towards that side, and current indicated was about $\frac{1}{20}$ volt. Putting down the exposed end of the film drew the needle back to beyond the same distance towards the right, and lowering the unexposed side sent it again to the left.

3. Same film exposed on sky and dark foreground, and same developer. The polarity was rather stronger than before in the direction of the less exposed end, but, after immersion of the film, the needle went off rapidly towards the more exposed end to about $\frac{1}{20}$ volt. The foreground did not develop clearly. Lowering the sky end drove the needle back at first, but it afterwards returned to its old position, and beyond. Lowering the foreground end sent the needle back only about $\frac{1}{2}$ division ($\frac{1}{80}$ volt).

4. Thomas's landscape film, exposed all over, same developer. At first there was no current, but, after the film had been exposed to the air, and re-immersed, the needle indicated about $\frac{1}{15}$ volt towards the left, and there remained steady. Lowering the right end, the current went that way. The real current during the development of this film seemed to be almost nothing.

5. Wratten's "ordinary" plate, two slips, one exposed and one unexposed, and immersed in the developer with the gelatine faces opposite to one another, and about one-third inch apart; ferrous oxalate developer. The current was towards the exposed side, but was much smaller than before, the needle indicating about $\frac{1}{80}$ volt, or less. Exposing more of the exposed plate sent the needle towards that side, and *vice versâ*, as with the films.

6. A piece of the same plate, half exposed and half unexposed, but not cut apart; developed in ferrous oxalate, in contact with silver wire conductors. At first the current was the same as the last, but when the deposit was fully formed on the exposed side, the needle went back towards the unexposed side, and then alternated; but the tendency was towards the unexposed side, which remained quite clear.

7. Thomas's landscape film, unexposed; eikonogen developer (eikonogen, 1 part; sodium sulphite, 2 parts; saturated solution, carbonate lithia, 100 parts). There was a slight polarisation towards the right, but, on immersing the moistened film, the needle indicated a current of about $\frac{1}{30}$ volt in the opposite direction, and remained very steady. There was no apparent deposit, and raising or lowering the opposite ends of the film produced little effect, the tendency being always towards the left.

8. Same developer. Another slip of same film, half exposed and half unexposed. Slight polarity towards the unexposed side, and current at first about $\frac{1}{80}$ volt towards the same side, quite steady for some time. After exposure to the air and reimmersion, the exposed end being lowered sent the needle in that direction, indicating about $\frac{1}{35}$ volt, and it remained there. There was a good deal of deal of deposit in the unexposed side.

9. The same repeated, with similar results as to the current observed towards the unexposed side.

10. Strip of Thomas's landscape film exposed on sky and dark foreground; same developer. The polarity was very slight. The needle at first went towards the unexposed side, but came back to 0, and gradually went towards the exposed side till it indicated about $\frac{1}{30}$ volt. Development was very slow. Lowering the film on the sky side made the needle go in that direction, and indicate about $\frac{1}{40}$ volt, or a little more.

11. Strip of Thomas's landscape film completely exposed. The polarity of the moistened film was about $\frac{1}{80}$ volt to the right, but when immersed in the developer the needle indicated about $\frac{1}{200}$ volt to the left. Lowering the right end of the film sent the needle in that direction, but it returned to 0.

12. Two slips of Wratten's ordinary dry plate, one exposed and one unexposed, in same developer, and immersed in the same way as before. No current was observed.

13. Thomas's film, treated in the same way, showed a slight current (about $\frac{1}{200}$ volt) towards the exposed side, but when the film was immersed in some fresh developer the current increased to about $\frac{1}{100}$ volt. Thio-carbamide and bromine added to the developer did not reverse the current.

14. Thomas's film, half exposed and half unexposed, with same developer, containing a few drops of solution of thio-sinamine. The needle remained persistently at 0, or only showed a very slight current towards the exposed side. No reversal.

A great many similar experiments were also made at Constance in the early part of September with the same galvanometer, chiefly with eikonogen and lithia developer, the films being moistened with water, and also with the potassium bromide solution. The currents observed were small, but showed the same uncertainty in direction. With developers containing thio-carbamides there was no such strong indication of reversal of current as was observed in Calcutta, but rather a neutralisation of the current towards the exposed side, the needle generally remaining at 0. In some cases, however, the reversal was observed. It was found that the potassium bromide solution was a much better conductor than plain water, and gave stronger currents.

In some experiments made in the same way at Starbeck, near Harrogate, with the assistance of Mr. J. W. Addyman, usiug a ferrous oxalate developer containing a small proportion of sulphate of copper, the current was almost invariably towards the exposed side, and with Thomas's thickly coated landscape celluloid films, it was as much as ·09 volt, the experiment being repeated more than once with the same result.

The experiment was also tried, at Mr. Addyman's suggestion, of using a series of exposed and unexposed films in separate cells, and a cut-out grating was also used, which enabled the film to be exposed so as to show alternate strips of exposed and unexposed sensitive surface, the ends of the strips in contact with the terminals being also exposed and unexposed. This arrangement gave a very good current towards the exposed side.

A Thomas's landscape film, first exposed under this cut-out grating so that parts of the film were exposed and parts not, and then given a supplementary exposure all over, and developed in eikonogen and lithia developer, first showed a current towards the less exposed side, then towards the more exposed, but as the film became developed all over the needle returned to 0. The same was tried with ferrous oxalate with similar results. Over exposure seemed generally to lower the current and draw the needle towards the less exposed side.

Colonel J. Waterhouse,
Assistant Surveyor-General of India.

Our Editorial Table.

Gelatino-Chloride Paper.

By the Britannia Works Company, Ilford.

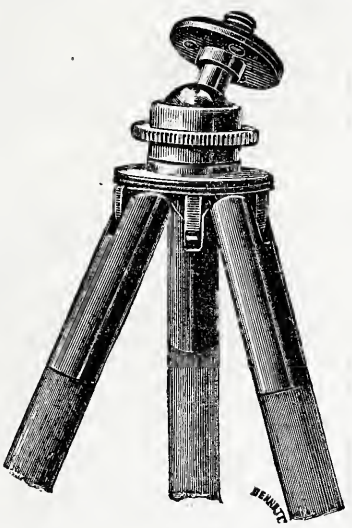
Having heard much of this paper, and of the claims made on its behalf, we tried a sample sent to us with some degree of interest. First of all, the paper itself, as paper, is strong, and of compact fibre. It is, indeed, of a most excellent quality, fine in grain and firm in texture.

It prints with a degree of rapidity that compares favourably with any other paper that we have tried. On looking at the directions for toning, we find it stated that any toning bath will do, although a special one is recommended. Having occasion at the time of trial to be using a carbonate bath, we immersed the prints in it, and treated them in every respect as the others. The Britannia prints toned just like the others, and, moreover, took such a fine tone in the carbonate bath that we did not experience the slightest desire to adopt any other, the Company's recommendation notwithstanding. The fixing was effected in the usual way, and, as a result, we have now before us over a dozen prints than which we could not desire any finer either in tone, vigour, or gradation. We compliment the Britannia Company on the excellence of this, their youngest child.

A Bamboo Stand.

By Henry Park, Acton-street, N.E.

When examining the various exhibits shown at the Hackney Society's Exhibition last week, we were struck by the excellence of the varied exhibit of Mr. Park, and, among other things, of his camera stands. The bamboo stand now under notice has a ball-and-socket arrangement, as shown in the cut, but with this difference, which, although not great, is still an improvement, that instead of the pinching of the ball being effected by the milled head screw shown, the nut in question has radial arms. This, we think, is decidedly advantageous. The movement gives great facilities to the photographer, who is thus enabled, after the stand is planted, to turn his camera in every direction, and then at the proper moment to pinch the ball into absolute rigidity by a touch on one of the radial arms.



By having a screw joint in the centre of each bamboo leg, the tripod can be divided and thus packed up in small space. As a whole, it is both light and rigid.

Wray's Catalogue of Photographic Lenses.

The new catalogue of Mr. W. Wray, of Highgate, contains a well-arranged list of the optical productions of this firm, which include wide and narrow angle rectilinear and landscape lenses, with and without iris diaphragms, and mounted in brass and aluminium. It also includes their Casket Lens, an article of great utility to the traveller who desires to have as much focal efficiency with as little *impedimenta* as possible. A full list of lenses specially constructed for hand cameras finds a prominent place in this catalogue, which is illustrated.

Photography in a Nutshell.

By the "Kernel." London: Iliffe & Son.

The issue of a fourth edition of this book attests the popularity it has attained. By comparing it with the former edition we find that it has been re-written to a considerable extent, and additional matter added. It is well known that Mr. W. Tylar, Birmingham, is the author or compiler of the book, and in the latter part, although separated from the text, we find a full catalogue of photographic requisites, in the manufacture of which he is interested.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,860.—"Aspirator Tank for Developing, Fixing, and Washing of Photographic Dry Plates in a Broad Daylight and in the same Vessel without Touching Liquids during those Operations." L. Nievsky.—*Dated October* 19, 1891.

No. 17,967.—"Improvements in Photography." G. B. Bradshaw.—*Dated October* 20, 1891.

No. 18,034.—"Improvements in Magnesium Flash Lamps for Photographic Purposes." D. Allan.—*Dated October* 21, 1891.

No. 18,219.—"New or Improved Paper for Making Transfer Pictures from Photographs." Communicated by Zahn & Schwarz. Complete specification. W. P. Thompson.—*Dated October* 23, 1891.

No. 18,332.—"Improvements in Photographic Vignetting Glasses." E. Marlow.—*Dated October* 24, 1891.

PATENTS COMPLETED.

Improvemenes in or relating to Regulating Shutters for Photographic Cameras.

No. 19,274. Arthur Samuel Newman, 71, Farringdon-road, London, Middlesex.—*October* 3, 1891.

This invention relates to shutters for photographic cameras, and consists in regulating the speed of the movement of the shutter (that is, to regulate the length of time of exposure) by means of a pneumatic cylinder and piston.

Letters Patent No. 7156, of 1866, were granted to me for an invention in connexion with photographic shutters, in which a pneumatic cylinder and piston are employed for regulating the speed by more or less opening or closing a valve, through which latter air is drawn into or expelled from the cylinder, and, according to the regulated size of the opening, so is the speed regulated.

Now, my present invention is designed to dispense with the said regulating valve and a tight-fitting piston, and instead thereof I use a valveless cylinder having a loosely-fitting piston working therein.

The piston rod is connected to some working part of the shutter slide or to some part of the apparatus connected therewith in any suitable or convenient manner, such as in the manner of connecting up the variable expansion gear or valve gear of a steam engine, in which (as is well understood), by moving the regulating gear, the length of travel or movement of the valve upon the steam parts of the engine is varied; that is, in my present invention the length of movement of the piston itself is thus increased or diminished, and thus acts to regulate the speed of the shutter, and so regulate the time of exposure.

For example, the piston rod connects upon an arm or crank attached to the shutter disc, the position of the outer end of the piston rod upon such arm or crank being varied by means of an adjusting lever, or by means of a set screw or otherwise (just as the position of the valve rod is varied in the link of link-motion valve gear for steam engines) thus varying the length of travel of the piston.

Instead of using the above-mentioned means of varying the length of travel of the piston I can obtain similar results by mounting the cylinder on a slide, swivel, or joint, and varying its position with relation to some working part of the shutter.

The claims in this invention are stated as follows:—1. The combination of a pneumatic valveless cylinder, a piston loosely fitting therein, and a piston rod having the outer end thereof connected to some working part of a photographic shutter, arranged and acting substantially in the manner and for the purposes hereinbefore set forth. 2. In a device or apparatus for regulating the speed of photographic shutters, I claim a valveless pneumatic cylinder, a piston loosely fitting therein, and a piston rod, the outer end of which is connected to some working part of the shutter in combination and in conjunction with a regulating lever connected to said piston rod or other suitable regulating device or arrangement, so that the length of travel of the piston rod, and consequently of the piston, may be varied as desired, substantially in the manner and for the purposes hereinbefore set forth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 3.....	North London	Wellington Hall, Islington, N.
" 3.....	Holmfirth	
" 3.....	Sutton	Sutton Scientific Society's Rooms.
" 3.....	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
" 4.....	Coventry and Midland	The Dispensary, Coventry.
" 4.....	Edinburgh Photo. Society	Professional Hall, 20, George-street.
" 4.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
" 5.....	Bolton Photographic Society ...	The Baths, Bridgman-street.
" 5.....	Leeds	Leeds Mechanics' Institute.
" 5.....	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
" 5.....	Glasgow Photo. Association.....	Philosophical Rooms, 207, Bath-st.
" 5.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.
" 6.....	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
" 6.....	Croydon Micro. Club (Photo. Sec.)	Old School of Art, George-st., Croydn

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

October 27.—Technical meeting.—Mr. J. Spiller in the chair.

The meeting was held in the Exhibition gallery, and the apparatus shown there was explained.

Mr. Howard exhibited and described Mr. W. R. Baker's developing tent, changing bag, and parallel trimmer. The tent is extremely portable, and packs up into a small space. It is easily erected. The plates are handled through sleeves, and an arrangement for the eyes is provided whereby the development or changing may be watched.

Mr. Frank Haes described Messrs. Benham & Froud's "Perfection" and "Holiday" candle lamp.

The Chairman remarked that with candle lamps you never could tell when the candle was exhausted, and suggested an index for the purpose of ascertaining how much of the candle had been consumed.

The exhibits of the Birmingham Photographic Company were explained by Mr. Howard. These included lipped porcelain dishes, and printing frames which admit of the whole of the picture being examined during the progress of the printing. A revolving lamp and several other lamps were also explained.

Mr. A. Gray's "Nameit" system of movable reversed type for printing titles on negatives was exhibited and explained.

Mr. R. C. Murray explained Messrs. Griffin's hand camera, which has several recent improvements. The fixed focus lens has been abolished, a sliding lens tube with a rack and pinion adjustment allowing of different foci being obtained. The plates are contained in a magazine box, which can be

changed in the field. The movement of the plate in passing from the magazine box to the exposing carrier has also been simplified.

Mr. W. GRIFFITHS explained his firm's "Guinea" and other detective and hand cameras, as well as their lantern camera, by which square-sized lantern slides are made from the negative in daylight.

Messrs. P. Harris & Co.'s representative explained the Cytox hand camera, in which the plates are contained in metal sheaths, the twelve exposures being capable of being made in half a minute.

Mr. HOWARD explained Hudson's magnesium lamp, which is so constructed as to allow of time exposures being given. Several excellent negatives and prints obtained with it were exhibited. Reservoirs are charged with magnesium, and one at the top of the lamp with spirit; a current of air is passed through from below by pneumatic pressure, which may be regulated to any degree of pressure. Instantaneous and time exposures may be given. In reply to questions, it was said that an admixture of weak daylight with the magnesium light would not prove harmful. For an exposure of thirty seconds, sixty to seventy grains of magnesium would be required, or, roughly, two grains per second.

Mr. EDGAR CLIFTON exhibited and explained the London Stereoscopic Company's Twin Artists' Hand Camera; the original Artists' hand camera; a magazine camera, in which the principle of discharging the plates was analogous to the system adopted in the Key Camera; and the Photoscript rubber-faced types and holders for printing titles on negatives.

Messrs. Morley & Cooper's new cameras were explained by Mr. HOWARD. One of them—a half-plate—was said to be the lightest of its size made.

The Paget Company's Glass-cutting Machine was exhibited and explained in action by Mr. W. J. WILSON, who justified the extreme need of such a machine on the ground that since hand cameras had come into vogue a great demand had arisen for accurately cut small plates. Two persons only were requisite for the machine; and, if speed were not a *desideratum*, one could attend to it.

Messrs. Oeffelein & Co., in exhibiting their burnt-in photographs on glass, explained that the images consisted of gold, which might be obtained in a great variety of colours. The surfaces of the enamels might be made glossy or matt. The process was no dearer than paper printing. A hundred enamels could be made in a day of ten hours, and each one had to be fired separately.

Mr. VELASCO exhibited and explained Messrs. Ross & Co's new portable divided camera.

Mr. T. SAMUELS explained his hand camera interchangeable boxes.

Messrs. Wilson's Marvel hand camera, and Mr. Spurge's actinometer were also described.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 22,—Mr. W. H. Harrison in the chair.

Mr. C. Lawrance, a visitor, exhibited the "Clifford" hand camera, which possesses several novel features. The shutter is capable of giving a considerable number of exposures without re-winding, its speed being about the fiftieth part of a second, which, however, can be reduced, by applying a brake, to half a second. The plates or films are contained in a book of sheaths hinged together at the bottom, with a front cover to protect the first plate. To let this cover down, a small knob is drawn, and upon the release an indicator will denote that the first plate is in position. Each movement of the knob changes a plate, until all are exposed.

Mr. Lawrance was thanked for affording the members an opportunity of examining his highly ingenious camera.

Mr. HENDERSON introduced the subject of packing unexposed plates by the makers, and complained of the markings which the paper placed between large plates gave. About three months ago he bought two gross of lantern plates. Those he used at the time were splendid plates, but others subsequently employed were spoilt by the paper markings. He recommended tinfoil instead of paper for the purpose, and exhibited some plates with the markings he complained of.

Mr. COWAN remarked that the defect did not appear to him to be due to the paper packing, but rather to light which might have reached the plates through the brown paper when the plates were removed from the box.

Mr. DRAGE said he had had plates spoilt in this manner.

The CHAIRMAN inquired if any one had had experience of drying plates *in vacuo*.

Mr. HENDERSON said this was the plan for seasoning dried wood, and he thought it would answer well with gelatine plates. Decomposition of the gelatine would be prevented by drying plates in cold dried air.

Mr. DEBENHAM, in reference to the packing, mentioned the Seed Company's method, in which a cardboard mat was used.

The CHAIRMAN said that, by drying plates in a vacuum, dust and dirt would be obviated.

Mr. HENDERSON moved a resolution to the effect that, as some makers' method of packing with paper sometimes produced markings on the plates, it was desirable a better method should be adopted.

The resolution, which also suggested the use of tinfoil for the purpose, when put to the meeting, was carried.

Mr. TEAPE, in connexion with the non-actinic colour of caramel, said that, thinking it might be useful for dark-room windows, he had exposed some diamond shape cuttings of a plate through an amber-coloured film of caramel, as well as through two thicknesses of golden fabric, to lamp-light and magnesium. He exhibited the plate, from which they would see the slight difference in the results. Caramel, used in thin films, was thoroughly successful for the purpose. The images on the plate took sixteen minutes to develop. In reply to a question as to whether damp would affect the gelatine film of caramel, he said he would use such a film between two thicknesses of glass.

Mr. DEBENHAM said he suggested this use for caramel when originally introducing the subject, but personally he preferred golden fabric as a dark-room illuminant.

A question from the box was: "How shall one proceed with hydroquinone development on gelatine lantern plates, first, to get density from thin negatives; secondly, to get soft transparencies from intense negatives." In the latter case Mr. HENDERSON advised full exposure and a weak developer. He promised to bring some transparencies from a thin negative to illustrate the excellent results which might be obtained from thin negatives. Much, if not all, depended on accurate exposures.

It being understood that this question would form the subject of a discussion at a future date, the meeting closed.

CAMERA CLUB.

OCTOBER 22.—Mr. HENRY SUTTON read a paper and gave a demonstration on the subject of *Reversals*. Mr. Lyonel Clark occupied the chair. The lecturer exposed a plate to magnesium light a sufficient time to produce the insensitive state of the plate by oxidation, and another plate not so treated was taken, and the pair exposed in contact with a negative. One plate gave a reversal and the other showed the undevelopable and insensitive state. The plates used were isochromatic plates, and they were put into the frame in the full light of the room. Mr. Sutton also showed experimentally how a similar appearance to the "dark flash" in lightning photographs could be produced by magnesium light.

In the discussion which followed, the CHAIRMAN referred to the early and complete experiments in reversal carried out by Claudet, and to the recent book of Mr. Clayden in regard to electricity and the dark-flash phenomenon in photography.

On Monday, October 26, a large number of lantern slides was exhibited, about 350 transparencies being shown.

On Monday, November 2, the monthly Smoking Concert will be given. On Thursday, November 5, Dr. J. J. Acworth will read a paper on *The Action of Light and Heat upon the Haloid Silver Salts.*

STEREOSCOPIC CLUB.

THE ordinary monthly meeting of this Club was held on Monday, October 26.—Mr. W. J. Cunliffe, President, in the chair.

Mr. LOUIS WECHSTER read a paper on *The Art Side of Photography*, in which he said that photographers were generally too anxious to excel in the technical, but neglected the art side of photography. There were hard-and-fast rules in every art, which could not be ignored, and the chief point in the picture must be—first, good effect of light and shade, which can only be done by massing the lights and darks, and by keeping the light well in the picture. There must be only one high light; other lights may be introduced sparingly, but must not compete with the high light. Good effects of light and shade may be obtained by light falling across the scene, or in front—say, behind a tree, a building, a cloud, &c.; but with the sun behind the camera, the view is too equally lighted, and consequently "flat." Black and white buildings, such, for example, as Bramhall Hall, with its black and white "dabs" occurring alternately, should be avoided as much as possible; but when such a subject must be photographed, try and cover up a large portion by trees, and do not allow the building to occupy the whole of the picture, as the effect is like that of a lattice door with a strong sun behind it, and is very irritating to the eyes. Similar bad effects are produced by light streaming between trees, or by the light falling upon leaves of trees which are wet with rain, they reflect too much light, and are "spotty." "Relief" obtained by opposing a light against a dark, or *vice versâ*, is often taken advantage of by artists, but they are careful not to repeat the process often, or they would produce the "lattice door" effect. (At this point several engravings from the painting of Orchardson and other artists were introduced to illustrate the lecturer's remarks.) Mr. Wechster deprecated the prevailing fashion in lantern slides, which was to make them too hard, too black and white. Sharpness and detail he did not despise, but it must not appear in a picture to the detriment of a good scheme of light and shade. He condemned "smudges." (Here several water-colour sketches by the lecturer were introduced to show the effect of schemes of light and shade.) Next in importance to a good scheme of light and shade was a pleasing variety in the lines of a picture. This is often easily obtained by judiciously selecting the point of light. He illustrated by diagrams how, by fixing the point of sight too near the margin, violent perspective was produced, and how, having the point of sight in the centre of a street scene, the lines were too formal and equal, and advocated fixing the point of sight about one-third from the side and one-third from the top or bottom, as producing the most pleasing effects. The horizon line, as a rule, should be one-third from the top or bottom, but he mentioned instances where this rule might be modified with advantage. In landscapes the diagonal line was usually adopted, but it must be balanced by another line running in a contrary direction—that is to say, suppose the lines took the form of a wedge, then the point of the wedge must be balanced by the lines running in a contrary direction, or there will be an uncomfortable impression conveyed that the mass is slipping down out of the picture. The balancing lines may be in the clouds. For buildings in landscapes the oblique view is to be preferred, as not only giving the most pleasing variety of lines, but showing the proportions to greater advantage. For interiors, when figures are the more important, the parallel view is often preferred, the background being of secondary importance, as the variety of lines should be secured by the grouping of the figures, the favourite lines for figures being the pyramid or succession of pyramids. (Illustrations were again given.) Coming to the strong points of a picture—landscapes and interiors with figures—the lecturer said there was a popular but erroneous idea that this was in the centre of the picture, but it was not so; the strong points were at about one-third from the bottom or top, and in the same proportion as to the sides of the picture. Thus, a good plan is to make lead-pencil lines on the ground glass of the camera for guidance in this matter. As to the choice of subjects, it was difficult to say what was good, and, judging from paintings, it seemed that good pictures could be made out of most unlikely subjects if based upon rules of art. Another important rule, often neglected by photographers, was that there should be "unity of thought." Let us suppose a picture intended to represent "Returning from Work;" the scene, a cornfield. Now, if the sun is in the meridian, the corn not cut, and the labourers returning, with their dinners—judging from their baskets—not eaten, that would

destroy unity of thought. When introducing figures in landscapes, care should be taken not to have them too near the margin. Figures attract the eye as lights do, and, when too near the margin, carry the eye out of the picture. Avoid such things as cutting off a bridge in the middle, but arrange that its support is included, or the thing will look dangerous and ridiculous. Avoid cutting off a tree-trunk above its roots, or you may puzzle some botanist to know how it has grown without roots. Avoid leaves or twigs appearing if you have cut off their supports, or their support is not suggested. Avoid a leg appearing if there is nothing to suggest that it belongs to a man not far off; in fact, avoid all such stupid things—a little thought will prevent such mistakes. For the study of light, and shade, and lines, the lecturer recommended the study of engravings of work by Turner and Birket Foster, and, in confirmation of the rules he had quoted, showed numerous engravings of paintings by Stansfield, Millais, Landseer, David Roberts, Hacker, Ferriers, McNab, Orchardson, and others.

At the conclusion of the lecture a lantern exhibition of members' slides was conducted by Mr. Wild, and as the pictures appeared on the screen they were criticised by Mr. Wechster.

WEST LONDON PHOTOGRAPHIC SOCIETY.

October 23.—The new aëro-carbon incandescent lamp for the optical lantern was shown by Mr. J. R. Pooles, of the Incandescent Gas Light Company of Westminster. Having shown a few slides through the lantern, when the purity and steadiness of the light were remarked on by the members, Mr. Pooles explained the working of the apparatus. It consists of a gas apparatus of a very portable description, which feeds a burner fitted with a Zirconium mantle, rendering it instantaneously incandescent, and giving a light of 150 to 180 candle power at a very small cost. Ordinary house gas can be used, but the light would be much inferior in quality. The burners will last about a year. The apparatus can be seen at the Company's offices, 14, Palmer-street, Westminster, any day.

The President thought the light would be found most useful to amateurs, doing away with the dangerous oxyhydrogen and the messy oil lamps, and would be specially appreciated by nervous ladies.

A hearty vote of thanks to Mr. Pooles and the Company for their interesting demonstration was passed.

The President then read his address to the members, congratulating them on the continued prosperity of the Society, which had increased its membership during the past year. They had had a most successful exhibition, which had been praised alike by the judges and the press, and their exhibit at the Crystal Palace, in the competition for the Challenge Cup, had run the winning Society's one very close, and, in the opinion of some, had surpassed it. They had had more medalled pictures in their alcove than any other society, and their only fault was that their pictures were too small; but if, as he proposed, the Society purchased a large camera—say 15 × 12—for the use of the members, this fault in a future year would be avoided. He also referred to the question of cheap railway fares for photographers, which the Society had brought very prominently forward during the year, and regretted that, notwithstanding the support they had received from the other Societies and the press, they had been unsuccessful. Having referred shortly to the Federation Scheme, he called on all the members to work together for the common good, and to try and get new members, so that they might be in a position to acquire a home of their own, with all the comforts such a luxury would mean. They had had provided for them, he said, a very tempting programme for the ensuing session, but if any of them could persuade either members or non-members to offer fresh papers or demonstrations for the benefit of the Society, they could easily find room for them. He finished an interesting address by referring in laudatory terms to the work the officers had so ably performed in the past, and was sure the Society would receive the same attention in the future.

The lantern was then brought into requisition, when slides by Messrs. Bennett, Chang, Freeman, Hodges, Holmes, Rogers, & Whitear, and some prize slides of Messrs. West & Son, kindly brought by Mr. Winter, were shown on the screen.

Mr. Whiting made some few remarks on the question of halation and the backing of plates, and exhibited a plate he had exposed for thirty seconds to lamp-light, half backed and half unbacked, when the difference was very apparent.

After some remarks by Mr. Hodges, who found that he got very little halation when using isochromatic plates, even under trying circumstances, the matter was dropped.

A vote of thanks to the President for his address terminated the proceedings.

The next meeting, a technical one, will be held on November 13, when members are requested to bring any object of interest with them, either for inspection or demonstration.

RICHMOND CAMERA CLUB.

October 23.—Mr. Cembrano, the newly elected President, was in the chair, and, from the comparatively minor matter of "backing plates," an interesting and useful discussion on the theory, causes, and prevention of halation was evolved.

Mr. Davis opened the ball, showing three church interiors taken on plates backed with red paper squeezed on with glycerine. One, comprising a west window of coloured glass with the sun on it, showed very little halation, while the other two were halated to a perfectly shocking degree.

Mr. Kidd attributed the extent of the halation of these partly to under-exposure and partly to the developer used (eikonogen) being too vigorous. He then experimented on one of the plates, and succeeded in considerably lessening the mischief by rubbing down with alcohol.

Mr. Ardaseer clearly explained the theory of halation and of the preventive effect of backing the plate with a substance which should reflect no rays, or such only as are innocuous.

The President gave the result of experiments made by different workers with backed and unbacked plates, and with plates backed with various substances, as paper, burnt sienna and dextrine, collodion stained with aurin and caramel, of which caramel was claimed to be the most effectual.

Several other members took part in the discussion.

To give a practical turn to next week's discussion on *Flashlight Photography*, the President promised to take a flashlight photograph of the members present.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

October 26,—Mr. F. W. Cox in the chair.

Mr. T. F. Smith, F.R.M.S., delivered a lecture on *Microscopic Photography* before about sixty members and visitors, the latter being chiefly medical gentlemen practising in the neighbourhood. The lecturer entered fully into all details of the science, and, demonstrating with the apparatus as he went along, showed how to place the flame of the lamp flat or edgeways according to the focus and angular aperture of the objective employed, as also how to centre the light. He proceeded to make several negatives, using isochromatic plates for the purpose. The demonstration being completed, about eighty slides of Mr. Smith's making were shown upon the screen, and were thoroughly explained by Mr. Smith. Amongst them were bacillus anthracas, Koch's coma bacillus, the tubercle bacillus, the microbe of leprosy, the microbe of caries of teeth, and about twenty other specimens of a similar nature. The other objects were diatoms and specimens of insect and vegetable structure.

CROYDON CAMERA CLUB.

October 12 and 26,—The President (Mr. H. Maclean, F.G.S.) in the chair.

On the former date, flashlight photography was explained and demonstrated by the Hon. Secretary. The exposures were effected by electricity firing several charges of magnesium and guncotton simultaneously. On the 26th, members' slides were projected upon the screen, Mr. White operating the lantern. The following gentlemen exhibited their work:—Messrs. Oakley, Brown, Cheshire, Isaacs, Samson, and White. Several of the slides were of notable quality and beauty, perhaps most satisfactory being a sunset on the lower Thames, with fine cloud effects, by Mr. Brown. A resolution was adopted asking the Council to consider the feasibility of holding an exhibition in 1892.

The next meeting is on Monday, November 9, when Mr. C. F. Oakley will describe the making of large-sized transparencies.

The following gentlemen were elected members:—Messrs. W. Daniells, Harry Letts, and James Packham.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

October 21,—Mr. W. J. Harrison, F.G.S., in the chair.

Mr. A. W. Wills, J.P., gave his lecture on *Burmah and its People*, illustrating his description with limelight views. Mr. Wills has lately returned from an extended tour in the East, where he used his camera with great success. The slides were his own work, and the applause with which some were received was well merited. The oxyhydrogen lantern was well manipulated by Mr. E. H. Jaques.

OXFORD PHOTOGRAPHIC SOCIETY.

October 20,—Mr. E. A. Ryman-Hall in the chair.

Mr. J. Bretland Farmer, M.A. (Magdalen College), Mr. R. A. R. Bennett, B.A. (Magdalen College), Mr. J. F. Burnett, F.C.S., Mr. F. J. Gadney, and Mr. J. Squire were elected members.

Mr. W. J. Williams resigned, leaving Oxford.

A special meeting then took place to finally revise the rules.

BURY PHOTOGRAPHIC AND ARTS CLUB.

October 21.—Annual Meeting.—The President (Mr. William Booth) in the chair.

The election of Officers and Council was proceeded with:—*President:* Mr. Robert Grundy, jun.—*Vice-Presidents:* Messrs. William Booth and C. H. Openshaw.—*Treasurer:* T. R. Bertwistle.—*Secretary:* Roger Wood.

The newly elected President thanked the members for the honour conferred upon him, and hoped they would rally round him, attend the meetings, and not be afraid of placing questions in the box set apart for them. He promised that there should be no lack of demonstrations, &c., if the members would only encourage him by their presence. He requested the members to make a good show at the exhibition to be held from November 19 to 24.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

October 21.—Annual lantern exhibition. The Hall was crowded to excess. The first part consisted of the lecture set *One Thousand Miles up the Nile*, followed by a selection of the members' own work and dissolving effect slides. Mr. William Shaw Adamson (the President), occupied the chair, and Mr. A. R. McLean Murray, F.E.I.S., gave the descriptive lecture. The lantern was under the charge of Messrs. Dakers and Innes. This has been the most successful exhibition given by this Society. Great interest is taken in its work by the townspeople, of whom one-tenth witnessed this exhibition.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

October 22.—The opening monthly meeting. Eleven gentlemen were proposed for membership, and unanimously elected.

Mr. John Morison, jun. (President), in his opening address, referred to the late exhibition in the Fine Art Institute, and congratulated the Society on its great success.

A discussion was initiated by Mr. William Goodwin (Hon. Secretary), on *Printing and Toning*.

The proceedings were brought to a termination by the usual exhibition of optical lantern slides.

BERLIN PRACTICAL PHOTOGRAPHERS.

October 7,—Herr Schaarwüchter in the chair.

The proceeding commenced by a feeling allusion to the late Carl Suck on the part of the Chairman, after which the latter proceeded to read his paper on the *Dresden Albumen Paper Manufactory*. The paper employed is exclusively that manufactured by Rives. Of the 40,000 reams manufactured yearly by that firm, the Dresden manufactory takes about 36,000. In spite of the efforts of English and American firms, the German albumen paper has not suffered any serious competition in the markets of the world. Herr Schaarwüchter then proceeded to combat certain prejudices which he said prevailed in reference to this branch of manufacture. Thus the albumen is not, as frequently supposed, employed either in a decomposed or adulterated condition, but, on the contrary, only pure albumen from "blameless" eggs is made use of. For the three-star brand about 40,000 eggs are consumed daily. The yolks are treated with chemicals, and supplied to leather manufacturers for tanning leather. The eggs are broken by hand, the good being separated from the bad ones, and the yolks from the whites. The whites are then introduced into a large drum, driven by steam, in which they are beaten up into froth in a few hours. It is then drawn off and permitted to settle for two or three days. After this it is beaten up by hand and filtered. The necessary salt and colouring matter is then added, and the coating of the paper proceeded with. This is performed by girls in a room heated to a very high temperature, 26° to 28° R. The drying and hot-pressing is conducted between sheets of zinc. It is of importance that the paper should be kept for some time in stock before being supplied to the consumer, preferably in rooms at a temperature of from 13° to 15° R. The temperature at which the silvering is conducted is also of importance. The solution should be 16° to 18° R., and the air should not be less than 20° R. The firm also supply a certain kind of paper, ready silvered, for the use of amateurs. No work is carried on during the winter, as it is then impossible to procure albumin of the right quality.

Herr Hack, of Stuttgart, described the manner in which he had prevailed on Steinheil, of Munich, to manufacture a lens enabling a life-size portrait to be taken direct. This Steinheil, after calculations extending over nine months, succeeded in accomplishing. It seems strange that the resulting lens had a diameter of only two and a half inches. Herr Hack also described the flash-light installation which he employed in conjunction with this lens.

After some remarks by Herr Penz on flashlight photography on the stage, and by Herr Schenrich on a new method of transferring prints mounted on glass to cardboard, the proceedings came to a conclusion.

Correspondence.

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

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the Editor.

Sir,—In your Journal of October 16 I find reference to Mr. Dallmeyer's new objective, intended for photographing distant objects.

I wish to point out that I have been occupied with the same subject, and have already constructed a system of lenses, and applied for a patent in Germany. My objective consists of a combination of convex lenses of positive focus, and a combination of concave lenses. The first combination is of longer focus than the latter. The whole instrument is constructed on the principle shown in the diagram below. It is formed on the principle of the Gallilean telescope, but having reference to the object in view, it differs considerably in detail from it.

I request you to publish this note in your valued Journal, and thereby secure recognition of my being the first inventor.—I am, yours, &c.,

Dr. A. Miethe,

Editor "Photographisches Wochenblatt," *and Hon. Member of the Photographic Society of Great Britain.*

Potsdam, October 22, 1891.

P.S.—If Mr. Dallmeyer's invention should be based upon another principle, I would still be obliged by your publishing this.

[By a mistake of the engraver the larger or positive lens in this combination is shown as a nearly equi-curved convex. It should in reality be a crossed lens, that is, one in which the front surface has a much greater degree of convexity than the back surface.—Ed.]

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the Editor.

Sir,—Some time ago—in fact, during the last total eclipse of the moon, in 1888—it occurred to me that the amplification of the small image of the moon on the ground glass (by a lens 32-inch focus) might be made by the aid of a second camera with a lens of short focus, as might be done in the case of an enlargement. After focussing both cameras and removing the ground glass of the first camera, a bright and enlarged image of the moon was visible.

In this case the magnification *was done in air*. Is this a clumsy attempt at what the new lens of Dallmeyer will accomplish?—I am, yours, &c., G. D. Harrison.

Staffordshire Potteries Water Works Company, Albion-street, Hanley, October 21, 1891.

BACKING PLATES.

To the Editor.

Sir,—Reading in your Journal so many arguments for and against backing plates, I venture to give my experience.

I find backing, if put on *close* enough to the glass, is of great service in giving good definition, especially in cases of strong contrasts of light and shade—exposing for the shadows as short as possible. Laying the plates, film side down, on brown paper, I coat them with the dead black varnish (used for cameras, &c.); this dries almost as soon as applied. When dry, place in the slides with usual black division. Develop, wash, and fix as if nothing was on back of plate. During washing, lay a knife, edge flat, on back of plate, and firmly scrape. This will remove backing, and leave the plate clean in as much time as it usually takes to clean a plate ordinarily.—I am, yonrs, &c. A. G. Salvucci.

48, *Richmond-road, Bayswater, October* 23, 1891.

ABOLITION OF HYPO.

To the Editor.

Sir,—Anent Mr. Forrest's letter *in re* "Hypo-Sulphite Soda," I only ask two questions. Has he tried hypo of potash, and (fully believing in his assertion that soda is a "master," and a bad one) why has soda held its place so long, if it be not a question of £ *s. d.*? Potash washes out like soap, not so soda—I am, yours, &c. W. T. F. M'Ingall.

Greenhithe, Kent, October 26, 1891.

THE NEW IRON PROCESS

To the Editor.

Sir,—Will you be so kind as to find space in your next publication for my most emphatic denial of all knowledge of the presence of silver in the paper I gave Mr. Varley.—I am, yours, &c., Friese Greene.

92, *Piccadilly, W., October* 27, 1891.

P.S.—*Requiescat in Pace*:—The infant with *two* fathers.

Such an abnormal offspring as the super-sensitive iron salt having two fathers could hardly be expected long to survive its *unnatural* appearance in this vale of photographic tears. In course of time, with one paternity his ferric lineage will be well established, and the argentous bar-sinister be removed by the parent who did *not* throttle him.

MR. TEAPE'S EXPERIMENTS.

To the Editor.

Sir,—In your last issue, I find in the report of the London and Provincial Photographic Association the following:—"He (Mr. Teape) exposed two halves of a plate to thirty inches of magnesium, and, with Mr. Burton's developer, failed to produce any sign of a reversal in fifteen minutes. With his own developer (hydroquinone), development was complete in twelve minutes." I think you will agree that most of your readers will come to the conclusion that no result was obtained with Mr. Burton's developer by me. As the name of a well-known experimental worker is mentioned, I think the complete experiment should be made known. Having succeeded so well in obtaining reversals with a modified hydroquinone developer, I thought I would compare it with those recommended by Mr. Burton for the same purpose. This I did in the following way. A plate (an Ilford Ordinary), was put in contact with a negative, and exposed to thirty inches of magnesium, burnt at twelve inches distance. The plate then cut in half—one half put into Mr. Burton's developer, the other in my own. The half in my developer developed in twelve minutes to a complete negative, with rather more density than the original. In fifteen minutes there was no sign of an image on the other half in pyro. I now added (a drachm at a time) four drachms of a ten-grain solution of carbonate of soda (the alkali used in Mr. Burton's formula). This completed the development in thirty-seven minutes, and the result a complete negative, with a little more density than the other half. Had the development been checked about one or two minutes sooner, the two halves would be the same in density.

I may just say that it is rather difficult to judge exactly the density of these reversals before fixing.—I am, yours, &c., J. S. Teape.

London, N., October 26, 1891.

THE PHOTOGRAPHIC CLUB.

To the EDITOR.

SIR,—"A Suburban Member of the Photographic Club," in your issue of the 23rd inst., communicates certain views on the management thereof. It surprises me to find published such a reference to a private association of gentlemen interested in photography. Their arrangements are not the concern of the photographic public, and it shows great want of taste in the writer to publish his suggestions in the public journals, this matter being of no concern to any but the members of this social club. If any suburban member has any suggestion or motion to make on the subject he refers to or any other, it is open to him to speak thereon, and record his vote at the general meeting of the Club which takes place on November 4. If he thinks he has a duty to perform that is his proper course, and not by an attempt at public agitation to save himself the trouble in what is an entirely a private matter.—I am, yours, &c.

Paulatin Club, October 25, 1891. HENRY E. DAVIS.

To the EDITOR.

SIR,—Your correspondent, "A Suburban Member of the Photographic Club," raises a point which will, I believe, be before the annual meeting of members, which is fixed to take place very shortly—early in November, I think. I should like to express a hope that the Club will adhere to its present custom of not publishing a record of its doings from week to week.

The vitality of the Photographic Club, as indeed of all others, depends upon its regular attenders, and it mainly exists for their benefit. What good will notoriety or advertisement do for it? None that I can see. The Club is in easy circumstances, has capital meetings, and its members are animated by a social and fraternal good feeling. Let the other Societies, if they will, see themselves in print in *all* the photographic publications, but the Photographic Club should remain as it is, the most social and sociable, and the most practical and *unreported*.—I am, yours, &c., S. HERBERT FRY.

Kingston-on-Thames.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITOR.

SIR,—I shall feel obliged if you will kindly announce in the columns of the JOURNAL that the Council of the Photographic Society of Great Britain have, with their customary kindness to us, allowed the exhibition of their Society, at the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, S.W., to be used for the benefit of this Association on the evening of Friday, the 6th November next. There will be an exhibition of lantern slides at 8.45 p.m., when specially selected slides will be shown. Doors open at seven. Tickets of admission, price 6*d.*, can be obtained from the attendants at the Gallery, or from, yours, &c.,

H. J. BEASLEY, *Hon. Secretary.*

65 *and* 66, *Chancery-lane, W.C.*

A PHOTOGRAPHERS' ASSISTANTS' CLUB.

To the EDITOR.

SIR,—Seeing that we have so many and various photographic associations and clubs, I am rather surprisedthat we cannot boast of having a club for photographers' operatives. If we consider what a boon such a club would be for the photographers' assistants, I think it highly desirable that no time should be lost in starting at once with the formation of this long-missed institution. Please let me give a rough idea of what character this club ought to be.

Firstly, educational, by giving weekly one night for lecturing or reading on photographic matters.

Keeping a free library and a reading room open every day.

Having an annual exhibition of members *own* work.

Secondly, social, by having one night every week for social gatherings, flavoured with magic lantern entertainments.

If possible, an annual excursion.

Thirdly, beneficially, by keeping a free registry for vacancies.

These are, of course, only rough outlines on which such a club could be started, and undoubtedly a great many more items might be added. If, therefore, any of your esteemed readers should feel inclined in giving their aid in establishing a "Photographers' Assistants' Club," they might communicate with me at once, so that an early general meeting might be called together where matters might be discussed more fully.—I am, yours, &c., OPERATIVE.

74 *Rattray-road, Brixton, S.W.*

VAN DER WEYDE'S EXHIBITS.

To the EDITOR.

SIR,—There are two inaccuracies in your JOURNAL which I beg you will be good enough to allow me to rectify. In the second notice of the Pall Mall Exhibition you say that the high lights in my *Dene Group* have been intensified by hand. You probably overlooked a small tablet in the frame which declares that none of the negatives have been retouched, except to correct the complexions, and that not a single high light has been tampered with. This reminds me that there is another tablet stating that "all *except one* are by electric light." Can the profession detect that one?

I also notice it stated last week by a correspondent, "Free Lance," that I resigned my membership because I was chagrined at not getting a medal for this same picture. Now, though it's a great nuisance, I suppose one has to answer such insinuations.

In the first place, my resignation had nothing to do with the *Dene Group*, but with the *Countess de Grey Group*, therefore it cannot be dragged into this matter.

No! I felt compelled to resign because, as I explained in my letter, the same unjust charge of my having knowingly sent an ineligible picture for competition having been made the year before, the repetition of it now left me no other alternative.—I am, yours, &c.,

182, *Regent-street, W., October* 28, 1891. HENRY VAN DER WEYDE.

PHOTOGRAPHIC SURVEY CLUB.

To the EDITOR.

SIR,—We are trying to form a Photographic Survey Club for the county of Stafford. Circulars have been sent round to those likely to attend, and we shall feel obliged if you will kindly make mention of it in your next issue. We enclose circular.—We are, yours, &c.,

A. J. CADDIE, *Librarian, Stoke-on-Trent Free Library.*
W. A. MEIGH, *Stoke-on-Trent.*

Ash Hall, Stoke-on-Trent, October 28, 1891.

Answers to Correspondents.

All matters for the text portion of this* JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "*THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

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

PHOTOGRAPHS REGISTERED:

H. G. Pike, Lichfield.—*Photograph of Oil Painting of Lichfield Cathedral.*

C. R. Richards, Barrow-in-Furness.—*Three Portraits of the Right Hon. the Earl of Lathom.*

F. G. S.—1. See our notice of Stock's lamp last week. 2. Probably camphor.

R. M. C.—At pages 752 and 753 of our ALMANAC for 1891 you will find several formulæ for the preparation of negative varnishes.

LOCHIEL.—Poitevin's process, described at page 365 of the ALMANAC for 1889, will instruct you how to obtain black lines on a white ground in copying tracings.

COL. GUBBINS.—The Vergara album is, we believe, no longer to be obtained commercially. We are under the impression that it was not a patented article.

FILM.—You must consult an analytical chemist. The identity of unfamiliar chemicals cannot be determined without careful analysis—which we have no time for.

JAS. NICHOLS.—Probably a little sulphide of antimony would accelerate the combustion of your flashlight mixture, but great care is necessary in employing it.

T. BRAY asks why it is that so many "opalines" fade, while similar prints, mounted on card, do not? Our correspondent will find the reason given on another page.

R. W. C. (Norwich).—If you address Mr. W. E. Debenham, at the Polytechnic Institute, Regent-street, he will probably send you the syllabus of the lectures he is now delivering there, which will guide you.

FITTINGS says: "Will you kindly inform me the name and address of manufacturers of brass fittings for cameras?"—Messrs. Lancaster & Sons, of Birmingham, will probably be able to supply you with them.

W. M. asks the best means of repairing an opal which is broken right across, but shows very slightly when joined together. Being of some value, he wishes to make some use of it if possible.—We fear that there is no method of repairing likely to conceal the join.

PICKWICK.—The experience of the gentleman referred to must be exceptional. We had never before heard that collodion negatives became denser by keeping: that is, if they were produced in the ordinary way—developed with iron, and brought up to printing density with pyro and silver.

FLASHLIGHT asks: "Will you kindly let me know the name of the maker of the flashlight which won the highest award in the Pall Mall Exhibition now on, or will you let me know the name and address of the one you think the best maker?"—1. To our knowledge no flashlamp received any award at the Photographic Exhibition now on. 2. Consult our advertising columns.

C. STERNE.—Of all the lenses at your command, we should say, under the circumstances, use the orthographic for taking the group. It will cover better than any of the others, because of its longer focus. It will give better definition over the whole field with its full aperture than any of the others when considerably stopped down. The portrait lenses when stopped down could not be expected to cover, with a group of fifty people, more than ten inches by eight. The best lens for the purpose would be a "rapid" of about sixteen inches focus.

W. A. C. asks why it is that some plates he has all develop with an iridescent or "metallic-like" appearance for about half an inch round the edges, and this no matter what developer he employed?—The reason is that the plates are of an old make—that is, they have been in stock for a long time. Changing the developer will be of no avail. The fault is with the plates.

S. Bower.—The albumen process is now but little practised for lantern slides. Although the results by it are as yet unsurpassed, dry plates are running them very close. Far less skill is required for working commercial dry plates specially prepared for the purpose, or collodio-bromide, than albumen. Ready-prepared albumen plates are, so far as we are aware, not supplied commercially.

H. H.—The term "dilute acid" is no criterion of the strength of a solution. An acid solution may be "diluted" with twice, twenty, or even a hundred times its bulk of water. The addition of silver nitrate in solution to ordinary water proves the presence of chlorides by the milky appearance it instantly assumes; permanganate of potash is a test for organic impurities, which are indicated by a brown colouration of the solution.

M. A. (Cambs.)—All that has been published with regard to photogravure has appeared in our columns, and will be found in back volumes. Those who work this and analogous processes commercially do not publish the details of their methods. Hence we fear you will have to rely very much upon your own experimenting. We strongly suspect if all the secrets of the most successful workers were known they could be expressed in two words—skill and experience.

T. H. Jones.—If you be really proficient in all the different branches of the business you enumerate, you ought to be valuable to your employer. With regard to the salary you ought to expect, that must depend upon the degree of proficiency and the class of establishment you are in. Many who understand far less branches than you profess to do—say simply taking portraits—receive as much as from one to three hundred pounds and upwards a year. All will depend upon real ability.

Flap says: "Can you inform me, without seeing plate, why the film should float clean off the glass—developed with hydroquinone (maker's formula), fixed, and placed in water with others? Two were discovered as above ten minutes after placing them in the water. Am I not entitled to damages from makers, as I am put to additional expense by hiring a conveyance to take the subject again?"—A variety of causes would produce this, and not necessarily an inherent defect of the plates. We cannot undertake to give an opinion which would have any bearing on the matter suggested by your second question.

W. Varney asks: "1. Where could I get a steel die for stamping photographs? 2. Where could I obtain an air-brush? I do not see the advertisement in your Journal now. Could you also tell me if the air-brush is a really trustworthy instrument for finishing enlargements, &c."—1. Any die sinker would cut one to order. 2. We do not know the present address of the Air-brush Company; perhaps some of our readers will supply the desired information. The apparatus is capable of producing excellent results in the hands of an artist. It requires as much skill to use it as ordinary water colours.

C. B. V. inquires: "Would you kindly inform me—1. How I can renovate old *papier-mâché* dishes? They are scratched, and I fancy in this condition they will retain a certain amount of the solutions employed in them and spoil my work. 2. What is the best way of keeping toning solutions? I make them up fresh, and find that there is a black deposit at the bottom of the bottle after standing for a week or so. I believe a good deal of the gold must be in this deposit.—In reply: 1. The best way will be to have them re-japanned. Next to this would be to give them one or two coats of shellac varnish. 2. If the gold becomes precipitated, it is a proof that some reducing agent is present in the shape of an impurity—the solution put into a dirty bottle or dish. Or it may be that the materials themselves are at fault. It must, however, be borne in mind that some toning baths will not keep many hours after they are made, also that light acts as a reducing agent.

T. C. D. writes: "Referring to the stability of silver prints, in which I have been deeply interested, can you tell me how it is prints cannot be fixed in a weak solution of cyanide of potassium? I suppose there is some important reason against it, or it would have been adopted before this. The reason I inquire is, seeing in what a good state of preservation some of the old glass positives are still in, though they have been done years ago, and could not have had much washing at the time. Kindly give me any information you can, as, if you think it practicable, I should like to try some experiments, to see if it would add to the permanency of silver prints; also, please state if negatives could be fixed that way as well, or would it not act?"—Cyanide of potassium is not at all suitable for fixing silver prints, or it would have been universally adopted for the purpose. It not only gives the lights a yellow appearance, but reduces the prints too much. This our correspondent can easily demonstrate for himself. Hyposulphite of soda, also, is a better fixing agent for gelatino-bromide negatives than cyanide of potassium, as the latter acts upon the gelatine.

The Photographic Club.—Wednesday, November 4, Annual General Meeting. 11, *Impurities in Photographic Chemicals*, Mr. A. M. Levy.

London and Provincial Photographic Association.—November 5, *Development of Lantern Plates.* 12, *Can Halation be Avoided by Staining the Film in any way?* 19, Lantern night. Visitors invited.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—Next meeting, Mosley-street Café, Newcastle, November 10, at 7.30; paper and demonstration on *Platinum Toning*, by Mr. James Brown.

Mr. Shapur N. Bhedwar, on his return to India, was recently entertained to a complimentary dinner by a number of his friends, and congratulated on the short but brilliant photographic career which he passed in this country. Mr. Bhedwar appears to have enjoyed a good share of royal favour.

Mr. Andrew Pringle discourses upon the *Development of Negatives on Gelatino-bromide Emulsion* before the members of the Lewisham High-road Camera Club on November 6. The syllabus of the Club's winter fixtures gives promise of some valuable papers and demonstrations.

To inaugurate their new rooms, the members of the Photographic Club gave, on Wednesday night, October 28, a most successful smoking concert and exhibition of pictures. The musical portion of the entertainment was of a high order of excellence, the zither solos of Herr Schulz being warmly applauded.

Mr. W. E. Debenham's Tuesday lectures at the Polytechnic are so successful that an overflow class for Wednesday nights has been rendered necessary. The supplementary series will commence on Wednesday next, and those joining will have an opportunity of going over the ground already traversed in the three previous lectures.

Croydon Microscopical and Natural History Club (Photographic Section).—Synopsis of coming Meetings: October 30, Special Meeting. November 6, *Oxyhydrogen Light for Optical Lantern*, by W. Low-Sargeant. 11, *Polarised Light*, by J. J. Briginshaw. 20, Lantern Night, *Through the Norwegian Fjords*, by J. A. Carter, M.A. 25, Annual *Soirée.*

Brighton Photographic Society. Winter Session.—1891: October 27, Mr. Percy Morris on *The Development and Printing of Hand Camera Negatives.* November 10, Lantern Slide Competition. 24, Exhibition of Hand-camera Prints. December 8, Conversational Meeting. 22, Lantern Night. 1892: January 8, Lantern Night. 19, Lantern Evening, by Mr. H. M. Smith, Slides from Kodak negatives. February 9, Annual Meeting and Exhibition.

National Association of Professional Photographers of Great Britain and Ireland.—The adjourned meeting of the Council of the above Association will be held at Anderton's Hotel, Fleet-street, London, 7.30 p.m. [no date given], to receive Secretary's report on general and important business. Any suggestions on matters affecting the welfare of the Association will be gladly received by the Secretary, addressed to Anderton's Hotel.

At an extraordinary general meeting of the Automatic Photograph Company, called for the purpose of considering the advisability of winding up the concern, a resolution to the effect that that course should be adopted was defeated by an amendment, which stated that the meeting considered that with proper management the Company could be carried on successfully, and that the shareholders consequently were not willing to sacrifice their property. A poll was taken, but the position of affairs remained unaltered.—*Financial Times.*

The prospectus of the Royal Commission for the Chicago Exhibition, 1893, is in circulation. May we inquire of the Commission upon what grounds photography has been excluded from the classification of departments intended to be devoted to British exhibits? Under the department of "Machinery" we find grouped "Photo-mechanical and other Mechanical Processes of Illustration;" and here, apparently, photographic exhibits are to begin and end. The prospectus is, fortunately, "under revision:" it needs it, in this regard at any rate.

South London Photographic Society.—Winter Season, 1891-92.—1891: November 2, *Copying and Enlarging Negatives*, Mr. F. W. Edwards. 16 and 17, Annual Exhibition. December 7, *Photographic Optics*, Mr. Crouch. 21, *Printing Process*, Messrs. Edwards, Herbert Whitby, &c. 1892: January 4, Beginners' Night, Mr. F. Webb. 18, Social Evening. February 1, *Chemistry of Photography*, Mr. Maurice Howell, M.P.S. 15, *Artistic Photography.* March 7, *History of Gelatino-gromide Photography*, Mr. J. Burgess. 21, Members' Lantern Evening (open criticism of the slides exhibited). April 4, Annual Meeting, Election of Officers, &c.

The Annual Dinner and Trip of the *employés* of Mr. J. E. Eddison, photographer, of Leeds, Sheffield, Castleford, and Barnsley, took place at Barnsley on Thursday last, 22nd inst. Wagonettes were provided for an afternoon drive, which, favoured by fine weather, was much enjoyed. The whole of the *employés*, numbering about sixty, dined in the evening at the Co-operative Hall, the catering of Miss Colley leaving nothing to be desired. After dinner the usual loyal toasts were honoured, and the health of the enterprising host and Mrs. Eddison was most enthusiastically drunk. The toast of the *employés* of the firm and others were also honoured. Dancing was kept up until a late hour, and altogether a very enjoyable day was spent. This gathering has now become with Mr. Eddison quite an annual institution.

In the Westminster County Court on Wednesday, Judge Bayley tried the case of Boehm *versus* Maitland. The action was for 7*l.* 3*s.* for photographs supplied to Lady Maitland. Mr. Fenwick appeared for the plaintiff; Mr. Ernest Pollock defended. Plaintiff proved taking several photographs of Lady Maitland in Court and morning dresses, proofs of which were sent to her. The defence was that Captain Sleigh was bringing out an album containing the photographs of those presented at Court, and plaintiff was to take the photographs in question to Captain Sleigh. Lord Maitland, an officer of the Scots Guards, said the photographs were taken upon the understanding that no charge was to be made to him. Sleigh was to bear the expense. His Honour came to the conclusion that the photographs were taken for Sleigh, who was liable. He gave judgment for the defendent, with costs.

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A NEW PREVENTIVE OF THE BLISTERING OF PRINTS.

The blistering of prints upon albumenised paper has for many long years proved the *bête noir* of the photographer, whether professional or amateur. Numerous theories have been hazarded as to their cause, and many remedies have been suggested, some of them successful, others only partially so.

Another preventive, and one which we have reason to believe will prove as successful under all circumstances as it is simple and inexpensive in operation, has been discovered by Mr. William Bishop, the newly elected honorary secretary of the North London Photographic Society, and at the meeting on Tuesday evening was fully described by him at the close of the formal business consequent upon the annual general meeting.

Mr. Bishop had formed a theory that blisters were caused by the non-adherence of the film to the paper, owing to insufficient coagulation of the albumen in consequence of (1) weak solution of nitrate of silver, or (2) too short time of floating the paper upon the solution when sensitising it. On this theory he argued that a complete coagulation should prevent blisters altogether, and in this view he was supported by the fact that soaking in alcohol had been found an effectual preventive, the coagulating influence of alcohol on albumen being well known.

Experiments were instituted to find a simple means of producing a similar result, and the action of steam had suggested itself, but was found not to be conveniently practicable. Finally, boiling water was tried, and a number of prints from a batch known to be likely to blister were plunged (for an instant only) into boiling water just as they came from the printing frames, the prints then going into the washing water to be dealt with in the ordinary course of washing, toning, and fixing. The immediate effect of the hot-water immersion was to turn the prints to a bright brick red, and to practically take out the sizing of the paper, making the picture plainly visible at the back; but no injurious effect was found in the toning, although it was noticed that the scalded prints took perhaps a little longer time in coming up to colour. In the final result, when dried, the prints were all of the same tone, those treated with the hot water being, if anything, slightly more glossy than the others.

But the blisters?—The prints, treated as usual blistered as usual; the scalded prints did not blister at all. As a confirming test, some sheets were immersed only half way down into the boiling water, with this ultimate result that, while the half not immersed gave copious blisters as usual, the other half was entirely free from them, showing distinctly the tide-mark to which the hot water had reached.

It may be that there are papers with blistering propensities that may defy the treatment by Mr. Bishop's ingenious discovery; this, time and a collating of experiences of printers who try the remedy can alone show; but in the meantime it may be accepted as a remedial measure for one of the greatest plagues of the printer's life—one which costs nothing, but is worth much. We cannot but express the opinion that photographers must feel grateful to Mr. Bishop (to whom they also owe the first practical repeating magnesium flash-lamp) for giving them a simple, easy, and inexpensive method of preventing blisters on their albumenised paper prints.

THE ELECTRIC LIGHT IN PHOTOGRAPHY.

We have now entered the month so proverbial for its fogs, and professional photographers, who, by the way, have had anything but a happy time of it, from a business point of view, during the past twelve months, will find their trade again restricted unless some means of artificial illumination be adopted. This fact, no doubt, accounts for several letters being recently received inquiring the probable cost of installing, and the method of employing the electric light in photography. Now, with regard to the cost, this will, of course, depend upon whether an engine and dynamo machine have to be purchased, or whether the electricity is obtainable from outside sources, as it can be now in most large towns. For the moment, let us assume the former to be necessary.

In the first place, there is the dynamo. If this be one capable of evolving an arc light of, say, from two to three thousand candle value, it will cost, with some few extra fittings, desirable when it is to be driven by a gas-engine, from thirty-five to fifty pounds, according to the make. Such a machine will require an engine of from two to three horse power to drive it. But, as gas-engines are somewhat unsteady when worked at their full power, it is, in practice, usual to have one of somewhat greater power than that actually absorbed, say, for this size dynamo, one of four horse power. An "Otto" of this capacity will cost about one hundred and eighty pounds. Such an installation as this will answer very well for copying and enlarging, but will scarcely be equal to the requirement for portraiture. For this a stronger light will be advisable, say, one of six thousand candle power; in fact, it is an arc light of this value that is generally employed in most London studios where it is adopted.

A machine to evolve such a light will, with extras, cost from seventy to ninety pounds, and absorb four or five horse power. With such a dynamo a gas-engine of six or seven horse power is

necessary for steady running. As the difference in price between the larger and the smaller sizes is but ten pounds, the latter should be chosen. Its price, with water vessel, is two hundred and twenty-five pounds, so that it may be taken, roughly, that the cost of an engine and dynamo machine for portraiture will alone be somewhere between three hundred and three hundred and twenty-five pounds, according to their make. We would here give a caution against purchasing a second-hand dynamo, which may often be met with at a low price, without previously having it examined by a competent electrician.

Few photographers, we imagine, would go to the expense of an installation for generating the current when they can obtain it from the mains. Indeed, several of the London houses, that have the necessary plant for the purpose, have discarded it in favour of the Company's supply.

When a supply of electricity is available, the cost of installing the light is but trifling. The current, as received, is usually of very high voltage, and has, therefore, to be converted into one of lower tension. The apparatus for the purpose is, we believe, supplied by most companies free of charge; hence the only outlay to be entailed by the photographer is for the internal fittings—the leads, the lamp, and, in the case of portraiture, the reflector and its fittings.

For enlarging, what is known as a focus-keeping lamp is essential. This will cost from fifteen to twenty pounds. But this form of lamp is quite unnecessary either for copying or for portraiture. One suitable for this work will be from ten to fifteen pounds. As a matter of fact, for portraiture a lamp is not actually required, as a very simple contrivance for keeping the carbons in position by hand during the brief exposure is all that it is necessary. Indeed, Mr. Van der Weyde does not, or, at least, for many years did not, use a lamp at all. For copying, the arc is fully exposed to the object, being simply backed by a reflector of some kind. We have frequently seen a sheet of cardboard used for the purpose. We have also seen the light placed between two cameras, with a curved reflector behind, and with this contrivance two operators were working with one light.

In portraiture, however, the light itself must be shielded from the sitter, and there is no better arrangement for doing this than that first devised by the gentleman just named. It is a large concave reflector, five or six feet in diameter, something like an inverted parachute consisting of a light wooden frame covered with canvas and papered on the inside with white paper. In the front of this is fixed the light, backed up with a small concave reflector, about the size of a saucer. This shields the arc from the sitter, and at the same time sends the rays of light back to the large reflector, so that the sitter is illumined by what in effect may be considered a white cloud. The whole arrangement is suspended by cords, with a counterpoise, crane fashion, from the top of the studio, in such a way that it can be moved in any direction. The whole of this contrivance can be constructed by any ordinary carpenter.

Instead of suspending the reflector and light, Mr. Frank Haes, a very successful worker with the electric light in portraiture, had his reflector, very similar to that described, fixed on a stand mounted on castors, so that it could be placed at any part of the studio, and the light projected in any direction. Some operators have the front of the reflector covered with tissue or tracing paper, to still further soften the light, but this is scarcely necessary.

From what has been said it will be seen that when the necessary plant for generating the electricity can be dispensed with, and the current obtained from outside sources, the installation of the electric light for photographic purposes is a very inexpensive affair.

FURTHER REMARKS ON THE USE OF SULPHITE.

The term sulphite has become as much a part of photographic colloquial terminology as "hypo." When the latter substance was as soda hyposulphite, instead of, as now, thiosulphate, the soda was quickly eliminated similarly with sulphites. There are to be had in commerce, besides the familiar sodium salt, the compounds of ammonia and potassium, the latter being three or four times the price of the sodium salt, while the ammonium sulphite is twice as dear. We believe that there is not the slightest advantage in using either of the most costly preparations; hence, when we adopt the word sulphite into the ordinary vocabulary of the photographer, our meaning will be as when speaking of "hypo."

As the true function of sulphite is not sufficiently recognised, it will be well to point out that it is not, as is usually assumed, to preserve a stock solution of "pyro" and quinol from becoming discoloured, but to prevent discolouration of the solution and staining of the film during the action of the developer upon the plate. To preserve stock solutions it requires the addition of acid. Solution of pyro will keep its colour better with the addition of two per cent. of its weight of citric than with five hundred per cent. of sulphite. If this fact were well committed to memory, a great deal of inconsequential argument about sulphite in the developer would be avoided. The same with the once famous metabisulphite of soda, which has no more preservative power over pyro solutions than ordinary sulphite with some added acid—citric, tartaric, sulphuric, or other, which at once liberate sulphurous acid when added, and cause the formation of a certain amount of acid sulphite in proportion to the acid added. It is true that there is produced a soda salt of the acid added, which is either inert or has a specific action. Practice has proved the latter to be inappreciable, if at all existent, while all that could be said of the former is that it is waste—waste of material, it is true; but the actual cost per unit of working efficiency is far less than when the meta salt is employed.

When the acid pyro or quinol is employed to develop, it then is perfectly immaterial whether they have been preserved with sulphurous acid, meta-bisulphite, acid sulphite, or acidified sulphite. In each case the alkali added to produce a developer combines with the free acid, or neutralises the acid salt, and the developer contains only sulphites of soda, ammonia, &c. We lay stress upon this point, as so much importance has, in some instances, been given to the particular preservative added to the pyro, &c., on account of its supposed power to influence the character of the developer. In saying this we are of course only referring to ordinary practice, not to possible but improbable additions. For example, if a very large percentage of citric acid were to be added as a preservative, there would be formed citrate of ammonia, or of soda, which have been shown to be great retarders of development; but, in the proportion ordinarily employed, the effect is practically *nil*.

The era of "saturated solutions"—most indefinite of all quantities in practical photographics—happily appear to be passing away with regard to sulphite. We are within the mark in stating that a twenty-five per cent. solution is the strongest that can be made without crystallising out at ordinary cool temperature.

With regard to the instructions for making acidified solutions sulphite as described by us a few weeks ago, we have been sked for definite formulæ. To do so is not easy, owing to ight variations in the strength of the chemicals employed, hether owing to difference in the amount of moisture present, slight impurities in the carbonate of soda, &c.; but we conude by giving the following instructions, which will be explicit nough as working formulæ for any non-expert:—One pound sulphite to be dissolved in any suitable quantity of water; if pound be used to make a gallon of solution, we shall have a n-per-cent. solution; reduced to smaller concrete quantities, is two ounces to a pint.

Such a solution made, let there be added to it one and threeuarter ounces of strong sulphuric acid first diluted with veral times its bulk of water. If, after well stirring, there nould be no smell of sulphurous acid, further additions may e made of not more than half a drachm at a time until ne sulphurous odour is perceived. The addition of so small a uantity as this is capable of converting a solution that has no erceptible odour into one that is too strong to be kept in a nall apartment if used in a tray. This odorous solution may e used as directed in a previous article.

HE question of the cost of electric lighting is one that is most fficult of solution; that it should be so is easy to explain, the rroundings and commercial aspects so govern it that a fixed rule nnot be formed. An instructive addition to our knowledge will be und in a paper lately read before the French Society of Civil Enneers by M. Hauftman. He states that in London the cost is ·375 ancs per hour "electric horse," and three times the cost of gas. In aris, where coal costs so much more, it is only ·9 francs. The cheapest ace in France is at St. Brieux, the price being ·52 francs. The lowest arge in all Europe is at Fribourg—·15 francs, or, if the consumption over twenty horse power, one-tenth of a franc. He points out that ese differences arise, not from the cost of the power required, but om differences in the amount of capital required. The moral to be duced from these figures is, that for photographic installations the eapest mode would be for several neighbours to join in the cost of e original plant, and thus save all charges beyond working expenses.

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is probable that in the metropolis, at least, the subject of electric ght and photography will become of increasing importance. During e winter rapidly approaching there will, in many studios, be a very rge proportion of what ought to be daylight hours absolutely wasted r those not possessed of an electric plant, which, to their more rtunately placed *confrères*, will be as remunerative as any. There e, of course, technical as well as pecuniary difficulties in the way its use, but they have been, and can be, easily surmounted.

HERE is one most important point too apt to be lost sight of with gard to this mode of illumination, and that is the freedom from ggy negatives that it permits, although the atmosphere be permeated ith fog. The cause is that, if properly managed, the light can be so ranged as to fall only on the sitter, and illuminate a very small ction only of the column of air between sitter and lens.

R. W. H. MASSEY states that in America they are far behind us in e of the light, there being in London alone more incandescent lights an in five of the largest cities (including New York) put together.

HEN, again, in connexion with the same subject are telephone rangements, which now ought to be far cheaper, as in England the icrophone patent recently expired—Edison's patent, No. 2909 (1877). may be noted that there is a tendency, owing to the prestige of the ectrical instrument, to use it for restricted distances rather than its humbler and ancient rival—the speaking tube. For small distances of a hundred or two yards the latter is both cheaper and better; but, instead of adopting the familiar gutta-percha tubes, common gas-piping should be employed, as being cheaper and quite as efficient. The theory of the improved sound-transmitting power of the gutta tubes is, in practice, a figment.

SOME few weeks ago Mr. Harry Napier Draper raised, in *Nature*, a point that is of considerable interest in connexion with optical lantern work. It is everywhere stated that, when dealing with subjects where variations of temperature would be an inconvenience, a cell of alum solution should be used. Mr. Draper says, Why not use plain water? and asks for actual evidence of the value of alum. No reply being forthcoming, Mr. Shelford Bidwell replies last week that experiments of his own indicate the uselessness of alum. He experimented with an empty cell, distilled water, water from the tap, and saturated solution of alum; the respective diathermancy was 1000, 197, 200, 204, plain water thus being the best. "Possibly," he writes, "the 'alum cell' tradition rests upon no better foundation than many others, which are generally accepted simply because it does not occur to people to question them." It is evident that the alum cell is a pure fetish, and that, in all probability, any experimentalist with the lantern need only interpose a cell of water between the condenser and the slide or other object if he wish to prevent any ill effect from the action of heat.

A MODE of measuring the actinic power of light by ascertaining its capacity for causing the combination of chlorine and hydrogen, Mr. H. N. Warren, "Research Analyst," has made an interesting contribution to our knowledge of the subject. He writes to the *Chemical News* that, using a powerful fifteen-inch lens, he has tried the effect of the lime-light, and also the combustion of magnesium. When the mixed gases were brought under the influence of the former, combination took place after a few minutes' interval; but, when the magnesium flame was employed, an almost instantaneous explosion ensued. Next he tried various coloured rays—red, green, yellow. In each case the explosion was considerably retarded. In cases where a bright red beam was allowed to impinge, combination took place very slowly, "amounting to the faintest explosion only." Similar results followed the impact of light upon the more violent explosives, chloride and iodide of nitrogen and fulminating gold. It is a pity that there is no account of the effect of the rays of more refrangible portion of the spectrum, as the analogue to photographic effects would be more valuable if the mode of measuring light is to be of value.

IN the current number of *Knowledge*, Mr. A. C. Ranyard, writing of *The Upper Atmosphere*, illustrates his paper with four collotype reproductions from Mr. C. V. Shadbolt's balloon negatives, which are probably the best of their kind so far produced. Mr. Ranyard explains the difficulties of securing well-defined balloon photographs in this manner: "The rays of light which fall on a photographic plate exposed from a balloon have had to pass twice through the densest and most dust-laden strata of the atmosphere. Even in photographing distant landscapes from the surface of the ground very little detail is ordinarily obtained upon distant hills, owing to the absorption of the photographically active rays in passing through a great distance of the lower atmosphere. But the difficulty is greatly increased in attempting to photograph the distant earth from a great altitude in a balloon, for not only is the absorption increased by the long course of the rays through the lower air, but the observer sees the dust-motes in the atmosphere from their sun-illuminated side The veil of haze spread over the earth, therefore, hides the objects behind it more effectually than the transparent veil of haze which we ordinarily see over a distant landscape, giving the soft effects of distance which artists so well know."

THE kindly movement for using the optical lantern to entertain the inmates of our hospitals has, we are pleased to notice, extended to the distant Colony of Natal. A correspondent of the *Natal Mercury* writes to suggest that, as the citizens have a hospital in their midst,

a lantern entertainment might now and then be given to relieve some of the weariness of the patients therein. The suggestion is both humane and easy of realisation, and we trust that a future issue of our contemporary will bring us intelligence of its adoption.

A Retouching Class has just been formed at the Camera Club, and Mr. Redmond Barrett, who, as most of our readers well know, is one of the leading professors of the art of retouching, upon which he has written from time to time in our columns, has arranged to give a course of lessons and demonstrations in connexion therewith. The members of the Club are to be congratulated on securing the services of a gentleman so familiar with his subject and so well qualified to teach it as Mr. Barrett.

The prospectus of Alexander Bassano (Limited) is in circulation. The capital is 50,000*l.*, divided into 5000 eight per cent. preference shares of 5*l.* each, and 5000 ordinary shares of like value. Shareholders are entitled to have their cabinet portraits taken annually free of charge. The receipts at the Bond-street studio for the year ending December 31, 1890, amounted to 5912*l.* A dividend upon the ordinary shares of 12 per cent. is promised; this will need, according to a contemporary, the earning of a net profit of 5000*l.* per annum.

In reference to Mr. Ingall's suggestion to employ hyposulphite of potash instead of hyposulphite of sodium as a fixing agent, Mr. J. A. Forrest writes to point out that the wholesale price of the article is three shillings a pound, and he naturally regards this as a great obstacle to its purchase. If, however, there were anything like a demand for it, that price would, of course, rapidly come down, since, we believe, its preparation involves no greater expense than does hyposulphite of soda.

ON SOME CONDITIONS AFFECTING REVERSAL OF THE PHOTOGRAPHIC IMAGE.

In drawing to a conclusion the discussion on Professor Minchin's paper at the last Conference of the Camera Club, Captain Abney remarked that the blue rays have a reducing, and the red rays an oxidising effect. Of course Captain Abney taught us these facts many years ago, but I mention their expression at the Conference, because it immediately occurred to me (though why, I cannot say, for Professor Minchin's entirely different subject was distinctly before my mind) that reversal of the photographic image must be a result of an overbalance of the two effects, by the exposure being continued for such a time as to allow the reducing action of the blue rays to act all over the plate, in short, to produce fog, even in the protected parts, it would allow the red and yellow-red rays time to re-oxidise such parts as are more or less unprotected.

It occurred to me that, by exposing a plate to ordinary light, so that the blue rays may exert their powers of reduction, and then subsequently exposing such reduced (or fogged) plate, in contact with a negative or positive, to red rays, by interposition of a red screen, the result on development should be reversal. On putting the matter to the test, I found such apparently to be the case. Captain Abney, Colonel Waterhouse, and Fox Talbot have noted the advantage of a preliminary exposure in assisting the reversal of image, but I have not noticed attention drawn to the connexion between the preliminary and subsequent exposures, or the manner in which such a reversal is possibly produced by the relative action of the reducing and oxidising rays. So that, in this paper no claim is set up how to produce reversal, nor yet to the effect that the red and yellow are the active rays in so doing (for, in the language of the Patent Office, "I am aware all this has been done before"), but what I desire to call attention to is how they probably act, and that in producing reversal a proper relation should exist between the reducing and oxidising rays. By a consideration of the subject from these points an every-day method of producing reversed negatives suitable for collotype and carbon work may result. From the influence fog seems to have in producing the results, I am afraid it will be impossible to produce reversed negatives suited to ordinary relief-block processes, in which clear glass is of more importance than density. In the following experiments very powerful exposures are used, and th results, except where otherwise stated, developed with Wood's Hydr quinone Developer used in strength as directed on the label, and ther fore normally developed. It is interesting to note that developme required about the same time as a normally exposed plate, and hen contrasts very remarkably with the results obtained by Mr. Humphe when using hydroquinone, as stated in his paper read at the Club la October. In my experiments, judging a plate by its colour, I no such as appear to contain iodide produce the best results; this, believe, is in agreement with the experiments of Captain Abney a others.

The theory of reduction and re-oxidation suggested by the followi experiments, it will be noticed, explains the alternate reversal, su as negative, positive, negative, positive, sometimes mentioned in t journals: these alternate reversals have not come under my noti experimentally.

Experiment 1.—Exposed an Edwards' Landscape plate to whi light for one minute, then, still in light, placed in printing frame contact with a negative, but separating them by a tissue of red-stain gelatine. This was exposed to direct sunlight (July) for five minut On examination in the dark room by ruby light, it showed a delicat printed-out positive. It was then developed with Wood's Hydroq none Developer, to which a small portion of same firm's eikonog solution was added.

Result.—The plate developed in the ordinary manner, except th the positive print-out image disappeared shortly after immersion the developer, and in less than one minute the reversed negative h begun to appear, rapidly gained density, and for ordinary work lit inferior to the original.

Experiment 2.—Edwards' Transparency plate, preliminary expos to white light, then in contact with positive exposed for twe minutes to diffused sunlight through red gelatine tissue.

Result.—Fog all over; no reversal.

Experiment 3.—Same conditions and result as experiment 2.

Experiment 4.—Preliminary-exposed Edwards' Landscape plate direct sunlight half minute; then exposed to direct sun through tissue for five minutes.

Result.—Good reversal.

Note.—Unless otherwise stated Edwards' Landscape plates used.

Experiment 5.—As Experiment 4, but exposed ten minutes throu red tissue.

Result.—Reversal, but rather thin.

Experiment 6.—No preliminary exposure; then exposed throu red tissue five minutes' direct sun.

Result.—Developed thin negative, which gradually reversed to t positive on front surface, and remained thin negative on back surf of film. On fixing, the result is barely visible. This experim should be compared with Experiment 4, being under similar c ditions, except that Experiment 4 had half a minute prelimin sunning, and produced a good reversal.

Experiment 7.—In order to have some idea of the developing v of the preliminary exposure, each side of the plate was expose candle-light at six inches for ten seconds; total exposure, twe seconds; then exposed with red tissue to sun (haze) for four minu

Result.—Very good reversal, and would indicate that the preli nary exposure should be such as to produce, if developed, a g density. In this experiment an extra minute of exposure to would have produced clearer glass.

Experiment 8.—Preliminary-exposed plate to candle-light, as in Experiment 7; then exposed ten minutes to diffused sunlight, wit red tissue.

Result.—Reversal, but not so good as 1, 4, 5, 7.

Experiment 9.—Preliminary-exposed Edwards' Transparency p as in Experiment 8; then exposed, without red tissue, to ten min diffused sunlight.

Result.—Exceedingly weak reversal.

Note.—Where transparency plates are used they are given an creased exposure, on account of the lower sensitiveness; they re not suited for reversal, but the landscape plates are particularly adapted for it.

Experiment 10.—Preliminary-exposed landscape plate to can light, then covered half with red tissue, and exposed to twelve in of magnesium at twelve inches distance.

Result.—No reversal under tissue, but reversal where uncov Evidently the exposure under red was insufficient; at the same this experiment indicates that a good relative proportion of the classes of rays may exist in the magnesium light, such as would duce sufficient fog all over the plate through all parts of the su posed image, and at the same time be sufficiently active in oxid

ys to undo the work of the reducing rays where the plate is least otected.

Experiment 11.—Preliminary-exposed plate, as in Experiment 10, d exposed, without red tissue, to eight inches of magnesium.

Result.—Thin reversal.

Experiment 12.—Same conditions and result as in Experiment 11.

Experiment 13.—Preliminary-exposed plate for thirty seconds to ndle at six inches; then covered half the plate with blue tissue, and posed to twelve inches of magnesium at six inches.

Result.—Partial reversal under the blue, but full reversal under the covered part. In this experiment the print-out image appeared as ong under the blue as under the uncovered part; yet, on develop- ent, a full reversal only occurred where uncovered. It is well to te here that a similar print-out image under red tissue reverses rfectly. It will be noticed in this experiment the advantage ined by increasing the power of the light, compared with Ex- riments 11 and 12.

Experiment 14.—As Experiment 13, except that a green tissue was ed to part cover the plate, and the magnesium burnt at eight ches. This experiment shows the result of reversal on the front rface, and non-reversal on back surface of film very distinctly; the fect only took place on the uncovered portion of plate, the tissue- vered part being insufficiently exposed. Experiment 13 shows, had e magnesium been burnt two inches nearer, a full reversal would ve occurred. It is interesting that this plate has caught the ansition stage nicely, as the result would disappear on fixing. The ate was not placed in hypo.

Experiment 15.—No preliminary exposure and no coloured tissue. xposed to twelve inches of magnesium at four inches.

Result.—Very good reversal.

Experiment 16.—As Experiment 15, but preliminary-exposed for irty seconds to candle-light at six inches.

Result.—Reversal as in Experiment 15.

Experiment 17.—No preliminary exposure, then exposed to eighteen ches of magnesium burnt at four inches.

Result.—Very good reversal.

Note.—Experiments 15, 16, and 17 show the improvement in results y stronger exposure.

Experiment 18.—Edwards' Slow Isochromatic plate. No pre- minary exposure, no coloured tissue. Exposed to twelve inches of agnesium at four inches.

Result.—Good reversal.

Experiment 19.—Edwards' Transparency plate. No preliminary xposure. Exposed to twelve inches of magnesium at four inches.

Result.—Very weak reversal.

Note.—Edwards' Landscape plates, exposed to from twelve to ighteen inches of magnesium weighing four grammes to the foot, and urnt at four inches' distance, produce the best results, no preliminary xposure being required, sufficient fog being produced to develop to ull density where the plate is protected, and at the same time the xidising rays do their work on the unprotected parts.

Experiment 20.—Strips of red, blue, and green tissue were cut and aid on a negative so as to divide it into four sections, one of which vas uncovered. No preliminary exposure being made, a landscape late was exposed in contact with the sectional negative for five inutes to direct sunlight.

Result.—Under the blue and uncovered sections a very strong rint-out positive appeared, and under the red and green a delicate rint-out positive. The blue and uncovered sections developed ecidedly positive, which gradually fogged away and left very thin eversals, mere ghosts. The red and green sections developed strong nd vigorous reversals in a very decided manner without any trengthening of the print-out positive. The development was the ame as met in every-day procedure, but under the blue and un- overed sections there was an increase of strength in the print-out mage, then a gradual fog, and finally a thin reversal. The green ection is slightly more dense in deposit than the red.

Experiment 21.—Preliminary-exposed plate one minute to candle- ight at six inches, then proceeded as in Experiment 20.

Result.—As in Experiment 20, but rather more deposit under the lue and uncovered sections, and more general fog. These experi- ments, I think, tend to show that a reduction is to some extent equisite in order that a subsequent oxidation may occur, but that a otal reduction is not desirable, and that this reduction may be btained either by a preliminary exposure or by the concurrent action f the reducing and oxidising rays in one exposure; in the latter ase, the oxidising rays require so much time for their work that the reducing rays have ample time to exert their influence on even the most protected portions of the plate, evidently the best conditions being those under which a full-timed exposure or fog is made to balance a full effect of the oxidising rays so that, when the latter produce as nearly as possible clear glass, the former may develop to full density.

HENRY SUTTON.

—*Camera Club Journal.*

WIDE-ANGLE LENSES.

(A Communication to the Manchester Photographic Society.)

WHAT is the function of a wide-angle lens? Surely for nothing but taking portraits, and by that I do not mean getting likenesses of *persons*—which may be good portraits, yet not pleasing pictures—but representations of the objects in front of the camera. For certain purposes it may be very desirable to obtain such portrayals when there is no intention of making a picture, such as to represent the greatest quantity of the contents of a room, perhaps to record its decorative features, or to display beautiful furniture and objects of art; but these delineations are rarely pictures, although in some of them there may be abundance of materials for several. Why is this? Not because of the quantity of matter, but because too much is crowded into the limited size of the photograph in relation to the one fixed point from which it was taken.

Wide-angle lenses have a great value when properly used; in fact, no other can be effective under special conditions, and it seems to me that those who persistently ignore them lose sight of their particular qualities and the purposes for which they are made, namely, portrait-getting, not picture-making.

A portrait of a place may be a picture, and a picture may be a correct portrait, but it is only in the best and most *artistic* works that both are combined. The artist in colours seeks, as a rule, to paint pictures, not merely portraits; and in doing so does not scruple to omit or modify any features of person or landscape he may consider prejudicial to the ultimate effect of his work; indeed, some artists paint their foregrounds in one locality, their mid-distance elsewhere, and possibly introduce a background of far-off hills from another part of the country. Such a composition may be a beautiful picture, but the reason of its beauty is the blending of the subjects into a harmonious whole, due, in great measure, to their delineation from a properly selected standpoint in relation to their general size and general characteristics.

Now, the lens that most nearly resembles the artist in picture-making is a narrow-angle lens.

It seems to me that the most common error with regard to wide-angle lenses, and that which is frequently made, is the use of the term "wide angle." So far as I can ascertain, nine times out of ten gentlemen mean "short-focus" lenses, without any real regard to their angle at all. It is easy to see that this error is caused by the fact that a short-focus lens will include more subject on a given size of plate than a long-focus lens; but it is forgotten that, if the size of the plate were increased in the proportion of the increased focal length of lens, the amount of subject included, and therefore the angle, would be the same in both cases, although neither lens may be of a wide angle.

Then, what is a wide-angle lens? At least, two answers may be given to this question. One, that has relation to the structure of the lens, and the other to its proper use.

First, it will be best to see what is the principal difference in the outward form of wide and narrow-angle lenses. And the class of lens which most easily shows this is the ordinary rapid rectilinear, familiar to all. Two meniscus lenses set in a tube at a little distance apart, with their convex surfaces outwards, and a stop usually mid-way between them. In order to obtain flatness of field with the largest working aperture, it is desirable to separate them as far as possible; but the distance is limited by other factors that obtrude themselves, which render this, the same as almost all photographic and optical matters, a compromise between advantages of one kind and disadvantages of some other kinds.

It will be found that, if an ordinary rectilinear lens be used upon a larger ground glass than it will cover, the illuminated portion of the glass will be circular, and the details of any one plane represented fairly well defined right across from edge to edge.

Let some object represented on the glass be measured—say a post or a wall—and let it be, say, two inches high, and then substitute a wide-angle lens of the same focal length, without making any other alteration, and it will be seen that the circle illuminated is larger, more subject included, and the light less evenly diffused over the glass, especially towards the margin; but the post or wall will be found to occupy the same place, and measure precisely the same height, as before, the difference in results being a less evenly illuminated and larger circle. So that lines drawn from the outer ends of the diameter of the circle to the lens will include a wider angle in one case than in the other, and, both lenses being of the same focus, any object produced on the glass by one lens will appear the

same size by the other; but, as a wide-angle lens will cover a larger plate than a narrow-angle lens of same focus, it follows that, if it be required to fill a given size plate with a certain amount of subject, a wide-angle lens may be used of short focus, enabling the camera to be placed nearer the subject, making it very useful under certain conditions. Then, if there is this advantage, why do we not always use wide-angle lenses?

One answer will be obtained readily enough if the ground glass is inspected, for it will be seen that the definition is very poor and fuzzy, and, in order to improve that, a rather small stop must be inserted to cut off those rays that would pass through the margin of the lens parallel to its axis; this renders a wide-angle lens slow in use.

Another disadvantage in the use of wide-angle lenses is the necessity arising from their shape to have the plane of the ground glass exactly vertical; the slightest tilting shows marginal distortion in a marked degree, this is caused by the increased curvature of the lens. A third reason will appear later. The wide-angle lens therefore gives a larger area of illumination, but lacks definition when used with a large aperture, while the less convex narrow-angle lens gives better definition, but only over a more limited area of illumination.

It is apparent that the area of illumination must be to some extent determined by the distance the lenses are separated, for bringing the elements of a narrow-angle lens nearer together will assist it to give a wider angle, that is, to give a larger circle of illumination; but, in order to improve the evenness of definition, a small stop must be used.

We have now somewhat roughly dealt with the results of the use of a wide-angle lens consequent on its form, let us now consider its use in the camera.

Many present will remember the historic photograph handed round at one of our meetings, of a horse and plough, in which the animal was represented with an enormous head, behind which the body and plough were diminished rapidly in size as their distance increased; that photograph was commonly spoken of as being taken by a lens of too wide an angle, yet it might have been taken with a comparatively narrow-angle lens, the fault was not caused by using too wide an angle lens, but in placing the camera too near the subject for the lens used. The use of a true wide-angle lens of the same focal length, in the same place, at its full covering capacity, would merely result in the inclusion of more of the field and sky, but the peculiar shape of the horse could not be altered, whether a wide or narrow-angle lens had been employed.

It was, in fact, an instance of using a too-short-focus lens for the position of the camera. Had a long-focus lens of either wide or narrow angle been used from the same position, upon the same size plate, the result would have been less subject in the photograph, but the relative increase in size would have been greater for the more distant planes of view.

Nevertheless, the horse with a big head was a correct picture, and would be seen to be so, if it were looked at from the right distance from the card, that is, the same as the focal length of the lens with which it was taken—whether that was four, six, or eight inches.

To say that the photograph in question was necessarily taken with a wide-angle lens is to speak incorrectly, yet at the same time to speak popularly. It was, however, the picture, not the lens, that was of too wide an angle to appear natural to the eye at the distance at which it could be seen comfortably. By too wide-angled a picture I mean that boundary lines drawn from any object in the foreground to a point in front of the picture, equal to the focal length of the lens, include too wide an angle. Now, it will be seen that this excessive fore-shortening or strained perspective is not a question of using a wide-angle lens, but of using a lens of too short a focus for the particular standpoint adopted, and for the unaided comfortable vision of the resultant photograph.

Some gentlemen speak of this defect as distortion, but it is nothing of the kind, for the seeming monstrosity disappears when the photograph is inspected at the distance from it equal to the focal length of the lens; but there is no reasonable way of looking at real distortion that will correct it.

Tilting the camera without using the swing back will cause distortion, clearly apparent when photographing buildings with vertical lines.

We are now led to consider what is the focal length of a lens used at its full covering capacity upon a given size of plate that may fairly be called a wide-angle lens. Probably no exact answer can be given, and a reply must be based upon our average experience of vision. It will be found on measurements that a lens of nine inches for half-plates and five and a half inches for quarter-plates yields good pictures including an angle of forty degrees. Now, if one looks out upon a landscape, one can comfortably view a space included in forty degrees without much movement of the eyeballs, although only a small portion of the landscape is really clear to the eye at any one moment, say about two degrees. Yet the eye easily sees, and, so to speak, approves of such a limit as forty degrees, and this limit generally yields the best pictures; but a slight movement of the eyes enables a view to be seen half as wide again, say up to sixty degrees, which seems to be the extent of a good ordinary picture without undue strain, for architects usually consider perspective strained if carried beyond that limit.

If we desire to clearly see a wider landscape than about sixty degrees we must turn our heads as well as our eyes; consequently the view previously seen disappears, and we are again limited to somewhere about sixty degrees in the new view. Now, keeping this in mind, it will be apparent that, if a photograph that can be easily seen all over without turning the head includes so much subject that in nature the head has to be turned round to see it, that photograph cannot be natural, and is offensive to our sense of naturalness acquired by experience. Such representation may be a portrait or likeness of the place, but probably in no case can be regarded as an artistic picture; therefore the use of a lens that will cover such a wide angle should be avoided as far as possible and is only allowable when a portrait of a place is wanted, such as the interior of a room, when, for certain reasons, it may be desirable to show more than the eye can see at once from any one position in it, and also for other confined situations where the standpoint is exceptionally near. In ordinary landscape it is desirable to use as long a focus lens as possible on a plate of a given size, that is, to employ a narrow angle whether the lens itself is of wide or narrow-angle construction. Any lens giving more than about sixty degrees may be called a wide-angle lens, but the term is usually assumed to refer to an angle of about eighty degrees and upwards.

Ordinary usage of five and a half inches on quarter-plates and nine inches on half-plates gives an angle of forty degrees, while five and a half inches on half-plates and three and a half on quarter-plates yield sixty degrees, and it is undesirable to employ shorter-focus lenses on these respective sizes, unless for special positions, whatever covering capacity a lens may possess.

H. M. Whitefield.

PARA-AMIDOPHENOL: SOME RECENT EXPERIENCE WITH IT.

Several months ago we gave an account of the advent of a new organic developer derived from carbolic acid, and called para-amidophenol. Since that time we have received many advices of its good qualities, and a number of formulæ have been published that differ from those originally given. We have already spoken of the chemical nature of this new developer, and shall now confine our attention to the purely practical qualities of the substance for the photographer.

The first difficulty encountered with this para-amidophenol is its slight solubility in water. To overcome this trouble, Dr. Vogel and Dr. Andresen proposed to turn the material into a hydrochloride, and then dissolve it in water with the other constituents of the developer. But, according to the statements of the Messrs. Lumière in the *Moniteur de la Photographie*, in the issue just to hand, this method of procedure does not overcome the lack of solubility, because the para-amidophenol separates in the developer as soon as the potassium carbonate is added. This is due to the precipitation of the hydrochloride by the potassium carbonate used, the potassium uniting with the chlorine of the hydrochloride forming the chloride of potassium, and leaving the para-amidophenol in exactly the same condition it was in before it was made into hydrochloride. It is also stated that the chloride of potassium formed acts as a retarder in the development.

The Messrs. Lumière tried a number of substances, liquid and solid, in order to increase the solubility of the para-amidophenol in water. Amongst those mentioned we note acetone, acetic ether, formic ether, methyl acetate, and glycerine. They also tried the effect of chloral hydrate, which, although a solid substance, has the property of liquefying certain organic bodies when mixed with them (*i.e.*, camphor); but some difficulty presented itself with each of these, and they were abandoned. After examining a number of substances as aids to the solubility of the para-amidophenol, it was found that the caustic alkalies, potash, soda, and lithia were the best suited to the purpose.

The quantity of alkali to be used with the para-amidophenol varies with its character. The figures given for a concentrated developer are as follows. For twenty grammes of para-amidophenol take:

Caustic potash	30 grammes.
,, soda	25 ,,
,, lithia	5 ,,

With the quantities of caustic potash or caustic soda given in these figures the developer has some very serious disadvantages. The presence of the caustic alkali makes the plates very slippery, and it also dissolves the gelatine film. It is, therefore, very convenient to use the caustic lithia, and, where the expense is of no consequence, this alkali is very

ul, as the quantity is small in proportion to the amount of para-lophenol it will dissolve. The formula given by the Brothers Lumière ; follows :—

Sodium sulphite solution, twenty-five per cent.	1000 parts.
Para-amidophenol	20 ,,
Caustic lithia	5 ,,

his mixture is so strong that fifty-five plates could be developed in it. amount taken was 100 cubic centimetres, and the plates 9 × 12 centi-res. These figures correspond to about 4 × 5 inches for the plates, three ounces of the developer. The first plate was developed in ty-five seconds, and the fifty-fifth in three minutes and ten seconds. mixture was still in working condition, but the plates had absorbed uch of it that there was not enough left to cover the fifty-sixth plate. he whole series not a trace of fog or colouration is to be seen on the es.

he full strength of the developer is recommended for under-exposed es. With plates that have had a normal or over-exposure, mixing it 1 its own volume of water gives a strength that is a little too rapid in ction.

fter reading the formulæ given for the use of lithia, we thought we ld try some plates exposed under the same conditions, and use this developer side by side with pyro and a mixture of eikonogen and roquinone. We must confess that we are delighted at the results. It lecidedly quicker than either of the older developers, and, what is ch more agreeable, it does not stain the hands or the plate. The ition, after some time, takes only a pale brownish colour, somewhat very weak coffee, and maintains its developing powers to a wonderful ent.

he only difficulty that we had to encounter was in the solution of the a-amidophenol in the caustic lithia. We found that the quantity given ve was insufficient to take the whole of the para-amidophenol into ition in the solution of the sulphite of soda. Perhaps it would prove rect if the lithia were mixed with the para-amidophenol, and then a all quantity of the sulphite solution added to the mixture. In this the full effect of the caustic lithia would be exerted. The dissolved terial could then be added to the rest of the sulphite solution. In our 1 case we added caustic soda to the mixture to assist the lithia in dis-ving the remaining para-amidophenol.

or all practical purposes caustic soda may be used to dissolve this developing agent. The best method to make the most of the least ount of caustic soda is to dissolve the caustic soda in twice its weight water, using this solution to dissolve the para-amidophenol by adding n small quantities at a time. In this way we believe we can use much caustic than that given in the formula above. We have also found t even with the addition of its own volume of water the developer ks too rapidly, and that a dilution of three or four times is a much ter strength for practical use in the dark room. The new developer is tainly an advance, and in our hands is superior to anything we have seen. The only drawback to its use at the present time is its cost; , as is the case with all these new substances, the chemist will soon d some cheaper method of making it, and then it will be as cheap as onogen or pyro. At the present time it is only available for experi-ntal purposes.

—*Anthony's Photographic Bulletin.*

N THE INTENSIFICATION AND REDUCTION OF GELATINE NEGATIVES.*

ERE are three methods, so to speak, of strengthening the negative age, viz., (1), The physical method depending upon the crystalline raction of silver in solution to deposit upon the silver forming the age; (2), the chemical method depending upon the reducing power of ver to reduce a a metallic salt which is soluble to a sub-salt, which sub-t is insoluble and is thus deposited upon the image, or else by acting in upon another substance produces an extra deposit; (3), by engthening the image by adding a dark material to the back of the gative over those portions which require strengthening. Under the st method comes Captain Abney's formula for silver intensification. is as follows :—

Solution 1.

Pyrogallic acid	2 grains.
Citric acid	2 to 4 grains.
Water	1 ounce.

Solution 2.

Iron sulphate	5 grains.
Citric acid	10 ,,
Water	1 ounce.

* Continued from page 681.

Either of these solutions are taken and a few drops of a ten-grain (to the ounce of water) solution of nitrate of silver is added just before using. It is then flowed over the plate. When the plate is sufficiently intensified it is washed and placed in a solution of common sodium chloride, and, after again fixing for a few minutes in hypo, it is thoroughly washed. Any stains which may happen to appear may be removed with a five-grain solution of potassium cyanide. Although this is theoretically the best form of intensifier, it cannot be recommended, owing to its liability to produce stains, especially if there should be traces of hypo in the film.

Another method of intensification, which is known as the Polytechnic method, and which I believe was introduced by Mr. E. Howard Farmer, is one of the best of its class that was ever invented. The intensified negative cannot be recognised from one which had been properly strengthened in development, and its best recommendation is it does not require any washing to free it from the hypo. The following solutions are required :—

Solution 1.

Silver nitrate	1 ounce.
Distilled water	12 ounces.

Solution 2.

Potassium bromide	1 ounce.
Water	2 ounces.

Solution 3.

Hypo	2 ounces.
Water	6 ,,

No. 1 is added to No. 2 ; this of course produces a precipitate of silver bromide, which must be washed two or three times in clear water and the water drained off. It is then dissolved by agitating it in No. 3 A muddy solution is thus produced which must be filtered. The solution is made up to sixteen ounces, and can then be bottled for use. To intensify a plate with this solution, it is first rinsed under the tap for a minute or so after removing from the fixing bath, and is then placed in the following :

Pyro preserved in sulphite	4 grains.
Water	2 ounces.

Silver solution as above, one drachm, to which has been added about half a drachm of ammonia diluted to about one of ammonia to eight of water. When density has been obtained, it is again rinsed and placed in the fixing bath to clear it. It is then finally washed. Should the silver not show any tendency to reduce, that is, should the plates not intensify as quickly as it ought, the solution requires more ammonia ; but, if on the other hand a brown precipitate is rapidly thrown down, it shows the presence of too much ammonia. If considerable density is required, it is necessary to throw off the solution as soon as it becomes muddy, and after rinsing to apply fresh. It is hardly necessary to add that the plate must be rocked all the time intensification is proceeding, otherwise it will become patchy. Another way to use this intensifier is to place the plate in the silver solution for about five or six minutes, and after letting it drain to flood it with an ordinary oxalate developer, when the silver will be reduced. If only a slight increase of density is wanted, then the silver solution is diluted, more or less according to the amount of density required with ordinary water. Of this intensifier I can speak in the highest terms as being one which can be depended upon, and, although appearing from a mere verbal description somewhat complicated, as being an extremely easy one to work in actual practice.

Before I leave this portion of my paper there is just one more formula I should like to bring before those who might care to experiment in this direction. It sounds to be a very good one, but I cannot say what its qualities are, as I have not tried it. It was published in the *Photographic Review* of December 14th, 1889, and is known as Kassebaum's Intensifier. I repeat it word for word from that journal. "The plate is soaked for some minutes in a solution of citric acid, say, one part in twenty of water, after which the following solution is poured on :—

A.—Hydroquinone	6 grammes (about 92 grains).	
Water	700 cubic centimetres (about 24½ fluid drachms).	
Nitric acid	10 drops.	
B.—Silver nitrate	8 grammes (about 123 grains).	
Water	100 grammes (about 3½ fluid ounces).	

Forty volumes of A are mixed with one of B. The action of this intensifier is slow, but very satisfactory. A second fixing is desirable so as to remove all traces of undecomposed nitrate."

We have now to consider the second class of intensifiers, which are those whose actions are due to chemical change, and which contain the forms of intensifiers most in use, namely, the mercuric intensifiers ; but before I go on to these there are two which I should like to mention chiefly on account of the novelty of the colour they render the negative. The first of these is Mr. Selle's method with uranium nitrate. The formula is as follows :—

Uranium nitrate	2 drachms.
Potassium ferricyanide	4 ,,
Water	½ pint.

This must be filtered. The plate after being well washed is placed in this solution, which acts by turning the film red, at the same time

strengthening the strong portions to a very great degree. This is a very good intensifier if very great density is required; but you must be certain there is not the slightest trace of hypo in the film, otherwise a precipitate will settle itself all over the film. The chemical change which takes place in this case is, the silver which constitutes the image reduces the potassium ferricyanide to ferrous cyanide, which, combining with the uranium, forms an insoluble double cyanide, which is precipitated on the image. Hypo also converts the ferric to the ferrous salt; so, if hypo is present in the film, a precipitate is deposited all over the negative. Mr. Carey Lea's is the other method which gives a bright red negative. This is as follows:—The plate is first immersed in a cherry-coloured solution of iodine until it has changed its silver to silver iodine, it is then placed in a solution of Schlippe's salts, half an ounce; water, one pint, which converts it to a bright red colour. Schlippe's salts is a double sulphide of sodium and antimony. The silver iodide combines with this and forms a double sulphide of silver and antimony, the soda which was displaced by the silver combining with the iodine and forming sodium iodide. If a very dense negative is required, the plate is left in the iodine until all the silver is converted to iodide. This solution of Schlippe's salts does not keep, therefore it must be made up as required.

Of the mercury intensifiers there are many formulæ, although very few operators seem to act in strict accordance with them. Perhaps the simplest is that known as Dr. Eder's formula. For this the following solutions are required:—

No. I.

Mercuric chloride	¼ ounce.
Water	1 pint.

No. II.

Ammonia (·880)	2 ounces.
Water	1 pint.

No. III.

Potassium iodide	1 ounce.
Water	1 pint.

To intensify with this the plate must first be placed in No. 1, since the mercury has whitened it in most cases right through. Then the plate is washed for a short time, after which it is placed in the ammonia solutions till it is blackened through to the back of the plate, and it is then finally washed. If, however, a greater amount of density is required than this gives, the plate must be placed in the iodide solution. This is done after the plate has been treated with the mercury and washed, and before treating with the ammonia, and the plate must be washed after the application of the iodide. After this treatment it is sometimes found to be too dense. If such is the case, it can be again reduced by placing it in a solution of hypo of about half an ounce to the pint. Dr. Eder is also, I believe, the author of the following formula, which is perhaps an improvement upon the last. After the negative has been bleached with the mercury it is thoroughly washed and treated with this solution:—

Potassium cyanide	10 parts.
Potassium iodide	5 ,,
Mercuric chloride	5 ,,
Water	2000 ,,

This causes the film to become dark brown, and, if it should give too great density, it need only be left in this solution for a little longer, when it will gradually reduce again. This is certainly very simple; but it is evident, as the solution reduces after the maximum density is obtained, the negative under treatment must be closely watched. A slightly different kind of mercuric iodide intensifier is that recommended by Mr. Edwards. Three solutions are made up as follows:—

No. I.

Mercuric chloride	60 grains.
Water	1 ounce.

No. II.

Potassium iodide	90 grains.
Water	2 ounces.

These two solutions are added when mercuric iodide is formed as a red precipitate. To this another solution is added, consisting of—

Hypo	120 grains.
Water	2 ounces.

which dissolves the precipitate. The plate is merely placed in this until density is obtained, which takes place very quickly. For this reason I prefer to use more hypo than here given, as the strengthening action takes place more slowly, and the plate is thus more under command. This is a very simple intensifier to use, and has, moreover, the advantage that the plate need not be very thoroughly washed after being fixed; but in my hands it has not been very successful, as I have never been able to prevent it clogging up the shadows.

About the best intensifier for general use is the one which Captain Abney has recommended some time back, and which, I think, is a slight modification of Dr. Monckhoven's method. The following are solutions required:—

No. I.

Mercuric chloride	100 grains.
Potassium bromide	100 ,,
Water	10 ounces.

No. II.

Silver nitrate	100 grains.
Water	10 ounces.

To this last is added a solution of potassium cyanide, which produce precipitate. The cyanide must be added gradually, little by little, with agitation. After a time the precipitate will re-dissolve, and cyanide must be added until only a very little of it is left undissolv The strength of the cyanide recommended by Captain Abney is grains to the ounce of water. After the plate has been thoroughly fr from the fixing agent it is bleached in the mercury solution, and a washing is placed in the silver solution until it is blackened ri through. Captain Abney says this is the best and most permanent tensifier he has ever used, and considers it supersedes all others. C tainly, if a clear and vigorous negative is required, it is without dout splendid one to use. However, where permanency is required, mercuric intensifiers should be used with caution, as compounds which mercury forms a part are looked upon by most experimenters unstable substances.

I will now go on to describe a method of treating negatives that quire strengthening, which I have used very successfully indeed fo long time, and one which is a good advance towards the ideal. T method is not entirely my own; it was, to a great extent, published one of the photographic papers a long time past; but, as it does not se to have attracted the attention of many photographers, it will, no dou be new to some of you. It is tolerably well known that if a negativ first whitened with mercuric chloride, and then blackened with ammo the density is considerably greater than if it had been blackened w sodic sulphite. Now, as ammonia and sodic sulphite can be used at same time, or one after the other, upon a plate without any harm com to it, I take advantage of the different strengthening powers of the chemicals in the following manner: Supposing I have a negative wh I desire to strengthen more in the half-tones than I do in the high ligl I proceed as follows: The plate is laid, face downwards, in a dish, ends being supported on a couple of pieces of match, so that the fac the plate does not touch the bottom of the dish. The mercuric chlo is then poured in, and allowed to cover the plate. The plate must be watched closely, and as soon as it is whitened through until all the highest lights are changed, it must be taken out and immedia washed. When sufficiently washed it is placed, face downwards as bef in a rather weak solution of ammonia, until the half-tones only h blackened through, when it is again placed under the tap for a seconds just to stop the action of the ammonia going any further. A this has been done it is finished by placing it in a solution of sodic s phite, about a quarter the strength of a saturated solution, until the h lights are blackened through. It is then washed as usual. It will obvious to all of you that this method gives to the half-tones a grea proportion of strength than it does to the high lights, especially if bleaching process has not proceeded too far. This method is equ applicable to a negative which requires a greater proportion of strength the high lights, as in the case of an over-exposed negative. The negat is bleached entirely through, including the highest lights. Then, a washing, it is placed in a solution of sodic sulphite until the half-to only are blackened through, after which it is finally immersed in a rat strong ammonia solution until the blackening is complete. Thus, it v be seen that not only can either the high lights or the half-tones strengthened as required, but by varying the length of time of immers in either solution, and by varying the amount of bleaching, almost a result can be obtained. As I have already taken up very much of y time, I must draw my paper to a close without speaking of the chemi changes which take place in all these operations, as I intended to Neither can I speak of the third method of strengthening negatives, v the powder process, although much use can be made of this process the artistic treatment of negatives; but must content myself with hope that some of you may have learnt something from what I h already said, or that fresh ideas may present themselves to you thro hearing me, and the hope that I may cause you to make more use these ways of improving the artistic merits of your pictures must be apology for having brought this subject before you.

ROLAND WHITING

ON LIGHT AND DIRECT ENLARGEMENTS.

[A Paper read before the Camera Club and printed in their Journal.]

I have recently come from indulging in a little climbing in the Alps Switzerland, where every peak of note has been trodden by, I think I m say, an Englishman; but I have always found that one of the chief joyments he still gets out of a climb, if he is a determined mountaine is to find a new route to the summit. It may have been ascended by t north-east and south-west *arrêtes*. There are still the south-east a north-west on which he may try and break his neck. With the air Switzerland still in the lungs, one is almost bound to look at any subj from the Alpine point of view. Taking this aspect of the question, I m say that, though a source of light may have been discussed from seve aspects, there may be others from which it may be looked at, and, taking a slightly different path from that usually trodden, I hope party to-night may not have any serious fall and break their necks, b

that we all may arrive safely somewhere. From the light of the glow-worm to that of the sun is a very long way to travel, part of it is like the grass slope and moraine which you have to traverse before you get to your peak, and so I propose to cut the first part of the journey short, and to commence where the real climb begins. Let us start from the common domestic dip, and take you by large jumps into the sunlight, with which we have not had a very large acquaintance this year, but with which we hope to be more favoured in that which is coming upon us. Now to plunge—I might say dip—into the subject. We can take a negative by the light of a candle, or of the moon, but if we try and print by either of these sources we fail, and it may be worth while to inquire why this is. First of all, we have to measure the visual effect of the lights, and, second, the photographic effects, and then make comparisons and deductions. The visual effect of sunlight may be measured in a variety of ways, though it is somewhat harder to do than it may appear. Measures recorded in text-books tell us that sunlight is equivalent to about 5500 wax candles placed one foot off from a screen. It is quite evident that to endeavour to use a grease spot or shadow photometer in the ordinary way would be impossible. A way to circumvent this is to use a standard intermediate between the candle and the sun, and so a measure can be got. The intermediate light can be a steady, burning, electric arc light, which may be of, say, about 1000 candles. In this case the sun should have the value of about five and a half electric lights at one foot off the screen. We may place it two feet off, and then the sun will be equal to about eleven such lights, and, if rotating sectors be placed in the beam of sunlight, they would have to be closed to about 16° of aperture, when equalisation would take place. Again, sunlight may be reflected from a piece of plain glass, and the dimmed reflection cast upon the screen, and the electric light can be placed further off, when, by similar means, the lights may be equalised. By calculation or absolute measure, the amount of reflected can be compared with the incident light, and the intensity of the sunlight is soon arrived at. There is another plan by which the intensity of sunlight may be so diminished that it may be directly compared with the light from a candle. Suppose we have a small vertical mirror a quarter of an inch wide attached to the spindle of rotating apparatus, and so arranged that it rotates round a vertical axis; then, if a beam of sunlight be made to fall on this mirror when still, it will throw a thin beam of light back on to the screen in the same way that a beam of light is sent from the mirror of a reflecting galvanometer on to the scale. If, now, the mirror rotates, a band of light will traverse the screen, which will be much enfeebled. If the screen were 220 inches from the mirror, the latter being exactly a quarter of an inch broad, and if the sunlight were 5500 times that of a candle at one foot off, the candle would have to be one foot off the screen to cast an equally illuminated shadow. The mirror might be diminished in width, when the sunlight would be balanced when the candle was further off. A better plan is to cause the beam of sunlight to fall on to the mirror through a slit which can be regulated and measured at pleasure, and balance the two lights in the ordinary manner, measuring the distance of the candle from the screen. I make sunlight at midday in June on a cloudless day to be about 5300 standard candles by all three plans. Now, the term sunlight is, as a rule, used in a denominational sense rather than in a quantitative. In the Alps, at an altitude of 8000 feet, you may fairly add half to this number, and sunlight will be about 8000 standard candles at one foot off. But as we are about sea level, and in England, I must point out how it varies in intensity at different times of the day and at different times of the year.

	Candles.
If it were overhead, it would be about	5600
30° above the horizon it is	4700
20° ,, ,, ,,	3300
10° ,, ,, ,,	2000
8° 30′ ,, ,, ,,	1400
Just before sunset	140

So, in measuring sunlight, this fact must always be borne in mind.

So much, then, for this light as appreciated by the eye, but what about its photographic value for negative making and printing? How can we measure it? Now, it happens that the curve of sensitiveness to the spectrum of a bromo-iodide plate and for platinum paper are almost identical, and this is of use, as we shall see presently.

First of all, however, we can directly compare the photographic value of sunlight with that of a candle in a simple manner. If we allow sunlight to pass through a very narrow slit in a shutter, reflecting it on to the slit by the heliostat (which, by the bye, I ought to have mentioned was used when ascertaining the optical value of the light) we can catch the beam on a plain glass and reflect it on to a screen. We can first measure the optical value of the beam against a candle, and then measure on a photographic plate the densities produced by it, and by a candle exposed for different times, and thus ascertain from this last scale its photographic value.

	Candles.
Overhead, it would be	120,000
At 30°	72,000
At 20°	42,000
At 10°	9000
At 8° 30′	5600
At sunset ..... about	1·7

The photographic value, therefore, diminishes much more rapidly than the optical value, and when close to sunset it is almost nothing. It is not hard now to see why at this altitude of the sun, photography, the effect of sunlight, is difficult of execution. Let us, however, take the sun at its best, and suppose we have a negative to print from in platinum. I have found that an exposure of fifty to sixty seconds is ample to make a print in direct sunlight. That is, the light of 120,000 candles, at one foot distance, will take, say one minute, to give a print. We may place a gas light (which is a slightly whiter light, and hence more photographically energetic, than a candle) of, say, 100 candles near the negative to print, and it would take 1200 minutes or twenty hours to obtain a print by. If it were a twenty-candle lamp, it would take 100 hours, an exposure which is certainly somewhat long. As a matter of fact, I have obtained a *trace* of a print from a twenty-candle gas lamp in about twelve hours.

Now a word about moonlight. I find that the photographic value of the light of the most brilliant full moon is about 400,000 times less than sunlight at midday in summer. (It is usually put down at 500,000 times.) It is, therefore, quite evident that to obtain a print (except by development) by moonlight is impossible, or rather, I should say, impracticable.

There are other lights to which we naturally turn in order to see what value they have, viz., the arc electric light, the oxyhydrogen light, and the magnesium light. Now, I have made pretty exact measures of the visual and photographic value of these lights, but it is useless to put them down in what I may call bulk, since they vary so enormously. They are even worse than sunlight in this respect. What can be done is to state, for every candle power as measured by the eye, the candle power as measured by photography, taking the candle as a unit in both cases. With the electric light and oxyhydrogen light the same method of measurement was adopted to find this ratio as just described for sunlight, viz., the light was sent through a slit and reflected on to a screen. For the magnesium light a rather different procedure was adopted. It was measured by means of the blackening of platinum paper, a scale of darkness being previously made by exposure to different intensities of light. As it was not required to measure the absolute values of the light, but only its relative value compared with the electric light, it became unnecessary to know the absolute intensities of the light forming the scale, but only their relative intensities. The scale was, therefore, made by a Spurge sensitometer exposed to skylight. A Nadar lamp was used for burning the magnesium powder, which was allowed to burn for a minute at a fixed distance from the platinum paper. Another portion of the same paper was then exposed to the electric light at the same distance, and for the same time, and was then developed. The blackness was measured and compared with the scale of shades. This gave the relative photographic values of the light. In the case of the magnesium light, the weight of magnesium burnt was noted and found to be 124 grains, and with electric light the visual candle power was measured and found to be 1150 candles.

The relative value of the two lights, each burning for one minute, was found to be—

124 grains of magnesium light—43 on the empyric scale.
1150 candles of electric light—181 on the empyric scale.
∴ 1 *candle* of the quality of the electric light = ·16 on the scale.
∴ 1 *grain* of magnesium = ·35 on the scale.
That is, 1 grain of magnesium = 2·16 electric-light candles burning one minute.

Now, the electric-light candle was found to be, photographically, equal to 10·7 standard candles. Therefore, one grain of magnesium burnt was photographically equal to an exposure of 23·1 standard candles burning one minute, of course, at the same distance.

One candle-power of the oxyhydrogen light (a blow-through jet being used) was found to be equal to 1·7 standard candles, but for reasons I am inclined to increase that value to a little over two standard candles. A good blow-through jet may equal 400 candles optically, that is, 800 candles photographically. With this light it would then take five hours to obtain a print on platinum paper.

With magnesium, 1150 electric light visual candles (that is 12,300 photographic candles) equal $\frac{181}{43}$ of the magnesium light, each burning one minute, that is, electric light is four times the photographic value of the magnesium light. Now, 12,300 photographic candles at a foot off is about $\frac{1}{10}$ of sunlight. It should, therefore, take about ten minutes to obtain a platinum print from the negative described if placed one foot off, or forty minutes when burning magnesium expending 124 grains a minute. That is, to obtain a print with magnesium, 4960 grains, or rather less than twelve ounces, should be burnt one foot off the negative.

These considerations, then, show that practically sunlight and the arc electric light alone are available for printing purposes. Ordinary daylight has been excluded from consideration, as it is in another category of sources of light.

Now, if these two lights are so useful in contact printing, why should they not be used for printing-out purposes in an enlarging apparatus? As a matter of fact, both are useful, and it does not require an elaborate apparatus to use them for such a purpose. Sunlight is perhaps that which may often be most available to the members present; but I will first describe the arrangement which I use for the electric light. I have two condensing lenses of about six inches diameter, and of about six

inches focus, and these I place about ten and a half inches apart from one another, convex side inwards. At five and a half inches from the front of the combination I place the electric light, placing between it and the lens a piece of plain glass, to protect the latter from the heat. In front of the other lens and close to it I place the quarter-plate negative which I may wish to enlarge, and at the focus of the combination is placed a lens of about seven and a half inches focus in a whole-plate camera. The light is turned on and an image of the negative is thrown on the screen and focussed. Platinum paper, or other paper, is placed on a carrier in the dark slide, and exposure made, and, so long as the image of the points of the carbons fall within the area of the lens, the whole image will practically be equally illuminated. To enlarge from ¼ to 7½ × 5 size practically the length of focus used was eighteen inches, so that really, if the negative were removed, the image of the points being taken as a source of light, the paper was twenty inches from the screen, as the circle of light was the same. Now, as has already been said, it takes ten minutes to print a negative when placed twelve inches from the screen. To print this enlargement it should take twenty-eight minutes. As a matter of fact, the prints, except those taken on very thin negatives, took thirty-five minutes.

Now, the light I used was 1150 candle power. If one of 11,500 candles was used, the time of exposure would have been reduced to four or five minutes. With my light, had I wished to produce a print from the quarter-plate negative on to a piece of paper measuring 15 × 12, the exposure would have been two-and-a-quarter hours; with the larger light, only about a quarter of an hour. There is absolutely no difficulty in producing prints by this plan. Even if the light changes in position slightly, it still is effective, and causes no blurring in the image, as is often supposed to be the case.

With sunlight the same kind of apparatus can be used; but, instead of two condensing lenses, one is sufficient, as the use of the two was only to shorten the focus, which would be long if only one were used with the electric light, seeing that it is placed so close to the condenser. With the sun, by using only one condenser, we get about the same length of focus as obtained with the electric light. The same camera and lens can be used, and the sun being reflected on to the condenser by an ordinary looking-glass, taking care that it is flat, and does not give a streaky reflection. So long as the focus of the sun is kept on the camera lens, the image will appear equally illuminated. In this case, with a midday summer sun, the exposure should be the same as that to be given to the 11,500-candle-power electric light. Solar enlargements are, therefore, not only practicable, but tolerably easy to obtain when there is a good sun.

For quick enlargements the negatives should be stainless, and, as far as possible, be perfectly bright. The image given by eikonogen developer seems particularly suited for them, as also hydroquinone. Pyro development is not quite so good. I have already shown in photography that the density of the highest light in a negative need only be such that it will allow $\frac{1}{50}$ of that light to pass which passes through the most transparent part. I show a print from a negative in which the highest light is only $\frac{1}{15}$, and yet it gives a fair print.

There are other practical points which I wish to call attention to. First, if you have scratches in your condensing lens, beware of putting the negative too close to it. In one of the two prints of the front of Monte Rosa you have an example of scratches in the lens at the bottom right-hand corner, and indeed the same scratches will be found in other prints. In the second one, however, the scratches are gone by removing the negative an inch away from its old position, in which the remainder of the prints were taken. Slight scratches on the film also show. These can be got rid of by coating the film with collodion or by soaking the plate well in water.

There is one point to be remembered in all enlargements, and that is that the opacities of negatives, except, of course, in the transparent parts, are increased. That is, if the density be measured when the negative is far away from the screen and when close to, it will appear to have a greater opacity in the former case than in the latter. I have entered into the reason of this before, and I don't wish to enter into a debate regarding it again. I think the prints from the small and large negatives will conclusively show that such is the case.

This fact renders it possible to obtain an enlargement print from a negative which is superior to that in contact in the printing frame.

I must not forget to mention that I am well aware of the beautiful enlargements made direct on platinotype paper by the Platinotype Company. It was the excessive beauty of their productions that set me to work to enlarge some small negatives. Bromide-paper enlargements are all very well, some are fairly nice, but there is always a look about them of—I can scarcely say what—and personally I never care about looking at one for long. The gradation, too, according to my measures, must always be inferior to platinotype, and that is the principal reason why I have wished to produce a platinotype enlargement, believing it to be truer to nature than anything else.

So much for light and printing-out processes. The results I have given are those obtained by careful experiment, and I think that a knowledge of the relative visual and photographic powers of different sources given in terms of a candle is more convenient than the statement that the magnesium light or sunlight is so many 100,000 times brighter than a candle. This means very little, as the quantity, though usually not the quality, of light emitted in all these sources of great illumination is so variable.

CAPTAIN W. de W. ABNEY, C.B., R.E., F.R.S.

Our Editorial Table.

THE ART ANNUAL, 1892.

J. S. Virtue & Co.

THE Christmas number of the *Art Journal*, which is issued under the above title, is devoted to an account of the life and works of Mr. Briton Rivière, R.A. Mr. W. Armstrong supplies a well-balanced critical estimate of the painter's chief works, of which some forty illustrations, including three etchings by Mr. C. O. Murray, are given in the volume before us. To those photographers who are taking up one of the most fascinating branches of photography—to wit, animal portraiture—a study of Mr. Rivière's masterpieces should have considerable educational value. In depicting animals as they are, he is probably without a rival, and the qualities of humour and poetry which his work exhibits are of a high order. The one photogravure, "Persepolis," might have been better rendered, but not the poorest example of reproduction could destroy the poetical majesty of the theme.

The second number of Messrs. Adams & Co.'s *Photographer's Indispensable Monthly* contains many useful practical hints. It is an improvement upon the first number.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,420.—"Improvements relating to the Production and Use of Artificial Light for Photographic purposes and to Apparatus therefor." E. J. HUMPHERY and W. H. SMITH.—*Dated October* 26, 1891.

No. 18,528.—"An Improvement in Photographic Shutters." E. H. P. HUMPHREYS.—*Dated October* 28, 1891.

No. 18,529.—"A Movable Photographic Dark Slide-holder." E. H. P. HUMPHREYS.—*Dated October* 28, 1891.

No. 18,564.—"Photographic Rocking Apparatus." T. F. WOOD.—*Dated October* 28, 1891.

No. 18,592.—"Improved Device for Photographing in Bound Light." Complete specification. E. HACKH.—*Dated October* 28, 1891.

No. 18,702.—"A New or Improved Focussing Cloth and Mask for the use of Photographers and for like purposes." A. VAN DER WERFF.—*Dated October* 29, 1891.

No. 18,786.—"Improvements in Developing Dish-rockers and Screens." C. C. VEVERS.—*Dated October* 31, 1891.

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 8232. BERTEL GEORG PAGH MÖLLER, Kolding, Denmark.—*October* 3, 1891.

BY the improvements in photographic cameras hereinafter described I am able to construct a photographic hand camera, by means of which a large number of photographic plates may be stored up, so that they may be exposed one after the other, and may be kept as long as desired. The camera thus offers advantages not only to tourists, military persons, journalists, and persons in similar positions, but also to photographers by profession. The changing of plates is effected by a single manipulation, and the mechanism is not liable to become disarranged, so that it is, for instance, possible to take, in a few minutes, twenty or more plates of a passing procession. A moving vehicle or a galloping horse can be readily photographed two to three times.

By means of a sliding portion or drawer, which carries the objective lens, and a scale of distances used in conjunction therewith, it is possible, with the improved camera, to photograph objects that are very near as well as those that are far distant.

A portrait of large size and a landscape are taken with equal facility and certainty. Even a very fine adjustment is possible, if the scale should not be sufficient, as a loose indicator disc can be provided. The camera is also arranged to be screwed upon a stand, and is distinguished by its small dimensions. An apparatus for sixteen plates of the size of 9 × 12 centimetres, together with its objective and everything appertaining thereto, measures only 21 × 14 × 13 centimetres.

The camera can, however, be constructed in all sizes without the satisfactory operation of the mechanism being in the least affected thereby.

The details of this invention are given, with drawings of the mechanism employed, in the specification.

IMPROVEMENTS IN SHUTTERS FOR PHOTOGRAPHIC CAMERAS.

No. 10,798. JOHN KERSHAW, Spring-gardens, Buxton, Derbyshire.—*October* 3, 1891.

THE improvements which are the subject of this invention relate to the means employed for opening and closing the spring blind in the shutter of a photographic camera, and the object of this invention is to construct a shutter that may be used either as an instantaneous or a time shutter without concussion or

shocks caused by toothed wheels, or like gearing, where such are employed for the purpose of opening or closing the spring blind.

In this invention, for the purposes as herein above set forth, I construct a shutter in which is a spring blind with an aperture therein for exposure of light to sensitive plates, said blind being attached to liberating and receiving rollers contained in the usual manner within the shutter.

At one side of the shutter and on one end of the liberating roller I attach a pulley. I connect to this pulley a cord, and at a prearranged part of said cord I place a stop, either by means of a knot formed in the cord or an attachment. To the side of the shutter I connect a flat steel spring, said spring being caused to fit against the face of aforesaid pulley, with a space under the pulley and between the spring and side of shutter for a pneumatic bulb, which is actuated through a tube by means of a like bulb connected thereto and held by the operator. I place a stud or stop on the face of aforesaid pulley, and a like stop on the inside of the flat steel spring hereinbefore described. I also attach a guide or guides in a suitable position on the inside of spring and also to the shutter through which to pass the cord that is attached to pulley on liberating roller.

In order to take a picture instantaneously by means of a shutter constructed according to this invention, I pass the blind from the receiving or tension roller on to the liberating roller by means of aforesaid cord that is connected to and wound on the pulley attached to end of liberating roller, by pulling said cord until it is unwound from the pulley, when the stop or stud on face of pulley engages with the stop or stud on inside of the flat steel spring herein before described, and prevents the blind rewinding on to the tension or receiving roller.

When exposure is required, the operator presses by the hand the aforesaid pneumatic bulb at the end of tube, when the pneumatic bulb that is placed between the side of shutter and the flat steel spring causes said spring to open outwards and thereby release the liberating roller, by these means permitting the blind to be rewound on tension roller the aperture in blind having passed the aperture in shutter in the interval.

When time exposure is required I turn a lever that is attached to shutter against the guide through which the cord passes connected to inside of spring, and the same operation is performed as herein last described, but the knot or attachment in the cord is retained when passing between the aforesaid guide and lever, and thus keeps the aperture in blind opposite the aperture in shutter until released by a second pressure of the pneumatic bulb in the hand of the operator, when the shutter is thereby closed.

In order to indicate the tension on the receiving or tension roller I form a worm on the end of said roller. I attach to the side of shutter a worm wheel on which figures are marked, the space between each figure corresponding to one turn of the tension roller.

By this means the tension put on aforesaid roller is indicated by the figures marked in the face of the worm wheel which is operated by the worm on end of tension roller.

For the purpose of protecting the mechanism herein before described from injury, I hinge or otherwise attach a cover of sheet metal, which may be drown back for inspection of mechanism, or with apertures in said cover, by which to obtain access to any particular part.

What is claimed is :—1. A shutter of a photographic camera, for the purpose of obtaining prolonged exposure, the use of a cord, in which is a knot or stop at any prearranged part of said cord, and in combination therewith a lever, or other equivalent, attached to side of shutter, and the guide attached to a spring, said spring being arranged so as to control the liberating roller in the manner substantially as herein before described. 2. In the shutter of a photographic camera, the use of a worm wheel in combination with a worm formed on the end of tension roller, said worm wheel having numerals marked thereon in order to indicate the tension placed on the tension roller by the number of revolutions given to said roller in the manner substantially as hereinbefore described. 3. In the shutter of a photographic camera, the combination and general arrangement of parts as shown on the drawings for the purpose and in the manner substantially as hereinbefore described.

Improvements in Shutters for Photographic Cameras.

No. 19,480. Arthur Samuel Newman, 71 Farringdon-road, Middlesex, and Arthur Lewis Adams, 81, Aldersgate-street, London.—*October* 3, 1891.

This invention relates to improvements in shutters for photographic cameras more especially for what are known as "detective" or hand cameras, and is designed to produce a shutter which is simple in construction and action, and which, after each exposure, will return to its normal position for giving the next exposure without admitting any light whilst so returning.

This improved shutter is so arranged and constructed that by pressing the release knob or projection the power necessary to work the shutter is provided immediately before releasing said shutter to make the exposure.

The arrangement and construction is as follows :—

A thin plate of metal or other suitable opaque substance of a quadrant shape or similar sector of a circular shape is mounted to turn on a pin at or at about the centre, so that its path of travel lies across the lens aperture.

This plate or shutter has a suitable opening or slot cut or formed therein.

A second plate or auxiliary shutter of similar shape, and having a similar slot or opening therein, is mounted in a similar manner to the first-named plate, its travel being across the lens in the same way as the first shutter, the two shutters moving in parallel planes.

The auxiliary shutter is pushed in one direction by a rod or similar appliance having a knob or projection which extends outside the camera case, and is brought back to its normal position by a main actuating spring, such as a coiled spring or other suitable appliance. On one part of this auxiliary shutter there is a cam or other surface (to act as hereinafter described), and on another part there is a recess or projection to engage a catch, which catch holds the auxiliary shutter "open" until the shutter proper releases this catch, and the auxiliary shutter is at once returned to its normal position, carrying with it the shutter proper.

The first plate or shutter proper is mounted at its centre on the same pin or in as the auxiliary shutter, to which latter it is connected by a coiled spring ; so that, when the auxiliary shutter is moved, the shutter proper tries to follow, but is prevented by a catch, which retains it in the normal position until the opening or slot in the auxiliary shutter is coincident with the lens aperture, whereupon the aforesaid cam surface or projection on the auxiliary shutter releases the said catch, and the shutter proper then travels across the lens aperture, and so gives the exposure, and thereafter releases the catch, which engages the auxiliary shutter, and the two shutters together are then drawn back (by the main actuating spring) in such a manner that no light is admitted while so returning.

The speed of the shutter (*i.e.*, the length of time of the exposure) may be regulated by any suitable or convenient regulating device or appliance as, for instance, by a pneumatic cylinder and piston, or by a leather or other suitable brake, &c.

A second notch recess or projection on the shutter proper engages the same catch as the first notch or recess on same engages, and so holds the shutter "open" for any length of time, until the auxiliary shutter is again moved and, by the cam surface or projection, thereon cause the said catch to release the shutter proper and so close the lens. Thus it will be seen that any exposure can be given from instantaneous to any desired length of time.

In shutters for photographic cameras the combination of the shutters or plates and rod connected directly to the shutter to force same across the lens aperture, and the spring wound up by the movement of shutter to actuate the shutter, and the main spring to automatically return the parts to their normal position, all arranged combined and acting substantially in the manner and for the purposes hereinbefore described and illustrated in the drawings hereunto annexed.

Improvements in and in connexion with Photographic or Camera Guns.

No. 18,238.—Clifford Lawrance, 141, Fulham Palace-road, S.W.—*October* 10, 1891.

This invention consists in the construction and arrangement of a photographic or camera gun, so that, when the said camera gun is pointed towards a bird on the wing, or other moving object, the same may be photographed on a suitable film or plate, by operating a trigger attached to the butt of the said camera gun, or such similar device, thus exposing the plate or film, and the same is carried out in the following manner.

To a suitably shaped butt, carrying the trigger mechanism, which consists of suitable levers or suchlike means, I hinge or otherwise connect the camera or box containing the plates or films.

According to this particular arrangement, I arrange the plates or films in book form, each plate or film being retained in a zinc or other suitable frame ; these frames being bound or hinged together at one of their sides or ends, preferably at one side, but in such a manner as will allow them to fold over freely, and be exposed respectively. This book of frames containing the plates or films is provided with an outside cover, as in an ordinary book. The book containing the plates or films is supported in the camera box, or "breech," on a partition or other support, their bound or hinged sides resting on the support. These frames are pressed against four or more clips or stops in the camera box by means of a spiral or other spring. In the opposite ends of these said frames I cut alternate and corresponding slots, the said four or more clips or stops corresponding with the same. These clips or stops are connected by means of levers, cords, or such suitable means, to a thumbpiece or knob, operated from the outside of the camera body. When it is desired to change a plate or film, the thumbpiece or knob is moved, which, operating the levers, rods, or cords, brings the four or more clips or stops opposite corresponding slots on the frames containing the film or plate, and, owing to the pressure of the aforesaid spring and the said frames, one frame containing a plate or film folds over, and thus exposes a fresh surface plate or film. This is continued until all the plates or films have been exposed, and the book exhausted. I provide suitable springs, which are fixed in the body of the camera box, so as to break the fall of the frames and plates or films as aforesaid, and prevent same from folding back, should the camera gun be inverted. In conjunction with this apparatus I use a suitable shutter, consisting of wings operated by means of a clock-spring and toothed wheels, which operates a revolving disc through the medium of convenient levers. I also provide an arrangement operated by knobs for enabling me to give an instantaneous exposure, or one of any desired duration. This shutter is placed between the camera box and a barrel containing the lens. This barrel is graduated so that the focus of the lens may be adjusted readily, to suit the various distances between the object to be photographed and the said lens. I provide suitable sighting mechanism on the said barrel. If desired, I may attach an indicator, which is operated by the falling over of the said frames, thus registering or indicating on a suitable dial the number of plates exposed. It will be readily understood that by connecting the knob operating the shutter mechanism to the trigger on the aforesaid butt that, when the camera gun is held in the same manner as an ordinary gun, the trigger may be operated and the plate or film thus exposed. The lens is adjusted in the barrel by a suitable rack and pinion motion. I may also, if desired, attach a "finder" to my said apparatus. I do not confine myself to the precise details of construction of the camera box, or to the method of changing the plates therein, as it will be seen that any convenient means of so doing may be used in conjunction with my butt and barrel containing the lens as herein described.

The claims are :—1. In photographic camera guns, the combination and arrangement of the various parts, substantially as described and shown. 2. In camera bodies, the arrangement of the plates and frames in book form, and the mechanism for operating same, substantially as described and set forth herein. 3. In shutters, the construction and arrangement of the mechanism for operating the shutter, substantially as described and shown in the annexed drawing.

National Association of Professional Photographers of Great Britain and Ireland.—The Adjourned Council Meeting will be held on Monday, November 9, 1891, at Anderton's Hotel, Fleet-street, London.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 9 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 10 ...	Great Britain	50, Great Russell-st., Bloomsbury.
,, 10 ...	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 10 ...	Derby	Society's Rooms, Derwent-bldings.
,, 10 ...	Bradford.....	50, Godwin-street.
,, 10 ...	Manchester Amateur	Manchester Athenæum.
,, 10 ...	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 10 ...	Paisley	Committee Rm., Free Lib. & Museum
,, 11 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 12 ...	Birkenhead	Association Rooms, Price-street.
,, 12 ...	Cheltenham	
,, 12 ...	Manchester Photo. Society	36, George-street, Manchester.
,, 12 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 13 ...	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 29,—Mr. J. S. Teape in the chair.

Mr. FRESHWATER, in exhibiting Messrs. Newton's improved system of lantern condensers and fittings, remarked:—The form of condenser fitted in the present instance is the one designed by Mr. J. Traill Taylor, which consists of two lenses five inches in diameter, and a smaller collecting lens. The principle upon which this condenser is constructed is that the first lens takes up an angle of 95° of light from the radiant, which is parallelised by the second lens. The third lens cones down this parallel beam so as to fill the focussing lens, and is made removable, so that similar lenses of different foci may be substituted to suit various objectives of long or short focus. In optical or magic lanterns, where large condensers are used to cone the light down through the picture on to the focussing lens, it is obvious that it is advisable to place the picture at such a distance from the condenser that the whole of the cone of light passes through it, that the utmost illumination may be obtained on the screen. This object is frequently attained by moving the slide forward till it reaches the desired position; but this necessarily puts it out of its right position as regards the front lens, so that it has to be re-focussed, besides which the amount of variation shown on the screen by re-focussing, &c., prevents the operator from ascertaining the effect the movement of the picture has on the illumination. This was partly remedied afterwards by moving the focussing lens *with* the picture; but this, besides altering the size of the picture on the screen, could only be fitted to the best forms of lanterns at the expense of rigidity, which, though of less importance in a cheap simple lantern, is fatal in the case of lanterns with heavy lenses of twelve and fourteen inch focus, the fronts of which should be rigidly attached to the condensers, that the axis of the lenses may be kept optically true. To obviate these difficulties, the condenser (preferably a triple combination, five inches in diameter) is fixed in a solid brass mount fixed to a brass base, in grooves on which the tray carrying the lime-jet fits. This brass base travels by double racks and pinions, or screws, on a stout metal bed-plate, to which the front plate of the lantern carrying the picture and focussing lenses is also permanently attached. By this means we can, after focussing the picture on the screen, move both condenser and jet together away from the slide, without affecting the picture on the screen in any way except by increase or decrease of illumination, and so can adjust the relative positions of the cone and the picture without difficulty. Should slides of various shapes and sizes require to be exhibited in succession, the condenser and jet may, if desired, be racked backwards or forwards to suit any one of them without altering any of the other adjustments, and without moving or affecting the picture on the screen in any way, except by increasing its brilliancy. The lantern front, being fixed to the bed-plate, is perfectly rigid, and, if it requires tilting up or down to make the disc coincide with other discs on the screen, this may be done in the usual way, without in any way affecting the optic axis, as the jet, condenser, slide, and front lens all move together. The tray carrying the jet is preferably fitted with rack motions, and slides into grooves on the travelling base of the lantern, so that, though it can be moved, together with the condenser, by means of the rack already described, it can also be moved independently to and from the condenser, and above and below, and to right and left of the optic axis, so that it may readily be centred.

Mr. A. L. HENDERSON, according to his promise of the last meeting, showed two transparencies from a weak negative, the one on a slow bromide plate, the other on a lantern plate, and made in contact, to illustrate his method of getting the best results from an indifferent negative. His point was, that accurate exposures and the quality of the plate determined the quality of the results. The positive on the lantern plate was much superior to the slow bromide picture. He also showed a wet-collodion positive from a feeble negative of a yellow colour, and remarked that such a result was obtained by "building up" the picture, which was not possible with gelatine plates. He preferred contact exposures for making positive pictures, as with the camera method the "diffusion of light in the camera" prevented the highest sharpness being obtained. The developer he employed for the gelatine positives was practically Thomas's.

The Chairman passed round a thin negative of a blue colour, from which he had made a transparency by an exposure of one inch of magnesium at a distance of six feet, which he estimated was one-quarter the exposure required for a negative of medium density. One-half of the plate was developed as Mr. Henderson suggested at the previous meeting, namely, with a normal developer, the other with a more powerful developer. He also showed results from a hard negative obtained by an exposure to one inch of magnesium at two feet, developed with normal and dilute developers, the latter being recommended by Mr. Henderson. The results obtained by Mr. Henderson's plan were of a different character to those by his (the Chairman's own).

Mr. J. WEIR BROWN remarked that dilution of the developer undoubtedly affected the colour of paper positives, and went on to say, in reference to Mr. Henderson's statement, that contact printing gave sharper results in transparency work than camera exposures, that it did not agree with the experience of many of them. If extraneous light were excluded from the camera, he thought equally sharp results could be obtained by reduction as by contact.

The CHAIRMAN had continued his reversal experiments, and tried to ascertain at what point of the exposure a "re-reversal" might be got. He had exposed a plate behind ten openings on a clear day to the sky, the exposures varying from one second to 512, each of the exposures thus doubling the previous one. He found that one second reversed the image; but, as he was in doubt, he exposed another plate, and confirmed the point. There was practically no difference between the longest and the shortest exposures; the image in no case was re-reversed. There was, however, some slight difference in the halation present round each opening. Another plate, with openings, was also exposed in the same way, the maximum exposure given being 32,728 seconds. In no case was there a re-reversal.

A question from the box was: "When dealing with the focus question at the Polytechnic recently, Mr. Debenham showed by diagrams the formation of an image by a pinhole, and by a lens. Is there any other difference than that of intensity between the two images?"

Mr. DEBENHAM replied that, with a pinhole, definition is equal for any distance; with a lens, definition is more perfect at the focus, but falls off at other places.

After a brief discussion on Messrs. Hurter and Driffield's theory, in which Messrs. J. A. Sinclair, Beckett, and others took part, and some remarks by Messrs. J. Weir Brown, Debenham, Henderson, and Cowan, as to some recent utterances of Mr. Chapman Jones in reference to the loss of detail and gradation in the high lights in a negative that has been bromised and redeveloped, the meeting terminated.

LANTERN SOCIETY.

OCTOBER 26.—A new oil lamp, designed by Mr. Stocks, was tried. This lamp possesses several points of difference to other lamps on the market, the principal ones being, firstly, that the interior of the lamp is so arranged that the whole of the flames from the four wicks are utilised, instead of the tower portion being obscured as is usually the case; and, secondly, that the chimney is adjustable in length by means of a rack and pinion, so enabling the draught to be regulated. In the ordinary four-wick lamp, in order to get a proper flame, it is necessary to turn the wicks up very gradually, and to allow some time to elapse before getting them to their full height. In this lamp the full power is obtained in a few seconds. The lamp was tried practically against two commercial four-wick lamps, both of which give a good light as oil lamps go, and proved far superior to either, both in purity of colour and in quantity of light. The experiments made tended to show that one of the chief practical advantages of the lamp would be that it might be relied on to give its full power under all circumstances.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

OCTOBER 30.—Special Meeting.—Mr. C. Oakley in the chair.

The object of calling together the members for a special meeting on this date was to consider and discuss the business of the coming winter session.

The CHAIRMAN, in opening the proceedings, said it was thought the off-nights—other than the ordinary meetings—were very badly attended for the want of proper subjects for discussion, and it was hoped that the members of the section would co-operate together more to fill up these particular evenings by bringing up some subject for discussion.

Mr. WEIR BROWN proposed, and Mr. J. A. CARTER seconded, that every Friday evening, during the winter months, the club-room be open for subjects that should be brought up for discussion amongst themselves. This proposition was unanimously carried.

Mr. WEIR BROWN said it would perhaps be a difficult matter to get subjects for every evening, but if we could not do this it would necessitate arranging for outsiders to give demonstrations.

The CHAIRMAN thought, considering the number of members—sixty or seventy now—comprising the section, that there ought not to be any difficulty in obtaining subjects, providing the members would only come forward; he then called upon several gentlemen present for subjects, and which, by the response he received, seemed to meet with every approval. Mr. Weir Brown thought that the Committee ought to have the co-operation of the members more than they had hitherto done, as it was a very difficult matter for the Sectional Committee to find suitable subjects for them.

Mr. F. C. BAYARD believed the Sub-Committee should be enlarged.

Mr. WEIR BROWN said the Sub-Committee was quite large enough, and that a larger one would entail a greater amount of work than it does at present.

Mr. W. H. COLDWELLS suggested that the section might have an exhibition and competition.

It was felt by many present that this could hardly be thought of, as the section itself could not take upon themselves the responsibility of organizing without the sanction of the Club at large. The Annual *Soirée* of the Club, which is held in November, when an exhibition of the work of the section is then shown.

Mr. A. C. CARTER asked whether pictures could not be exhibited in the club room if members would like to exhibit.

Mr. BAYARD and Mr. WEIR BROWN suggested that screens, which the Club possessed, should be placed in the club-room on the general meeting nights, and that members of the section who had pictures to show would then be able to exhibit their work, and so interest the members of the club at large.

ENFIELD CAMERA CLUB.

OCTOBER 28.—Mr. W. H. TREWARTHA JAMES read a paper entitled *Notes on Hand Cameras*. The paper dealt firstly with those parts common to all hand cameras, viz., 1. *The Lens*, which was considered the most vital and important

part of the instrument, and which, therefore, ought to be of the best quality money could buy. The various features of the principal types were fully discussed, and especial mention made of the comparatively new form of lenses made with Jena glass by Messrs. Swift & Son, and for Messrs. Shew's Eclipse camera. 2. *The Shutter*, its best position, and most suitable pattern. 3. The form of the dark chamber, viz., box and bellows. 4. The methods of registering, exposing, adjusting, and changing the sensitive surface, classified into (*a*) box changers, (*b*) dark slides of various forms, (*c*) magazines pure and simple, (*d*) automatic and semi-automatic changers utilising gravity, (*e*) roll holders and other film changers, after which the various extra features, accessories, and adjustments were dealt with, viz., view-finders, including twin lens mounts, reflecting mirrors, &c. Exposure counters and automatic tallies, safety and secondary shutters, attachments for tripod work, special focussing adjustments, sliding lens, mounts, &c. Stops and diaphragms. Mr. Trewartha James considered that the *Reflecting mirror* type would ultimately hold the field for the highest class and greatest range of work. Bag changers, properly made were certainly the most compact and convenient form; but, if size and portability were unimportant, then properly made magazine cameras, and after them dark slides, held the field. Most of the automatic changers required rather delicate mechanism, and in the well types the jarring of the plates seemed a great defect, though otherwise many of the movements were reliable and very ingenious. In summing up, the use of the tripod was strongly insisted on, as, even with the fastest lenses and dry plates, and the best control over shutter speeds, it was only under favourable conditions of light and subject that properly exposed plates could be relied on. There was no doubt that hand-camera work (not mere snap-shot practice) would, as its conditions became better appreciated, grow into increasing popularity and value. A fine show including many of the best types of instruments in the market, in addition to several very clever home-made and home-designed cameras by members was presented.

The walls were decorated with frames contributed by some of the members.

PUTNEY PHOTOGRAPHIC SOCIETY.

OCTOBER 31,—Rev. L. Macdona in the chair.

Mr. S. H. FRY, of the Fry Manufacturing Company, gave a demonstration on *Bromide Enlarging*, on their new "Naturalistic" paper. Mr. Fry first showed members the method of judging the correct exposure, giving four, eight, twelve, sixteen seconds. He then proceeded to enlarge a quarter-plate negative of a yacht on the Thames to 12×10 inches, using hydroquinone as developer, and fixed in an acid bath composed of hypo, four ounces; bi-sulphite soda, one ounce; water, 16 ounces. He showed the members that they could obtain with hydroquinone results quite equal to those by ferrous oxalate, with less uncertainty and greater simplicity, as, by the use of the acid fixer, the operations could be reduced to two. He succeeded in producing two very beautiful enlargements, one of which he kindly presented to the Chairman. Not the least interesting part of the demonstration was his method of printing in clouds, by covering the foreground (after development, and while still wet), and then printing in the clouds from another negative. Mr. Fry showed how simple it was to bring out flagging detail by breathing upon the print, and by local application of developer on a pad of absorbent cotton-wool.

The following were elected members:—Messrs. J. B. Ball, S. Buckland, and A. E. Smith, making nine new elections during the month.

RICHMOND CAMERA CLUB.

OCTOBER 30.—The subject for discussion was, *Flashlight Photography*. Mr. Cembrano presided, and introduced Mr. J. G. Hudson, the inventor of the "Kolm" Time Exposure Magnesium Lamp. Mr. HUDSON fully explained the apparatus by which a sustained light is produced by means of magnesium powder, the power of light being under the control of the operator. By aid of this lamp the President took two photographs of the members present, and was then photographed himself, the exposures varying from five to fifteen seconds. Mr. Hudson also exhibited a repeating flash-lamp of his own design, and several other makes were shown by members present.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 29,—Mr. Paul Lange (President) in the chair.

The following were unanimously elected members of the Association, viz.:—Messrs. J. S. Craig, G. A. Carruthers, T. A. Moulton, John Medcalf, and Geo. Moore.

A report was made by the President on the excursion to Latham House, on Saturday, October 17.

It was announced that the next fortnightly practical demonstration would take place on Wednesday, November 4, when Mr. Edwin Banks, an old-experienced worker, would deal with the subject of the *Wet Collodion Process*. A little later on Mr. W. B. Beaton would demonstrate on *Bromide Enlargements*, and a special evening on Monday, December 7, would be occupied by Mr. John Howson, of the Britannia Works Company, who would give an impromptu demonstration on the working of their new printing-out paper.

The President then called attention to the arrangements that were being made for the prize competition on the day of the annual meeting, Thursday, November 26, when all pictures and lantern slides for competition should be sent in that day not later than half-past two, addressed to the Hon. Secretary. The following gentlemen had consented to act as adjudicators on that occasion, viz., Messrs. R. Talbot Kelly, Edward Whalley, and George E. Thompson.

After a discussion on several matters of interest to the members, an adjournment was made to the New City Hall, Eberle-street, where a large audience had assembled of members and friends. The first half of the evening was occupied by the showing of some 160 slides. All the pictures exhibited were of extreme beauty and finish of *technique*, looking on the screen like finely executed steel engravings. The entertainment concluded with the exhibition of the new set of American slides (eighty in number) just received from the Boston Camera Club, U.S.A., consisting of scenes in the famous Yosemite Valley. Mr. F. B. Ingleworth read the descriptive lecture. These slides now go on circuit, and have been largely booked up to April next. The powerful oxyhydrogen lantern was supplied by Messrs. Archer & Sons.

The annual meeting of the Society takes place on November 26. The Hon. Secretary (Mr. E. M. Tunstall) will, it is understood, resign his office at the meeting, the pressure of business engagements not allowing him sufficient time for the performance of the duties of the Secretaryship.

MANCHESTER PHOTOGRAPHIC SOCIETY.

OCTOBER 28.—Lantern Meeting.—This, the first meeting of the session, was devoted to a lecture by Mr. J. Macnamara, illustrated by slides mostly made from his own negatives. The subject, *Shakespere: his Home and Haunts*, proved a very interesting one, and kept the attention of a well-filled room of members and friends for nearly two hours. Stratford-on-Avon, with the beautiful country surrounding, were very fully illustrated and described by the lecturer, who also introduced many stories and anecdotes which have been preserved of the early life of the bard. The Society's new lantern, manipulated by Mr. J. T. Hughes, gave the pictures with excellent definition.

At the next lantern meeting, Mr. Smith, of the Eastman Company, will give his kodak demonstration.

OLDHAM PHOTOGRAPHIC SOCIETY.

THE Annual Meeting of the above Society was held in the club-room of the Oldham Lyceum last Thursday evening (October 29), at 7.45, the President (T. Heywood) presiding.

The minutes of the last Annual Meeting having been read, the following gentlemen were nominated for membership:—Messrs. W. Lees, J. Ogden, T. Wild, and F. Wilkinson.

The Secretary next read the report for the past year (enclosed), and the Treasurer's statement of accounts, which were confirmed, after which the election of officers for the ensuing year took place, the following being elected:—*President:* Mr. Wallace Thompson.—*Vice-President:* Mr. J. Chadwick.—*Committee:* Messrs. J. H. Ashton, J. Brooks, J. S. Dronsfield, J. Greaves, jun., T. Heywood, W. Jackson.—*Librarian:* Mr. L. Tetlow.—*Treasurer:* Mr. W. Schofield.—*Hon. Secretary:* Mr. T. Widdop, 16, Burnaby-street, Oldham.—*Assistant Secretary:* Mr. W. A. Nash.

During the election, Mr. J. Mellalieu, of Middleton, exhibited a novel developing arrangement, consisting of three bottles, with pipettes for dropping, which he intends shortly putting upon the market. A vote of thanks to the retiring officers for their services during the past year concluded the business of the meeting.

DOUGLAS (I.O.M.) PHOTOGRAPHIC SOCIETY.

AT the meeting on the 27th inst., a demonstration, *Photography by the Flashlight*, was given by the members, Messrs. Harrison, J. Windsor, Thomson, and the Secretary, the President posing the groups, &c. Amongst others the "Auctioneer," in which Messrs. Windsor, Brearey, and Lupton took part, caused considerable amusement. Good negatives were secured, and it was decided to repeat the experiment on a larger scale at an early date.

TYNESIDE CAMERA CLUB, NEWCASTLE.

OCTOBER 27,—The Presdent in the chair.

He gave an interesting paper on *The Uses of Uncorrected Lenses in Photography*. He referred to the writings of J. Traill Taylor, E. Dunmore, and Lyonel Clarke. He showed how to apply them to hand cameras for lengthening and shortening the focus of other lenses, and to correct the distortion of single achromatic lenses.

ABERDEENSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

THIS Association, which was formed last month, has made a very promising start. The second meeting was held on Tuesday evening, October 28, Mr. Alexander Mackilligan in the chair.

Mr. G. Brodie submitted the proposed rules of the Association as drafted by the Provisional Committee. The rules, after undergoing some slight alterations, were unanimously approved. The following were then appointed the office-bearers of the Association:—*Hon. President:* Dr. J. Mackenzie Davidson.—*Hon. Vice-President:* Mr. Thomas Ferguson.—*President:* Mr. Todd Moffat.—*Vice-Presidents:* Messrs. J. Clark and W. G. Lindsay.—*Committee:* Messrs. James Main and Alexander Mackilligan.—*Secretrry and Treasurer:* Mr. G. Brodie, 2, Powis-terrace.

It was agreed that the Society should be represented at the forthcoming Art and Industrial Exhibition (to be held in the Art Gallery, under the auspices of the Aberdeen Trades Council) by photographs illustrative of the different printing processes, these photographs to be contributed by, and to be the work of, members of the Society. It is expected that several different frames will have to be provided, on which the photographs will be advantageously arranged with suitable mounts, the frames to become the property of the Association. Prizes are to be offered for the best print sent in.

The regular meetings of the Association were fixed for the last Tuesday of every month.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 27.—The President, Mr. William Dougall, after passing through the usual preliminary business matters, called upon the SECRETARY (Mr. Pitkethly), who stated that his work that evening would be a demonstration of the practical working of one of the newer photographic methods. The kallitype, a printing process, the invention of Dr. W. W. J. Nicol, an Edinburgh gentleman, now in Birmingham. He described it as consisting essentially of coating a smooth, stout paper with a neutral solution of ferric oxalate. This, after

being rapidly dried in the dark, is used as a printing paper, under a negative where, during exposure to light, the ferric salt is reduced to the ferrous state. The print being now ready, through the action of light, is enabled to react on the silver haloid developer, whereby metallic silver is thrown down in the proportion of the action of the light through the negative. The process was one purely of development, and, being very sensitive, required care and experience to attain to the best results, but, as he showed by developing a number of prints, was very simple and easy of manipulation. Mr. Pitkethly showed how, by a shorter or longer exposure, and a weaker or stronger method of development, that the kallitype was capable of producing as great a variety of tones with as great a certainty of permanency of results as any of the printing processes in which silver was present. Fixation was effected by a short soaking in very dilute ammonia, twice repeated, and a rinse in clean water completed the print.

A number of questions were asked and replied to, bringing out the detail of the correct exposure, which was insisted upon, an actinometrical test for each negative being stated as the best preventive of spoiled prints, but he also stated that by a little acquired experience, such as was necessary in every process, the eye and the judgment of the operator proved a very fair test.

The thanks of the meeting, which was a pretty full one, were awarded to the Secretary for his contribution.

There was submitted and distributed quite a quantity of photographic literature which had been sent to the Secretary, also samples of Vever's lantern slide masks, in various colours.

The exhibition of the lantern work of the members was arranged to take place at the meeting in February next, which concluded the business.

Correspondence.

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

PERSPECTIVE AND THE PHOTOGRAPH.

To the Editor.

Sir,—Reading your article on a lecture given by Mr. W. E. Debenham on the above subject in your last week's issue, I was struck by some technical errors therein displayed. Either Mr. Debenham has forgotten his perspective, or perhaps he has never thoroughly mastered the subject. The end of the third paragraph reads thus:—"In the case, however, of the rays from the marginal spheres A and C, the cones are cut obliquely by the perspective picture plane P P, so that the section will be an ellipse." Very good. Now, sir, the cone of rays in question is cut by the picture plane certainly not perpendicular to its axis, but, it being a sphere cut by a plane behind and parallel to the picture plane which is to be represented, and as any section of a sphere can only be cut at right angles to its axis, the result is a disc, or circular plane, which can never be represented as an ellipse. A circle in perspective, whether it be parallel to the picture plane, to the right or left of the spectator, above or below the eye, in an ascending or descending, or an oblique plane, is *never* an ellipse, it is simply a circle in perspective; its form may and does frequently approach the curve of an ellipse, but that is all.

According to Mr. Debenham's theory, we should represent the great circle of a sphere placed as A or C by an ellipse with its transverse axis horizontal, which is manifestly absurd to the merest tyro. A perspective representation of the great circle of a sphere so placed would be a circle (in perspective, not an ellipse) with its vertical diameter slightly longer than its horizontal diameter, but its deviation from the true circle would be so slight as to be scarcely perceptible without close examination and measurement.

As to what Mr. Debenham says of the practice of artists in general, that may or may not be correct. I think the remark unnecessary and also untrue; at the same time, I would point out that all artists do not study perspective. There are artists, and mere artists; the latter, no doubt, have only a smattering of the subject, and are as a body, I should say, not far in advance of the mass of photographers.

I would remind you, Mr. Editor, that perspective is *not* an art, but an exact and infallible science; and I do not think that photography will ever teach anything in that direction; but I maintain that they go hand in hand on parallel lines always, and support each other in every possible way, even to the distorted vase in question, which corroborates the theory and one of the first principles of perspective.

If professional photographers would condescend to study perspective (I don't mean the mere reading of an elementary treatise, but to work it out thoroughly), they would be in a better position to judge it and photography side by side. Why not found a class, or have periodical lessons, at one or more of the Societies or Clubs? They would lesson the advantage now held by many amateurs; and, if the knowledge so acquired did no other good, it would tend to dismiss some of the absurd fallacies that have lately been paraded in our journals.—I am, yours, &c.,

Scarborough, November 2, 1891. Henry Flather.

[Our correspondent fails to realise that it is not the great circle of a sphere, but a cone having for base the great circle of a sphere, which we represent as being cut by the picture plane; and when this section is oblique to the axis the result can only be an ellipse. In speaking of a circle "which may and does frequently approach the curve of an ellipse" and of "a circle with its vertical diameter slightly longer than its horizontal diameter," Mr. Flather goes altogether beyond our comprehension.—Ed.]

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the Editor.

Sir,—I have read Dr. Miethe's (at present) anomalous *assertion* in your issue of the 30th ult. At present it is unknown to the scientific world at what date he "applied for" a patent in Germany concerning an invention for which I had *already* been granted provisional protection in this country.

Dr. Miethe has made no previous publication; it will be preferable in every sense that he discloses forthwith the date of his application to the Patent Office in Germany.

I shall then take the opportunity of fully treating with his communication.—I am, yours, &c., Thos. R. Dallmeyer.

25, *Newman Street, London, W., November* 4, 1891.

[Mr. Dallmeyer's patent was applied for on October 2. Can Dr. Miethe antedate this?—Ed.]

TROUBLES IN IRON DEVELOPMENT.

To the Editor.

Sir,—I shall feel greatly obliged if you, or one of your readers, will tell me the cause and cure of the following difficulty:—In developing transparencies with ferrous oxalate (Edwards's formula) my developer usually throws down a dense, primrose-coloured precipitate within a minute or two after mixing, and this whether I use distilled or ordinary water in making up the oxalate and iron solutions, and whether I mix them in the orthodox manner, by adding the iron to the oxalate, or *vice versâ*, the only difference being that, if I reverse the process, and add the oxalate to the iron, the precipitate is a little longer in making its appearance. Development goes on, to all appearance, as well as though the liquid remained clear, as it ought to do; but the precipitate is troublesome, and the developer is sooner exhausted. I have made many experiments, and tried in various ways to remedy the nuisance, but without success. I should have thought the water (tap water) was in fault, and that oxalate of lime was formed too abundantly, if it did not occur to the same extent with distilled water. The most curious thing about it is that now and then the developer remains clear, though mixed from the same bottles, and under the same conditions. I may add that I am a careful, experienced, and successful worker, and it is only lately that I have been troubled in this way. I should also like to know why this developer stains the film a pinkish hue during prolonged development.—I am, yours, &c.,

London, S.W., November 4, 1891. Ferrous Oxalate.

CONTROLLING DEVELOPMENT.

To the Editor.

Sir,—Will you kindly give me space to recommend to your readers the use of the common form of odorater or spray producer for throwing into the developing dish an additional quantity of accelerator, restrainer, or developer, as may be required.

Compared with the usual plan of pouring off the developing solution, dropping in the addition required, and pouring back upon the plate, the use of the odorater possesses great points of convenience. A simple touch on the rubber ball of the instrument distributes over the flooded plate the appropriate fluid, or directs it to any part of the subject where local acceleration or restraint seems desirable. Air bubbles, of course, cannot be formed, as they frequently are in pouring the solutions.

In using this plan it is best to make the spraying solutions somewhat weaker than the stock solutions, though the odorater seems to be almost an ideal instrument for keeping volatile or oxydisable fluids, admitting as it does only sufficient air to take the place of the solution ejected.—I am, yours, &c., W. E. Crowther.

School of Science and Art, Londonderry.

HYPOSULPHITE OF POTASH.

To the Editor.

Sir,—In reply to the letter in your last issue from W. T. F. M'Ingall, I beg to state I have not heard of hypo of potash before. I sent to my chemist to inquire, and he says the wholesale price is 3*s.* per pound. This is a great obstacle to a purchase as compared with 2*d.* per pound. When it graduates to something like half the money, I will gladly become a buyer.

The next question is, Why has soda held its place so long? Because at first the paper was more carefully made, and the silver solution was stronger than is generally used at present. The amateur looks to *price* too much, rather than put himself to the trouble of making up the solution. There are bad cardboards also on the market, that help the fading process. This latter difficulty may be overcome by mounting with rubber solution.—I am, yours, &c., James Alexander Forrest.

Waverley, Alexandra-road, Birkenhead, November 2, 1891.

DETERIORATION OF LANTERN PLATES.

To the EDITOR.

SIR,—I have had an experience similar to Mr. Henderson's with regard to lantern plates. I bought some three dozen boxes about six months ago, and have been using them constantly since. They were by one of the best makers, and were of recent date. From the very first I found markings on nearly every plate, at the edge, about a quarter of an inch wide, sometimes on two adjacent sides, evidently the corner of the larger plate from which the plates were cut. I showed several at the maker's, and was told that they were "drying marks," and that, if I developed more quickly, these bands would not appear. I have done so, with the result that the stripes come up *black*, not merely dark grey. As these markings are quite visible on taking a plate from the box, surely they cannot have been examined before being packed and sent out.

I have used many hundred plates of this make, and have never found this defect before, which seems inherent in the entire batch.—I am, yours, &c.,

(Rev.) E. HEALY.

London, N., October 31, 1891.

MR. VAN DER WEYDE'S EXHIBITS.

To the EDITOR.

SIR,—I was surprised, on reading Mr. Van der Weyde's letter in the last issue of your JOURNAL, to find him writing of the "*unjust* charge of having knowingly sent an ineligible picture for competition for the year before," &c.

As I was the first person to call attention to the fact, I should like to know how he can call it unjust on the face of his own explanation in a letter he sent to your JOURNAL at the time (October, 1890), in which he says: "In the first place, I had no idea of exhibiting at Pall Mall this year, and should not have sent, but that, incidentally meeting the Hanging Committee at the restaurant where I lunch, they particularly requested me to do so. I promised to see if I could find something, and the same day I sent an enlargement (a life-size single figure), which, in the hurry, I quite forgot had been exhibited at the Drapers' Hall last season. This picture, on delivery, was recognised, refused, and brought back. For several succeeding days I met the Committee at the same place, and one day I spoke to Mr. Cocking, the Secretary, and expressed to him my regret at the mistake, and told him that I had nothing else I cared to send which had not been exhibited at the Crystal Palace or in the City, upon which he told me, in a friendly aside, that he did not think there would be any objection to the Palace, it being so nearly out of the postal district, but that anything shown in the City was out of the question; and he again urged me to send something that day, as, though the hanging was practically finished, he could yet find room if my pictures were not large. Two small photographs were accordingly sent that evening."

It may have been an error of judgment on his part to yield to the temptation of a plum in the shape of a possible medal; but two blacks never yet made a white, and every just thinking person must admit he stands "guilty" on his own confession.—I am, yours, &c.,

Bedford, November 2, 1891. ANNIE E. BLAKE.

STOLEN LENSES.

To the EDITOR.

SIR,—Between the 12th and 17th of last month two French lenses were stolen off the premises of the late Mr. Bettony, Maryport.

To-day I have missed a Grubb's B 1, No. 8705. One of the lenses has a single scratch on it. If it is offered for sale to any brother photographer, I shall be glad if he will communicate with the police.

Circumstances, with which the police are already acquainted, point suspiciously towards a man who called upon me on the 14th of October. He told me he had come from ——; he seemed down on his luck, to put it vulgarly, and I loaned him a few shillings for present necessities, and gave him a book of coupons to sell. I gave him two more on the 17th, and have not seen him since.

I don't say there is any connexion between the simultaneous disappearance of him and my lens; but I remember he asked me if didn't take my lenses home at night. I don't, and I'm afraid I shall never have the chance of taking my Grubb home now.—I am, yours, &c.,

Workington, November 2, 1891. J. ATKINSON.

FRY MANUFACTURING COMPANY'S DEMONSTRATIONS.—The second of this series was delivered on Friday last, October 30, to a full audience. The subject—*Bromide Enlarging*—was treated in a practical manner, the lecturer describing the apparatus required and the method of using it, afterwards illustrating his observations by producing enlargements by artificial light. Details of development were given and suggestions to meet possible failures. The lecture was followed by a general discussion and questions from the audience. During the evening Griffiths' fixed-focus enlarging apparatus was shown and used. The next lecture—subject, *Lantern Slides*—is fixed for Friday, November 13, at eight o'clock; tickets as usual, in return for stamped directed envelope.

Exchange Column.

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

Wanted, good optical lantern, in exchange for Beeston Humber tricycle.—Address, R. H. BLYTH, Photographer, Ilfracombe.

Will exchange fine Lincrusta dado accessory, 6 × 3 feet, for background, interior or exterior.—Address, SCAMELL, Church End, Finchley.

Wanted studio accessories, dry plates, dark slide, or sensitised paper, in exchange for nearly new Simplessium printing press, complete.—Address, JOHN WILLIS, Chatteris.

James's flash lamp and lantern complete, cost 6*l.* 6*s.*, in exchange for 12 × 10 camera, with three double backs. Difference arranged.—Address, SIMMONS, 258, Westminster-bridge-road, S.E.

Exchange, Ross' compound instantaneous stereoscopic lens, with rack adjustment and extra back lens, in morocco leather case, equal to new, original cost 7*l.*, for a seven-inch focus rapid rectilinear, with iris.—Address, W. H. BELCHAMBERS, Woodhatch, Reigate.

Half-plate polished mahogany, leather bellows camera, one double slide, with Marion's view lens, and ash tripod, in exchange for whole-plate bellows body camera, with lens. No objection to camera being a little out of order.—Address, R. HUSSEY, 38, Thrale-road, Streatham.

Exchange a well-made corner show-case, size of glass sides 26×28½ inches, all ready lined for portraits, open by doors at back; also a large fern-case. Wanted, cabinet portrait lens or whole-plate camera.—Address, PHOTO, 186, New Kent-road, S.E.

Pair Grabb's stereo lenses, five inches focus, whole-plate landscape lens (Lancaster's); for C.-D.-V. portrait lens.—Address, PHOTO, Castle Hedingham.

Dark tent, fitted with tank, piping, chemical compartment, London make, and bamboo tripod for quarter-plate camera; exchange for background or pedestal.—Address, PHOTO, Castle Hedingham.

Exchange 500 stereoscopic slides of the wonders of the Pennine Range for half-plate printing frames or card mounts, plain or printed.—Address, J. WILKINSON, Blue Hall, Ingleton, Kirkby Lonsdale.

Will exchange a muffle furnace and all requisites for producing ceramic enamels for photographic apparatus, lens, and other requisites.—Address, ANDRE, 5, Queen's-terrace, Kingston-on-Thames.

Two retouching desks, thoroughly well made, dimensions 20×22 and 28×36—latter for working 24×18 negatives—will exchange for box printing frames, large sizes.—Address, C. W., 146, Rucklidge-avenue, Harlesden, N.W.

Exchange McPhun's *Family Reference Atlas of the World*, forty-six maps, with copious index and universal gazetteer, slightly soiled, but perfect and strongly bound, for good field glass or stereoscope, with photographs.—Address, N. S. BROWN, 16, Glebe-park, Kirkcaldy, N.B.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPH REGISTERED:—

John Stuart, Glasgow.—*Two photographs of the Drawing-room of the ss. "Ophir." One photograph of the Dining-room of the ss. "Ophir." One photograph of the Dome of the ss. "Ophir."*

A. M. Riddle, Oban.—*Photograph of the Rev. Alexander Stewart, LL.D., Nicher Lochaber.*

W. W. W.—Daguerreotype plates are not made now.

A. DONALD.—Thanks; but the method you describe is in every-day use.

T. WHITMORE and C. C. will find the information they seek given in another column.

HON. SECRETARY TYNESIDE CAMERA CLUB.—By all means send us your reports regularly.

GEORGE PENDRY.—We could not say without having fuller particulars of your proposed method.

R. ROBINSON.—Put yourself in communication with the police authorities of the town in which the man resides.

N. ROWLAND.—You will find information on the subjects you mention in Burton's *Photographic Printing Processes*, and in Wilkinson's work.

SOL.—1. A lens of the rapid rectilinear type would probably answer your purposes best. 2. The productions of both firms are in all respects excellent.

A. L. F. ROBERTSON FULLARTON.—1. A half-plate kodak would, we think, do capitally. 2. The films keep very well. 3. Fresh supplies may be obtained in the towns referred to.

W. A. Y.—We do not undertake the testing of mounts for the purpose of settling disputes between purchasers and vendors. Such work is not within the province of journalists.

T. H. JONES.—As we know nothing of your abilities, we, of course, cannot advise you as to what salary you should ask. Salaries are governed entirely by ability, and not by the income of the employer.

Y. Z.—Without seeing an example of the work, we are quite unable to say how it was produced. We can only repeat the suggestion previously made, that possibly the pictures were tinted with some of the coal-tar colours. These colours may be obtained from any dealer in dyers' materials.

S. WARMAN.—In copying a painting, in which blues and yellows predominate, a yellow screen will be necessary. Several formulæ for orthochromatising plates are given in the ALMANAC for the current year.

R. BERDOE.—With ordinary care, working on an amateur scale, there is very little probability of your suffering inconvenience from the bichromate when practising carbon printing. Take care to thoroughly wash the hands after sensitising or developing.

No. 3.—All the most important specifications of photographic patents are published in our columns, although space will not allow of our giving the claims made. These, in some instances, occupy more room than the specification itself, especially with some of the American patents.

R. C. TURNER.—Yes; wet-collodion negatives can be dried by heat. There is no fear of the film "exploding," although it is composed of "gun cotton." A collodion negative can be, as you were told, developed, fixed, washed, and varnished ready for printing in half an hour, or even less than half that time if necessary. Your friend was not "throwing the hatchet," as you appear to surmise.

S. SMITH complains that in his attempts to make transfers for photo-lithography the ink will not come away from the paper clean, and, when a gentle friction is applied, the finest lines are liable to be injured.—Possibly the paper has been sensitised too long, so that the gelatine has become partially insoluble; or it may be that the negatives are at fault, being too thin for the purpose. Dense negatives are essential in photo-lithography.

AMATEUR (Birmingham) asks if there is any—and, if so, what—objection to the use of dextrine for mounting photographs? He says that it would be so much more convenient for amateurs than having to make starch every time one wants to mount a picture or two.—Dextrine is a very convenient mountant; but, unfortunately, it is almost invariably acid, and for this reason it would be liable to act deleteriously on the photograph, particularly if it were exposed to damp.

OPERATOR (Belfast) writes as follows:—"With all the black varnishes I have tried, I find that in blocking round fine details, when it has to be applied thinly, it is not opaque enough to stop out the light when the negative is tolerably dense. Can you assist me?"—When the varnish proves too thin, it may be remedied in two ways. First, by leaving it exposed to the air, so that some of the solvent may evaporate; second, by adding some black pigment, such as lampblack, to it. The latter is, perhaps, the best plan, as it does not add much to the viscosity of the varnish, which is an advantage.

P. Y. R. O. says: "1. I am troubled with a scum on my negatives, which shows only when they are dry, and turns white when I wipe it. Will you please tell me the cause of it, and how to get rid of same? 2. A few weeks ago you gave an address of a firm who make a speciality of producing carbon pictures on china, &c.; will you please repeat it?"—1. Send us a specimen negative, showing what is complained of; we can then the better say the cause. Examine the plates before they are exposed, and see if there are any markings to be seen on the surface of the film. 2. Write to the Autotype Company or Messrs. Elliott & Son.

MR. W. C. HUGHES directs our attention to what he considers conduct unbecoming in one of his brethren, the manufacturers of lanterns. Soon after the Crystal Palace Medal was awarded Mr. Hughes for his Docwra lantern some correspondence relative to it was entered into in this JOURNAL. What Mr. Hughes complains of is that a rival maker has, by publishing in his catalogue extracts from this selected as being unfavourable to him, endeavoured to do harm to his business. To say the least of it, such conduct is highly unprofessional, and it is a course we were not prepared to find adopted by respectable tradesmen. The Docwra lantern met with the high approval of all the judges at the Crystal Palace, and received the prize as being the best in that exhibition.

R. B. writes: "In the ordinary case of the taking of the photograph of a person for which the photographer is paid, and in the absence of an agreement to the contrary, I presume the copyright of the negative belongs to the person on whose behalf it is made; in fact, that the whole matter comes within the Copyright (Works of Art) Act, 1862. Assuming this to be so, it would appear that if a person, other than the one on whose behalf the photograph is made, applies, without authority, to the photographer for a copy of the photograph, and obtains same, both the photographer and such person are liable to penalties. It is, of course, the duty of the photographer to properly satisfy himself that he is authorised to deliver copies to the applicant. As an alternative to the remedies given by the Act I have referred to, has any other course been found effectual for stopping this practice, and obtaining a restoration of the copies of the photograph disposed of?"—The Copyright Act of 1862 is very unsatisfactory. It was decided, in the case cited last week, that the copyright in a picture belongs to the author of it, that is, the one who takes the photograph. No respectable photographers part with copies of their sitters' portraits without consent; but, as the law stands, we fear there is no remedy.

PHOTOGRAPHIC CLUB.—Wednesday, November 11, *Impurities in Photographic Chemicals*, Mr. A. M. Levy.—18, annual dinner.

THE North Middlesex Photographic Society's annual exhibition of photographs will be held at Jubilee House, Hornsey Road, on Monday, December 14, next. The judges are Messrs. J. Gale and Ralph W. Robinson. Certificates only are to be awarded, the six classes being confined to members' exhibits.

SOCIETY OF ARTS.—The arrangements for the meetings of this Society during the ensuing Session have just been announced. The first meeting will be held on Wednesday, November 18, when the opening address will be delivered by the Attorney-General, Chairman of the Council. On the following Wednesday evenings previous to Christmas papers will be read, *inter alia*, on *The Measurement of Lenses*, by Professor Silvanus P. Thompson; on *The World's Fair at Chicago in* 1893, by Mr. James Dredge; and on *Secondary Batteries*, by Mr. G. H. Robertson. The first of a series of Cantor Lectures will be delivered by Mr. A. P. Laurie on *The Pigments and Vehicles of the Old Masters*, and will consist of three lectures, commencing Monday evening, November 30.

MR. E. BENEST desires us to state that there is a slight error in line thirty-seven of Section II. of his paper on *Light, and its Action upon the Haloid Salts*. Instead of "The affinity for chlorine is again set up, and *no free chloride being in the tube*," the italicised part should read, "*as there is free chlorine in the tube.*"

THE Holborn Camera Club's arrangements for November are as follows:—November 6, Discussion on Photographic Printing, to be opened by F. J. Cobb. 7, The Annual Supper, at Anderton's Hotel, Fleet-street. 13, Lecture. 20, Mr. J. G. Hudson will demonstrate with "The Kolm" flash lamp, which gives a steady flame, produced at will of operator, and is perfectly under control. 27, Lantern Night.

THE photographic section of the Fillebrook Athenæum, Leytonstone, hold an exhibition of photographs on December 2 next. Amateurs only may compete for the six silver medals offered, and photographs which have gained awards in any open exhibition or competition are ineligible. The Hon. Secretary is Mr. J. W. Spurgeon, 1, Drayton-villas, Leytonstone, from whom all particulars may be obtained.

THE Committee of the Polytechnic Institute are arranging trips to the Chicago Exhibition of 1893, specially intended for those whose means will not permit of them visiting the New World under ordinary circumstances. The excursionists will travel by the fastest Atlantic steamers. It is proposed that two days be spent in New York; Philadelphia and Washington visited, and six or seven days passed in Chicago. The charge will probably not exceed twenty-five guineas. Further particulars may be obtained of the Secretary to the Institute.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The following will be the arrangements for the lantern displays at the exhibition during the coming week:—Saturday, November 7, Competition Slides. Monday, November 9, Competition Slides. Wednesday, November 11, Lantern Slides, by Mr. J. A. Sinclair, illustrative of *A Scamper through Normandy*. Thursday, November 12, last night of the exhibition slides sent by Tasmanian and Indian contributors, and the Prize Competition Slides. The next ordinary meeting of the Society will take place on Tuesday next, November 10, at 8 p.m., at the Gallery, 5a, Pall Mall East, instead of at the Society's rooms, as has already been announced. Mr. Leon Warnerke will read a paper, illustrated by lantern slides, upon *Photographic Technical Instruction upon the Continent*. The medals will also be presented to the prize-winners.

PHOTOGRAPHY IN COURT.—*Theft of Bromide of Silver.*—William Simmonds, of 1, Bertha-terrace, Headstone-drive, was charged with stealing, during the month of October, 1891, ninety-three ounces of bromide of silver waste, of the value of 12*l.*, the property of the Eastman Photographic Materials Company, Headstone-drive, Harrow. Mr. Regg, solicitor, who appeared for the Company, stated that the prisoner was employed in the emulsion or separating room. It was there a part of his duty to superintend a machine that was used for separating bromide of silver. The waste was put in jars, either for future use or for sale. The waste was very much like putty, but it was rather more yellow in colour. Five or six pounds' worth could easily be taken away in a small box. On or about October 2 the prisoner went to Mr. Blundell, a silver-refiner, at 162, Wardour-street, Oxford-street, and produced to him an ordinary jam jar containing some bromide of silver waste. The prisoner asked him to buy the contents. Mr. Blundell asked him where he got it from, and he said it was the residue of what he had before he went to the Eastman Company. Mr. Blundell accepted it, and took down the prisoner's name and address. Mr. Blundell refined thirty-seven ounces, and sent the prisoner Postal Orders for 6*l.* 10*s.* On the 20th inst. Mr. Blundell received a letter from the prisoner stating that he had a small lot of fifty-seven ounces of silver waste, which he was seuding on by Parcels Post. The prisoner also asked him to send Postal Order on to the address he gave at Wealdstone. Mr. Blundell, on receiving the parcel, thought it proper to communicate with the Eastman Company, whose offices were in Oxford-street. The result was this prosecution. William Hall Walker, managing director to the Company, said that when the prisoner entered their employ he said he had been a steward on board the late Mr. W. H. Smith's and Mr. Vanderbilt's yachts. He had been about twelve months in the Company's employ. He worked in the emulsion or separating room, where three or four others were also employed. Witness received a message from Mr. Blundell on the 20th inst. about some bromide of silver. He saw the bromide of silver waste, which was similar to their own at the factory. The next day he questioned him in the office, and asked him whether he had been employed in photographic works before. The prisoner said he had not. Witness then asked him where he had got the silver waste that he had been known to offer to Mr. Blundell, and he then admitted that he had taken it from the jar in the emulsion room. Witness requested him to give an explanation, and he replied that he could not. Witness understood him to say, however, that he was put up to it by other fellows. He admitted that he had sold it to Mr. Blundell. James Blundell bore out the statement of the solicitor. F. W. T. Crone, a chemist in the employ of the prosecutors, said the prisoner worked under him at the factory. The waste produced was their property. P.C. Miles, 298 X, proved apprehending the prisoner. When Mr. Walker gave him into custody the prisoner said, "It's quite true what Mr. Walker has said. I did take it, but I did not know I was doing wrong. I was led away by others." The Bench sentenced the prisoner to six weeks' imprisonment with hard labour.

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SOME CAUSES OF BAD BUSINESS.

RE remains now, unhappily, very little doubt that the past ɔn has been a bad one for professional photographers. The ɔus and, indeed, the inevitable explanation of the depres- is the exceedingly unfavourable weather we have had for ly the whole of the year. Undoubtedly, this has seriously fered with professional as well as amateur work, for people ıot much inclined either to be photographed or to take ographs when the sky is dull and the rain is falling; but re disposed to think that the much-abused weather is not ;ether responsible for the stagnation which has called forth complaints of so many of our professional friends. To a great nt, we believe that the regrettable state of things we have ted at is due to other causes, including, we venture to say, one altogether to be dissociated from photographers themselves. little more than a year ago we pointed out that, owing to growth of photography among many who find it useful to ı in their professions—such as builders, architects, engi- s, solicitors, and many others—outdoor work was rapidly ing away from the hands of professional photographers, since we wrote, our observations tend to confirm us in the ion we then gave. It is, indeed, clearer than ever that in pho- aphing landscapes and buildings, interiors, machinery, objects ct, articles of manufacture, and possibly in other departments is craft, the position of the professional photographer is not t it once was, the control of those classes of work having ɔst entirely left him; and that, therefore, he is driven to upon portraiture as the staple of his calling. Such being case, the sooner the professional frankly and fully recog- s that this deprivation is a real one, and, in all probability, nanent, the sooner, we apprehend, will he set about taking ɔs to adapt himself and his business to the restricted, but necessarily diminished, requirements of his *clientèle*.

ow, in portraiture, it is a trite remark, that the professional tographer need have little fear that the amateur will ever ace his superiority. Perhaps it is this knowledge which es to make the average professional so confident in his and position, that he is reluctant or unwilling to move ı the times, and keep himself abreast of them in the matter he latest novelties and the newest processes. Times out ıumber we have declaimed against the indestructible con- atism of the British photographer, and to this unfortunate acteristic, more than any other, are we disposed to attri- e the periodical lamentations which occur as to the bad e of trade among them.

ortraits, with the great majority of people, are as much a ıry as a necessity, and it is said that luxuries are the last gs which, even in times of general depression, are removed ı the list of one's personal requirements. If this be so, ı photographers must seek for some other reasons besides hardness of the times and unfavourable weather to account for bad business. We have accused them of not moving with the times, and we proceed to ask, To what extent has por traiture by artificial light been taken up by them? Even if magnesium lamps be too troublesome, or not suitable, has any advantage been taken of the recently introduced facilities for photographing by electric light? Again, are platinum and bromide papers, gelatine emulsion papers, used for small work so much as they might be; or is it the fact that the majority of the smaller photographers cling with fatal tenacity to the old and almost extinct albumen printing process?

Not only is it the case that British photographers are slow to initiate novelties, but it is also the undoubted fact that they are just as unwilling to adopt those which may be introduced. Many instances of the long neglect which new processes have encountered at professional hands, before being tried and adopted, will occur to our readers. Perhaps, in artistic skill and technical manipulation, we have not, on the whole, much to learn from our American brethren; but as regards business aptitude, and quickness to recognise the merits of a new dodge or process, with a view to turning it to profitable account, we are still far behind them. An illustration of native apathy, contrasted with American smartness, has only recently occurred. Photographers in both countries have long asked for a means of varying the tones of developed bromide prints, in the direction of greater warmth. A process of the kind was brought to the notice of a London Society by an amateur worker and the full formula subsequently published. So far as we have yet heard, this toning process has met with little or no notice from professional photographers and enlargers in this country. In America, however, it has been warmly taken up, and already "sepia bromides" are becoming highly popular with them and their clients.

To sum up, we are convinced that, though the past season has undoubtedly been adverse to photographic prosperity, bad weather alone is not the cause of the depression of which photographers are complaining. It is largely due, we are of opinion, to their neglect to place fuller facilities in the way of people being photographed by artificial light by day as well as night, combined with a neglect to keep up a succession of novelties in printing processes. For the insane cutting of prices, which unhappily goes on, we have nothing but condemnation. It is, however, a factor which must not be lost sight of in reviewing the bad state of business with photographers in recent years, and is probably just as effective as the other causes we have previously touched upon.

COLLODION EMULSION WITH CHLORIDE OF SILVER FOR TRANSPARENCIES.

In speaking of collodion emulsion with chloride of silver, in the ordinary course of events the particular form known as collodio-chloride of silver would be intended, that being the

only way in which silver chloride and collodion have hitherto been practically utilised in conjunction.

Collodio-chloride, as most of our readers are aware, is an emulsion containing free silver, as well as an organic restraining acid, and its use is for printing out direct pictures, either upon paper or glass, in which capacity it behaves much in the same manner as ordinary albumenised paper. But, though a plain chloride of silver emulsion has not hitherto been practically utilised, it has long been known that such a film is amenable to ordinary alkaline development, the late Mr. Herbert B. Berkeley having demonstrated that fact so far back as thirteen or fourteen years ago. That research in this direction has never yet led to any practical application of the plain collodio-chloride film is perhaps rather due to the almost total abandonment of collodion for gelatine soon after Mr. Berkeley's publication, than to any inherent adaptability; and, judging from what has been done with developed gelatino-chloride, it seems likely that the corresponding collodion preparation might prove equally useful as well as present certain advantages over its rival.

The particular advantage derivable from the use of chloride of silver with gelatine is the capability of producing an almost endless variety of tones or colours, many of which are utterly unlike anything obtained by development on either of the other silver haloids. Many of our older readers will recollect the astonishment created some ten years or more ago when Dr. Eder's first examples of developed gelatino-chloride prints reached this country. The tones of these varied according to the circumstances of exposure and development, from bright green, through shades of yellow, brown, and red, to purple; indeed, it seems that no colour or shade is impossible of attainment by suitable modification of the conditions.

If a similar latitude can be gained with chloride of silver suspended in collodion, then, the well-known advantages of the latter vehicle being taken into consideration, it is not improbable that collodio-chloride for development would take a permanent position amongst the processes in daily use, and, for some purposes, supersede the gelatine film now generally employed. In the following remarks we propose to deal with the capabilities of collodio-chloride emulsion both with and without free silver, or, in other words, for "printing out" and development respectively.

Collodio-chloride properly so called—that is, the preparation hitherto known under that name—has during the quarter century or more it has been before the public secured scarcely any permanent support. At one time, years ago, and again recently, collodio-chloride upon paper has been put forward as possessing advantages over albumen paper in the matter of permanency; but, for some reason or other, it has never seriously entered into the competition of printing processes. It has frequently been belauded as a means of easily producing transparencies of the finest quality with a minimum expenditure of trouble; but here, again, it never seems to have succeeded in attracting the public attention; in this case, probably, because, as usually prepared for use on paper, it is of practically little use upon glass, and is utterly and completely unsuited for lantern slides, which form the great bulk of the transparency work produced.

We say that, as usually prepared for paper work, it is unfitted for lantern slides; but it does not follow that it is necessarily unsuited to that purpose. The conditions of working upon glass and paper are so different that, in making a preparation that will answer most fully the requirements of paper, it is not surprising that it should be wholly or parti unfitted for glass, and *vice versâ*. We may, therefore, bri indicate the directions in which the ordinary collodio-chlo is unfitted for employment upon glass.

From what has been already said, it will be recognised t collodio-chloride is not a washed emulsion, that is to say, it not been deprived of the soluble salts formed by double composition in sensitising. More than this, it contains a l proportion of other soluble matter besides the decomposi salts in the form of free nitrate of silver, and of citric or o acid, purposely added, to give the organic bases upon wh vigour depends. When employed upon paper, these solu substances are almost wholly absorbed by the porous supp and consequently exert no inconvenient influence upon character or uniformity of the coating; but, when the emuls is applied to glass, the case is altogether different. The g surface being completely impervious, there remains noth but the collodion film itself to hold these matters, and, tho the collodion may be purposely made very thick, it pro wholly inadequate to the task, and the result is that the solu contents of the emulsion, when dried, crystallise in star- forms over the whole surface of the plate.

In many instances, especially when the plates are used s after coating, little or no injury arises from this crystallisat bad as it may look, since the crystals which form chiefly on surface are dissolved directly the film is immersed in wat but, if the plates are kept for any length of time between c ing and finishing, it is almost certain that the minute crys of silver nitrate will exert a local influence to the detrimen the uniformity of the picture, if, indeed, the film is not p manently discoloured by spontaneous decomposition.

This danger is increased by another circumstance which in itself also inimical to the keeping of the coated glass pla and, in a lesser degree, renders it impolitic to store coa paper for lengthened periods. We allude to the deliquesce of the citric acid, and especially of any bye-salts it may fo in the emulsion. This property, of course, renders the film at all times liable to absorb moisture if it has the chance; a though, in the case of paper which may be placed in close c tact, and thus in a measure protected from atmospheric in ence, it need not be seriously felt, glass plates, which usually stored in grooved boxes after coating, suffer in a greater degree. The result is, unless stored in an absolut dry place, that the surface becomes covered with a fine dew sweat, which gradually increases until, under its influence, crystals already referred to are dissolved and disappear, film being practically submitted to the constant action concentrated solution of nitrate of silver and citric acid. The probable action of this upon the permanency of the films may be readily imagined.

The evils of deliquescence may be avoided or mitigated by the substitution of other organic acids, such as tartaric oxalic; but, from their insolubility in collodion, they are inconvenient to use, and the results are decidedly inferior. The crystallisation, too, may be greatly diminished, if not altogether got rid of, though at the expense of an additional operation in the form of a preliminary coating of the glass. If the latter, after cleaning, be coated with a thin layer of plain gelatine ten-grain solution, carefully filtered and clarified, the dried fi serves the double purpose of causing the collodion to adhe to the plate, and at the same time provides an absorptive bed into which the crystalline matter sinks instead of going to the surface.

elatine is, of course, perfectly impervious to either alcohol ther, and, therefore, to collodion, which is quite incapable enetrating it; but, upon coating such a gelatinous surface collodion or emulsion, the ether and alcohol first evaporate, ing the film still moist for a very considerable time from residual water originally contained in the alcohol, and added ensitising. It is during this latter stage of moisture that gelatine absorbs the crystalline matter held in solution, or ially so, up to then, and, swelling slightly, draws the collo- film into more intimate contact, so that, when perfectly the adhesion is very powerful. The additional trouble of preliminary coating is, after all, not great when a number lates are treated at once, and will well repay the expenditure ime.

nother fault in ordinary collodio-chloride when applied to is is found in the "texture," as it is called, of the collodion . As already hinted, the collodion is usually made as thick possible, compatible with its fluent qualities, in order to en- it to carry its load of soluble matter; and this alone confers n the film a degree of texture or structure which, though ctically unnoticeable on paper, amounts to a very decided apiness" when seen on glass. But this is not all, for the ion of the free acid upon the collodion materially adds to the dency to run unevenly.

Most acids, but citric especially, exercise a powerful glu- ising action upon collodion, which increases with prolonged tact; this action converts an originally thin and limpid lodion to a condition of great viscidity, and, in the case of lodio-chloride emulsion, eventually entirely destroys its ncy. When freshly prepared, such an emulsion may flow dily enough, either on paper or glass; but the film when ist, or even when dry, exhibits considerable streakiness. This reases with time, until the emulsion becomes absolutely opy," and runs over the glass in lumps or clots; and ntually the whole solidifies into a jelly in the bottle. arly this forms a serious obstacle to the use of the emulsion transparency purposes, especially if for lantern use, where point of homogeneity the film should be immaculate; and fortunately, in the case of the emulsion as usually prepared paper, there seems no means of overcoming the difficulty.

However, there is no necessity to abandon the process for ss on this account, since, the requirements being so different, re is ample room for beneficial modification. For paper e requirements are an emulsion containing but a small pro- rtion of silver haloid, and capable of giving a thin, clear age, to which surface vigour and brilliancy are given by the cess of silver and organic acid. Such an emulsion usually ntains at least six grains of pyroxyline, three of chloride, elve of silver nitrate, and from one and a half to three of ric acid in each ounce.

For transparencies a greater "body" is necessary, and this gained by increasing the proportion of silver chloride. This es not entail a proportionate increase of the excess of silver, r of free acid; on the other hand, these may be decreased, ice the force of the transparency is gained by the increase of e haloid. At the same time the proportion of pyroxyline ay be decreased, all of which modifications go towards ducing the trouble to which we have referred.

The formula for a collodio-chloride emulsion for glass may nd something as follows:—

Pyroxyline (powdery)	4 grains.
Chloride of calcium	5 „
Citric acid	1 „
Nitrate of silver	16 to 17 grains.
Ether	½ ounce.
Alcohol	½ „

With such a preparation, and using the gelatine substratum films may be obtained which show neither crystalline markings nor structure, and which print as vigorously and give as rich tones as does the ordinary emulsion on paper.

The drawback to this process is its slowness, which confines its use to contact printing; but the ease of working and richness of tone will compensate for this in many instances. In another chapter we shall deal with collodio-chloride for development.

When we credited Mr. W. Bishop last week with being the initiator of the system of curing blisters on albumenised paper by the use of boiling water, we had for the moment overlooked the fact that such a plan was suggested about a year ago by Mr. A. W. Clark in the *St. Louis and Canadian Photographer*, in which he detailed a number of experiments he had made, establishing the blister-preventive properties of scalding water. Although, of course, Mr. Bishop discovered the fact independently, yet to Mr. Clarke undoubtedly belongs the honour of being the first to give us this valuable method.

A case of considerable importance to photographers and others who take apprentices and articled pupils was decided in the Chancery Division of the Queen's Bench on Thursday last week. A widow lady brought an action to recover 150*l.*, paid as premium in the apprenticeship of her son to an electrical engineer who makes a special feature of taking "gentlemen's sons" as apprentices and pupils. It came out in evidence that the defendant only employed seven or eight workmen, while he has between sixty and seventy apprentices. The learned Judge who tried the case, in some strong comments, said the defendant appeared to have left the business to a manager, who in turn left it to the foreman, and he looked upon the apprentice as a person employed to do mechanical work. In the end the Court decided that the plaintiff's son, who was kept for nine months filing and fitting brass rods and minding a machine for making screws, received no real instruction in electrical engineering. It gave a verdict for the plaintiff for 120*l.* damages, with costs; and also in her favour, with costs, in a counter-claim by the defendant for damages.

The case just cited is very much akin to that of some photographers. They obtain "articled pupils" or apprentices—articled pupil sounds more euphonious than apprentice nowadays—with good premiums, for a term of years, and thus get the major part of their work done for nothing, or at a merely nominal cost, instead of employing skilled labour at a fair remuneration. This system of business is not confined simply to studio work, but extends to all other branches, even to the simple operations of spotting and mounting; and we have little doubt that it proves very lucrative to those employers who adopt it. Just now, fond parents are on the look-out for genteel employment for their sons and daughters, and electrical engineering and photography are being made capital of. What may be the value of the former in the labour market we are unable to say; but, with regard to photography, we do know that the market is vastly over-stocked already in every department with skilled workers, who would be glad of employment at almost any price. Therefore, what is the prospect?

What is there now to learn in an ordinary photographic business to demand a heavy premium and a long term of service at a nominal salary, or, in some instances, no salary at all? This, so far as operating is concerned, is best answered by the work that many amateurs are able to show within a few months of their first essay, their opportunities for practice being solely confined to the few moments they can spare from other avocations. There are really skilled operators of many years' experience who would be glad of appointments at from a hundred to a hundred and fifty pounds a year. Is such

a prospective salary worth a premium when it is considered that at the present time so many are out of employment, and the probability is that as time goes on matters will grow worse? Let us now go to the minor branches in connexion with the business, say, spotting and mounting. For this even some photographers take apprentices for two or three years without salary, or perhaps one of only three or four shillings a week. Within a few weeks they are, if they have ordinary intelligence, as proficient as they will be at the end of the term, when they may be able to earn from twelve to fifteen shillings per week. At the present time that is the average wage for this class of work; yet there are apprentices taken, even with premiums.

THE prospectus of the English section of the Chicago Exhibition is now before us. Application for space must be made before February 29 next. The price of floor-space under one hundred square feet is at the rate of five shillings per square foot, with a minimum charge of five pounds. If this charge is made for wall-space, we fear that British photography will not be very well represented. Probably it will not. We reiterate the regret that photography does not find a place in Department K, Fine Arts—pictorial, plastic, and decorative—although engraving and etching does.

CAN Photography Lie? was a question that met us at every bookstall a few weeks back. It also engaged the attention of a judge and jury in one of the law courts several days last week in an action for libel. Some instantaneous photographs had been published to show the quantity and quality of the smoke given off with two kinds of gunpowder. The defendants, in a pamphlet, said "the representation is a gross exaggeration, incapable of deceiving any who has had any experience in shooting." A good deal of evidence was given on both sides as to these photographs, and the circumstances under which they were taken. In the end the jury could not agree, and were discharged without giving a verdict. Most of our readers, if called upon, we imagine, would be able to produce photographs that would show either the maximum or the minimum of smoke evolved from an explosive as might be desired, according to circumstances.

WHEN a description is given of a large paper albumenising establishment, such as that referred to a week or two back, which is said to consume ninety per cent. of all the Rives paper made, it is invariably mentioned that only fresh eggs are employed. This being the case, it would be interesting to learn how it is that there is so much malodorous paper in the market.

THE Imperial Portrait Association, of which Mr. Charles Beresford is "President," and which is located at 9 and 11, Grace Hill-avenue, Folkestone, seems desirous of competing with Messrs. Austin & Eddy, of Lombard-street, Margate, in the new philanthropy of giving enlarged portraits away for nothing. Mr. Charles Beresford, like his rivals, merely stipulates that these eleemosynary enlargements shall be suitably framed, and that the work will be shown to friends and recommended, &c. We are open to accept pictures of ourselves on the same terms, and so are a good many of our friends, Mr. Beresford—in fact, if *you'll* supply the pictures, *we'll* guarantee to do the rest, as picture-frame makers in London are from twenty to ninety per cent. lower in price than the Imperial Portrait (*and Picture-frame*) Association of Folkestone.

A VALUABLE method of obtaining pure erythrosine, so important a chemical in orthochromatic plate-making has, incidentally to other processes, been recently published in the *Chemical News* by Messrs. F. Mylius & F. Foerster. The particular purpose of this purification has been the obtaining a new titration indicator, the new preparation, as it may well be termed, possessing such delicacy as to permit millenormal solutions to be employed with the greatest distinctness.

ERYTHROSINE, or the soda-salt of iodo-fluorescence, as found in commerce (supplied by the Baden Aniline Works), is a brick-red powder soluble without fluorescence, but with a rose colour in delicate all from which solution it can be reprecipitated by super-saturation acid. The unpurified salt contains foreign matters which, diss in alkali, exhibit a violet-blue tone. They are insoluble in Messrs. Mylius & Foerster's process is to dissolve the commercia in aqueous ether, and remove it from the filtered solution by sh with a dilute solution of soda. The aqueous liquid is then treat the addition of a strong soda solution, which precipitates the ery sine as a brick-red soda-salt. The salt is filtered out, washed spirit, and then redissolved, by-crystallised out of strong alcohol. result is a number of well-formed crystals with a green surface c It has a decidedly lighter colour than the commercial product, a alkali dissolves as might be expected with a more yellowish c than the crude product. It is insoluble in absolute ether, benzine, p leum, ether, and chloroform, more soluble in aqueous ether (whic old collodion workers will remember, will take up about ten per of water), and in alcohol. It is very desirable that this mode of p cation should be known, and the pure salt made use of in compar orthochromatic experiments, the impurities of a particular salt sc quently proving to be the effective agent.

LANTHANUM and zirconium, the oxides of which, our readers remember, are believed to possess greatly superior incandescing po to the ordinary lime cylinders, but which have been little employe the purpose on account of their costliness, ought no longer to b cluded on that account. In a recent communication from the ma of the Welsbach Incandescent Light Company to the Franklin I tute, he states that the supply is practically unlimited, hundre tons of the ores being known to exist in N. Carolina, while the dep of a certain kind of sand, which furnishes the metals in large quan are practically unlimited.

THE existence of Mr. Carey Lea's allotropic silver having been dou by Professor Meldola, the former gentleman, in a communicati the *Chemical News* last week, offers the strongest evidence of reality of the substance in question. Quite recently, also, M. Bert called the attention of the Paris Academy of Sciences to Mr. C Lea's paper on these substances and exhibited specimens of th He explained the importance of the results, which, he said, remi us of the work of the ancient alchemists, but he reserved the ques whether the substances were really isomeric states of silver, or com and condensed compounds, conformably to the facts known in history of the various carbons, of the derivatives of red phosph and especially of the varieties of iron and steel.

La Nature last week gives an engraving, taken from a photograp a thunderstorm for ten minutes of its career. It consists of a mu tude of ramifying lines, thus, in addition to others published of years, disproving the past dicta of many meteorologists that zig lightning is rarely ramified. It adds, that without doubt t ramifications are little visible to the naked eye. Our French *confr* are certainly ahead of English photographers in regard to the nu of such photographs published, and this is to be regretted, scientifically recorded photographs of meteorological phenom clouds, lightning flashes, &c., may prove to be very valuable furthering the progress of a science yet in its infancy, and alre owing much to our science.

WE would direct the attention of our readers to the most interes paper (given *in extenso* in *Nature* last week) by Dr. W. J. Rus F.R.S., introducing the discussion on *Town Fogs*, at the Hygi Congress. Every photographer, metropolitan especially, is only acutely cognisant of the evil effects upon light that the presence fog in the air produces; but it will by no means be devoid of inst tion to learn what Dr. Russell has to say about it. With respec the town fogs, he states that their power of obstructing light depe principally upon the coal products it contains. "The slower vibrat red rays can struggle through a fog which is absolutely impervi to the more refrangible ones. Even a mist but slightly tinged w smoke is opaque to the blue rays, and thus screens us from th

action; but, as Aiken has lately shown, the heat rays can pass readily through. . . . . Important as the red rays may be, still it is undoubtedly the blue rays which are most active in producing the chemical changes going on around us. . . . . A simple actinometer is much required, and I hope the want will be soon supplied; but, at present, the only records bearing on this point are the observations made at various stations by the Meteorological Society and Meteorological Office with the Campbell-Stokes instrument, and some interesting observations, by Mr. H. Raffles, on the distance at which objects were visible during a London winter."

A HAPPY HUNTING GROUND.

It may seem somewhat late in the year to suggest localities for outdoor work; but, as the summer itself has been of an eccentric and abnormal kind, there is no reason why suggestions of this nature should not follow *en suite*. Providing the elements permit—and there may be some suitable days yet before the close of this autumn—there is an unlimited store of good things within an easy distance of London, especially at the present time (October). Personally, I regret I did not know it before, as, without a shadow of doubt, there are more pictures waiting to be taken within a circle of a few miles than anywhere else I wot of within a short distance of town.

The Great Eastern Railway will land you at Wood-street Station in about half an hour, and then a few minutes' walk taken in the direction of Snaresbrook will open up such a photographic district I never expected available so near home, and, moreover, suitable for *any* season of the year, spring, summer, autumn, or winter. It is impossible to point out any particular view; but when there is unlimited variety and abundance—both open views and pretty bits—suitable either for large stereoscopic, or small work, the photographer will be very blind who cannot find full occupation. I do not hesitate to say that a year's constant visiting would still leave plenty to do.

Either Wood-street or Snaresbrook Railway Stations may be the points of arrival; but I prefer the former, as there the route lies in one direction, but with Snaresbrook it is in two opposite directions. Any way, as there is plenty of work for many days, so the photographer can suit his own convenience in this respect. On arriving at Wood-street, turn sharp to the left and keep straight on, bearing slightly to the west. You soon get to a wide space of broken ground, with capital trees and pools of water—part of Epping Forest. You can now fix up the camera, and set to work. Right and left will supply any amount of material. After a time the "Eagle Hotel" will confront you, with the "Eagle" pond or lake in front. From this point to Wanstead is only a short walk; there is nothing particular to photograph. At Wanstead things begin to look pretty again, and on the right side of the road there are several pretty bits. Taking the high road to the westerly gates of the park, there are some beautiful subjects *en route*. Enter the park—I believe permission has to be had from Sir J. Monckton, Guildhall, to make pictures within the boundary—and keep round the outer side of it by the River Roding, which forms its partial boundary, we shall find trees in avenues, trees detached, trees in clumps, and trees in every imaginable form, but all wild and untrimmed. The water is equally varied in character, solemn, shady pools, like mirrors, reflecting the white stems of the birch and the heavier foliage of the chestnut, with stately swans here and there like cloistered monks secluded from the world. Natural open spaces of water and artificial lakes, but with the artificiality thoroughly concealed; the river itself, shallow in places, rippling amongst pebbles in which barelegged children paddle and enjoy themselves. There are no waterfalls and no mountains, but most other things that make a photographer's outing agreeable, and very much more than might be expected so near the metropolis.

After making a tour of the park itself—it is a mile or two, by the bye—we get into the main road again, and find some old red-tiled farm buildings, with the usual surroundings, well-grown trees, and a wide, undulating, open country, capital for cloud effects. Although this has not taken a very long time to tell, or many words to tell it in, there undoubtedly are more variety and picturesque bits in a few miles than anywhere I know in the vicinity of London. It is rather late now for the sedges, reeds, and rushes; they are turning brown and decayed, but still there are yet plenty. The trees, too, have not yet become quite denuded of foliage, and the contrast between bare branches and those in fuller leaf is very agreeable.

Three or four weeks remain in which good pictures may be secured, where foliage is an important feature, provided only the weather is suitable. Afterwards winter will supply equally good subjects, on account of the beautiful growth of the trees. I can only recommend a visit, either without apparatus and see for oneself, or take a camera and plenty of plates, and return home rejoicing.

Edward Dunmore.

AMERICAN NOTES AND NEWS.

At the annual meeting of the American Photographic Conference, held in New York in May, 1891, Dr. R. L. Maddox was elected to the first honorary membership of the Conference. The official notification was delayed for four or five months; but better late than never.

The *Philadelphia Public Ledger*, the only journal which has, so far, had an opportunity of examining the results, thus writes of Mr. F. E. Ives' new colour process:—"The long-sought problem of photography in the colours of nature has been practically solved by Frederick E. Ives. Months ago Mr. Ives communicated his process and showed its results at the Franklin Institute, and he has since repeated his demonstrations there and before the Photographic Society of Philadelphia. That the discovery has not been taken up by the civilised world with the enthusiasm which its importance warrants may be accounted for by the fact that men's eyes have been turned in another direction from that in which Mr. Ives has worked. It seems to have been thought that the solution to the problem could only be reached through chemistry, and yet, in the present stage of chemistry, it may be safely said, the problem is as far from solution as ever it was. Mr. Ives, in *his* solution of the difficulty, has reached his success entirely by photographic means, and through an exhaustive study of the laws of light, rather than of the subtle chemical peculiarities of the silver salts."

"Taking for a basis of his experiments a suggestion thrown out many years ago by a tutor in the household of Queen Victoria, Mr. Ives has, after years of the most laborious investigations, perfected a process which, stated very briefly, is as follows: Three negatives are made on the ordinary commercial orthochromatic dry plates, from the same point of view, one by means of the red light rays, one by the blue, and one by the green. From these negatives positives are made, which are projected upon a screen, the three images being exactly superimposed. The light passing through each of these positives is coloured by suitable tinted glasses, corresponding to the light rays employed in securing the negatives. These colours are automatically separated and combined, by the action of the transparent positives, so that the resulting image on the screen appears in the colours of the original. If it be objected that this picture is but a transitory and unfixed lantern view, Mr. Ives answers it by producing, by an ingenious modification of his process, permanent transparent positives showing the same wonderful colour effects."

The *Public Ledger* concludes its notice as follows:—"When the most delicate colours in the sky and foliage of a landscape, whether the striking contrasts of the Yellowstone or the soft beauties of forest and meadow, the brilliant and varied colours shown by the polariscope, or the intricate combinations of colour in a painting can be reproduced with such marvellous accuracy as Mr. Ives has done, entirely by an automatic and photographic process, it may be said that photography in the colours of nature has been accomplished." To which sentiment we ourselves heartily subscribe, while at the same time we envy our contemporary the privilege it has had of actually inspecting such a marvellous achievement.

Dealing with a suggestion, made some time ago in these columns, that photographic prints if mounted on thick paper large enough to leave a clean white margin, might, like water-colour or other drawings, be stored in portfolios, a plan which would possibly meet the general objection to the album that has prevailed with most people for a long while, *The Beacon* alludes to a collection of 8×6 prints, executed in 1855, on $12 \times 10\frac{1}{2}$ sheets of paper, giving a clean margin of two inches on top and two sides, and two and a half inches at bottom, which are as fresh and bright as when printed. They were made on Turner's

heavy smooth drawing-paper, salted by immersion, some in sea water and some in a five, seven, and ten-grain solution of common salt, and sensitised with a solution of silver nitrate and citric acid. The combined fixing and toning, and the plain hypo-fixing, baths were used.

For this old printing method the article enters a plea which we ourselves do not hesitate to endorse. Many prints made by the process are in our possession, and it would be impossible for us to exaggerate their artistic excellence, or omit admiration of their unalterability from a period long anterior to the introduction of most, if not all, the now popular "permanent" processes. From the directions given, it will be seen that it is a process which is well within the compass of an intelligent amateur. Suitable paper is cut to the required size—$7\frac{1}{2} \times 5$—negatives being printed on sheets at least $11\frac{1}{2} \times 9$, and is salted by immersion in a five-grain solution of common salt. When dry, sensitise in a bath composed of—

Silver nitrate	1200 grains.
Citric acid	300 „
Distilled water	20 ounces.

If a precipitate of silver nitrate be formed, it will dissolve on the application of heat. Float for two or three minutes, dry and keep under pressure. The probabilities are that paper so sensitised would not keep more than a few weeks; but, as the salted paper remains good indefinitely, it could, of course, be sensitised as might be required. To prepare the *clichés* for printing, strips a little broader than the intended margins should be pasted along the edges (film side) of the negatives. Printing is said to be quicker than on ordinary albumen paper; deep prints are to be taken and fixed, without washing, in a hypo solution 1 : 8. The colour will be a warm purple, which may be deepened by adding one grain of gold to the hypo solution. Of course, this method entails the use of large printing frames, which the *Beacon* omits to mention.

Mr. Thomas J. Bray enumerates in the *Photographic Times* a few of the articles that he finds handy in or near his dark room. He says he visited a brother photographer's room, and found little provision made to do work as it ought to be done, and so he is moved to give the world (and his brother photographer) the benefit of his ideas on the subject. Camel's-hair brushes for dusting plates before exposure and after development, a kalsomining brush for dusting shelves, a packet of soapine and two bristle brushes for cleaning trays &c., an apron and a clean towel, some sharp, stout pins for sticking paper or films to dry, opaque paper, mucilage, bottle-corks, absorbent cotton, pen and ink, blotter, pencil and scrap-book for formulæ, a pair of long-bladed scissors for cutting films, a paper of tacks and a tack-hammer, a piece of plate-glass for cutting masks on and trimming prints, a good, sharp penknife, and a bottle of parlour paste are, he tells us, a few of the articles needed. If these are ready for use at a moment's notice, he says, pinholes, stained films, dirty negatives, and defects will be the exception, and not the rule. Careful Mr. Bray! We are afraid, however, that "pinholes, stained films, dirty negatives, and defects" are more often than not due to other causes than the absence from the dark room of the apron, clean towel, tacks, and other articles of your "little list."

Mr. J. Weir Brown's uranium toning process appears to have acquired a far greater popularity in the United States than in this country. English photographers are notoriously slow to adopt improvements. Mr. G. Hanmer Croughton, in an article on the subject in the *St. Louis and Canadian Photographer*, credits Mr. Weir Brown with having "solved a problem which has baffled the manufacturers for years," and, besides saying that one of the latter "has taken the credit and rewards of Mr. Brown's discovery to himself, and is trying to make others pay him for that which is not his," charges the Photographers' Association of America with having given the manufacturer a special diploma for the process! Mr. Croughton mentions two interesting practical hints in connexion with this system of uranium toning. First, that he experimented on lantern slides, and found that he could get any warm tone from brown to red with an actual gain to the transparency of the shadows; second, that black platinum prints tone just the same as bromide prints in this solution, giving sepia tones superior to those produced according to the usual platinum developing formula.

Mr. J. F. Sachse gives, in the *American Journal of Photography*, a method of reproducing faded or discoloured manuscripts, which, he says, yield excellent results. A slow plate is used, and a short exposure is given. Develop with combined hydroquinone and eikonogen until the detail is well out; fix in an acid fixing bath, wash well, and when dry bleach with the usual solution of mercuric and ammonium chlorides; wash for fifteen minutes in running water, and when dry place in front of a dead black surface and photograph. The resulting negative can then, if necessary, be intensified. Mr. Sachse remarks that the greatest advantage of all by this method is that the original is not injured.

Mr. F. C. Beach describes, in the *American Amateur Photographer*, the following curious experience with rollable films. He had been using a kodak in the country and at the seaside, and, when proceeding to unwind the exposed film, he found that it adhered so strongly to the celluloid support that it had to be literally peeled off. Some parts would stick stronger than others, and, in giving the film a steady pull it would unwind for a quarter of an inch quickly or suddenly, and then for half an inch more slowly. When these sudden movements took place he discovered a streak of bluish-white light appear transversely across the film at the point of separation from the roll. Foggy images resulted on development, which he ascribes to the production of electricity "by cleavage." Electricity also appeared on the unwinding of the unexposed portions of the film. He concluded that the unwinding of the film in the camera was likely to produce a sudden twitch at the point of separation from the roll, which, in all probability, generated electricity and fogged the film, which was thus doubly exposed to the light of the electricity. Mr. Beach supposes either that the dampness of the seashore had something to do with it, or that the film was not dry when it was originally wound up. He verified the phenomena by tightly rolling up a film, subjecting it to an atmosphere of steam, and allowing it to stand for twelve hours. On unrolling it, the film adhered to itself, and faint traces of electric discharges appeared at the points of separation.

ALLOTROPIC SILVER.

In a recently published lecture, Mr. Meldola seems to call in question the existence of allotropic silver. This opinion does not appear, however, to be based on any adequate study of the subject, but to be somewhat conjectural in its nature. No experimental support of any sort is given, and the only argument offered (if such it can be called) is that this altered form of silver is analogous to that of metals whose properties have been greatly changed by being *alloyed* with small quantities of other metals. Does, then, Mr. Meldola suppose that a silver alloy can be formed by precipitating silver in the presence of another metal from an aqueous solution, or that one can argue from alloys, which are solutions, to molecular compounds or lakes? Moreover, he has overlooked the fact that allotropic silver can be obtained in the absence of any metal with which silver is capable of combining, as in the case of its formation by the action of soda and dextrine. Silver cannot be alloyed with sodium.

Mr. Meldola cites Prange as having shown that allotropic silver obtained with the aid of ferrous citrate contains traces of iron, a fact which was published by me several years earlier, with an analytical determination of the amount of iron found. Mr. Prange repeated and confirmed this fact of the presence of iron (in this particular case), and my other observations generally, and was fully convinced of the existence of both soluble and insoluble allotropic silver. Mr. Meldola's quotation of Mr. Prange would not convey this impression to the reader.

Of the many forms of allotropic silver, two of the best-marked are the blue and the yellow.

Blue allotropic silver is formed in many reactions with the aid of many wholly different reagents. To suppose that each of these many substances is capable of uniting in minute quantity with silver to produce in all cases an identical result, the same product with identical colour and properties, would be an absurdity.

Gold-coloured allotropic silver in thin films is converted by the slightest

essure to normal silver. A glass rod drawn over it with a gentle essure leaves a grey line behind it of ordinary silver. If the film is en plunged into a solution of potassium ferrycyanide, it becomes red or ue, whilst the lines traced show by their different reaction that they nsist of ordinary silver. Heat, electricity, and contact with strong ids produce a similar change to ordinary grey silver.

These reactions afford the clearest proof that the silver is in an allo- opic form. To account for them on suppositions like Mr. Meldola's ould involve an exceedingly forced interpretation, such as no one who refully repeated my work could possibly entertain. M. Carey Lea. —*Chemical News.*

PHOTOGRAPHS, LIMITED.

R. Alexander Bassano, the well-known photographer of Bond-street id Pall Mall, desiring to be well abreast with the times, has decided to rn his business into a limited liability company—that is, if he can evail upon the public to regard the matter in the same light as he gards it himself. Of this, however, there may possibly be a doubt. r. Bassano is a perfectly admirable photographer; we willingly pay him is tribute of respect. He has also a happy knack with a prospectus, suming the one now before us to be his work. We do not remember n invitation to the investor at once so lavish in its promises and so ankly meagre in its information. There is, no doubt, a very natural sire on the part of Mr. Bassano not to divulge too many of the secrets his business; but, then, tradesmen who wish to avail themselves of ie privileges of the Companies Acts must also suffer their disadvantages. ou cannot eat your cake and have your penny. It is a pretty penny, o, that Mr. Bassano wants—no less than 50,000*l.*, of which, assuming ie entire capital to be subscribed, 34,000*l.* is to go straight into the ockets of the vendor. But Mr. Bassano is willing to accommodate him- lf to circumstances, even to the extent of accepting the whole of the rchase-money in shares if cash be not convenient, and, in such case, ie contribution of the public will not be more than 16,000*l.* In any rcumstances, the working capital of the company would not exceed at sum, which, we fear, would be somewhat unequal to the demands of ie vast extensions of the business hinted at.

Mr. Bassano—in the belief, no doubt, that the recipients of his pro- ectus may be induced to wonder why he is so eager to dispose of a siness in which he has such profound faith—declares that he is only lopting his present course to facilitate family arrangements. It will eatly facilitate the arrangements that he proposes to make if he clear , for the benefit of persons who might be willing to lend a hand, rtain points that are at present involved in much obscurity. The siness, as we have said, is well known, and deserves its high reputation. ny one in doubt as to the distinguished character of the clever photo- apher's *clientèle* need only turn to the selected list of patrons that companies the prospectus. It includes nearly a thousand names, rang- g from Her Majesty the Queen's down to Sir William Harcourt's, taking , on the way, all the Royal Family, several of the crowned heads of urope, most of the bishops, a choice selection of the judges, a choice riety of members of Parliament, and numerous distinguished novelists, tists, and scientists. In fact, after a glance at this galaxy of brains id breeding—to say nothing of beauty—we are forced to the conclusion at not to have been photographed by Bassano argues oneself unknown. only the constitution of the proposed company recognised Founders' ares, and if only Mr. Bassano's distinguished customers could have en persuaded to take a Founder's share apiece, what a haul there would ve been! But no; 5000 eight per cent. cumulative Preference shares 5*l.* each and 5000 Ordinary shares, entitled to all the surplus profits, e good enough for the framers of the prospectus, and it is only pro- sed to issue immediately 4000 of each.

At present the business is carried on at 25, Old Bond-street, and , Pall Mall, where premises are held "on extremely favourably rms." These centres have been found most suitable for the high- ass connexion Mr. Bassano has cultivated. Visitors to the royal laces when important functions are in progress show a healthy dis- sition to pop in as they pass and have their photographs taken, and, of urse, have always been received with a hearty welcome. During thirty ars Mr. Bassano's customers have left behind them hostages to fortune the shape of negatives, the stock of which now numbers no fewer than 0,000, and these are exhibited in the prospectus as a most valuable rt of the business to be disposed of, owing to the many orders received r reproduction; indeed, the income derived from this source is de- ribed as "permanent." Can this really be the case? In the absence figures, we doubt it; for we have always understood this branch of a otographer's trade to be extremely liable to fluctuations. Of course, a shionable beauty or a popular actor has a run for a time; but who nts old photographs? Neither the sitter nor the public. What an tery the German photographers made when the Kaiser grew a beard! l their stock-in-trade of negatives and pictures suddenly made useless! ho wants Mrs. Langtry in a chignon and crinoline, Cardinal Manning the quaint costume of an Anglican archdeacon, or Lord Randolph urchill with a shorn chin? These are, perhaps, to be found among r. Bassano's stock of negatives; and what is their value, except to llectors of curios?

As to the income of his businesses, Mr. Bassano is vague in the extreme. "The receipts from sittings and orders at the Bond-street studio alone for the past three years has averaged 5881*l.* per annum; those for the year ending December 31, 1890, amounting to 5912*l.*" The receipts—yes; but what were the expenses? and what was the profit? And what about the Pall Mall studio? For all we know, the profit may be *nil*, although, to be sure, the profits of one of the London studios alone are enough to satisfy the interest on the Preference shares. But it is to the extension of the business that the shareholders are bidden to look for "at least twelve per cent." on the Ordinary. This figure has been arrived at by "most careful calculation," of course; but how is any sort of calculation to be made on a business that does not yet exist? The purchase of the going concern of Bassano is one thing; the establishment of branches in certain provincial towns, and the assiduous cultivation of the growing business of commercial photography, the illustration of trade circulars, catalogues, and so forth, is another. It might prove an admirable speculation, or it might prove a very bad one. Who can tell? Certainly this is a matter concerning which the "most careful calculation" is likely to go astray. Such a business as that carried on at Bond-street and Pall Mall owes everything to constant and careful supervision. There are only two Messieurs Bassano, and how are they to impress their personality on a dozen businesses in different parts of the country? What, indeed, is to prevent them from clearing out altogether? Mr. Alexander Bassano, it is true, undertakes to remain in the service of the company as general manager, but he does not say for how long. Moreover, the present issue of shares provides for a working capital of only 6000*l.*; if the entire authorised capital be subscribed, there will be a working capital of 16,000*l.* How on earth do the promoters suppose they are to extend the business on the lines suggested with no more money at command than this? We fear that "Bassanos, Limited," will never be built out of the present scanty material, not even with the inducement that "shareholders will be entitled to have their cabinet portraits taken annually at any of the Bassano studios free of charge." If investors are well advised, they will respond to the invitation to subscribe to this venture in a way with which the photographic artist is thoroughly familiar —namely, with a negative.—*Financial News.*

THE REPAIR OF VULCANITE TRAYS.

Vulcanite trays of the older, better, stronger, and more expensive pattern were made square and deep, and were strengthened at the corners by an additional thickness of vulcanite. The price was considerable, being about four shillings and sixpence for whole-plate size; therefore, when one's developing tray of fifteen by twelve inches dimensions met with an accident, it was a rather serious business. Inquiries of dealers failed to elicit anything of value with regard to repairs, except that the cost of repair would very nearly buy a new tray.

Now, it happens that in the practice of my profession, viz., dentistry, I am frequently called upon to repair broken and cracked vulcanite plates; these cases are usually repaired by replacing the vulcanite along the line of breakage, with fresh rubber and then vulcanising afresh. Now and then a case occurs where the repair may be quickly effected by means of one or other of the many porcelain cements so much in use for fitting teeth; these cements are costly to buy; but, as they consist for the most part of oxychloride of zinc, or the oxy-phosphate of the same metal, the difficulty on the ground of cost in the way of using a cement of this kind for repairing large fractures in vulcanite trays disappears. My own tray had one corner broken clean off, and it was repaired in the following manner.

Fit the broken piece to the tray, and, while held accurately in position, let an assistant drop melted sealing-wax on the outside, along the breakage line; when cold, the corner will be held on sufficiently for the next operation. Mix some plaster of Paris with water, rather stiff, rather more than enough to fill the broken corner of tray, and level it off at the top and edge. When set and hard, remove the block of plaster, break off the wax, and with a sharp file, three-cornered or rat tail, cut dovetails in the vulcanite at various distances, and it is better to file also all along the line; when this is done, replace the plaster block and adjust the broken corner.

The surface of the plaster in the region of the interstices now requires oiling—a little sweet oil applied by means of the finger—when we shall be ready for the cement. We require pure oxide of zinc and chloride of zinc. Small quantities of these chemicals will suffice; the latter is in the form of white sticks, very deliquescent and caustic, and must be kept in a bottle; the solubility in water is about ten in four. We require a saturated solution; therefore, a due proportion of water must be added to the purchase. As a preliminary, and to give one an idea of the cement it makes, take a few grains of zinc oxide on a glass slab, add a drop or two of the zinc chloride solution, and mix with a strong knife into a stiff paste; it will harden in almost less time than it takes to write this. The cement is to be mixed, and worked into

the crevices and dovetails, doing as much as you can with one mixing, working it well into the undercuts, smoothing it up afterwards and when hard with sand-paper, finally polishing with a little oil. The inner surface is also better protected by a thin coating of paraffin wax. Vulcanite trays cemented in this way acquire a new lease of life, but they require careful handling; and, personally, I secure the joint by an additional thickness on the outside of thin vulcanite. A piece should be cut to size with a fine saw, and holes carefully drilled through not only the piece to be attached, but the tray itself, and screws accurately adjusted. A clean fracture, of course, can be repaired with two thin pieces of vulcanite attached inside and out by means of screws; a fish joint, I believe, is the proper term for it. Fractures are not all simple; therefore I recommend, to such as may require it, the cement as suggested above. D. D.

MADDOX TESTIMONIAL FUND.

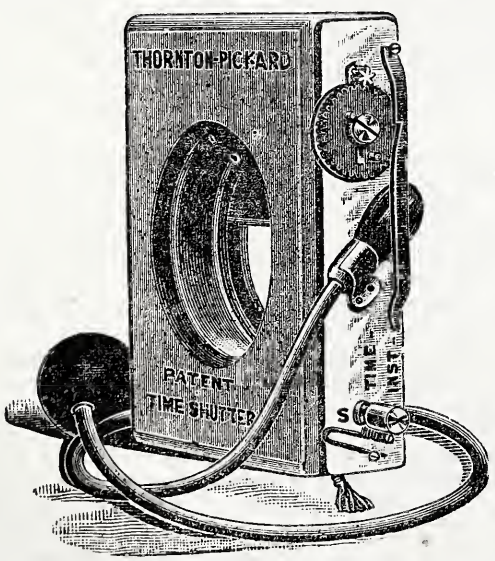
In order to make the appeal international, as suggested by our correspondents of the 9th and 16th ultimo, a Foreign Committee has been formed in Southampton of the following gentlemen :—James Lemon, Esq., M.Inst.C.E., F.R.I.B.A., F.S.I., Mayor of Southampton; Colonel Sir Charles W. Wilson, K.C.B., F.R.S., R.E., Director of the Ordnance Survey, Southampton; Major-General J. Innis Gibbs; and Commander Robert Evans, R.N.

The Secretary is Mr. Charles J. Sharp, solicitor. The National Provincial Bank of England (Southampton branch) has kindly consented to receive foreign remittances towards the common fund. We understand that circulars will be sent to other than English-speaking nations.

Our Editorial Table.

The Thornton-Pickard Shutter.

Since we last described this shutter the Thorton-Pickard Company have effected still further improvements upon it. In the former shutter it was necessary to set the lever for "time" or "instantaneous" each time an exposure was made; but, by a new lever arrangement, one setting now suffices. They have also added a speed indicator, which



shows, by a glance at a dial, at what speed the shutter is working. Other improvements have been added until the shutter is now really very complete.

In Scripture Lands.

By Edward L. Wilson. London: The Religious Tract Society.

There is a twofold charm in this volume: first that of a well-written narrative of adventures in a country replete with interesting associations; and, secondly, the profusion of illustrations from photographs. The author, with true American strength of purpose, started for the East, determined to see for himself, and, by the aid of photography, to bring home pictorial transcripts of a land every portion of which teems with interest, and, despite of opposition and discouragement which would have caused many men to turn back, he succeeded in his endeavour. Travelling in the less-frequented parts of Syria is not quite the easy thing that might be imagined by those whose ideas are derived from such works as *The New Pilgrim's Progress*, and others written from notes compiled on the popular-beaten routes through Palestine, and whose Bedouins are comprised in half-a-dozen show Arabs with long rusty guns, the discharging of which would probably prove fatal to those by whom it was attempted. Possibly some portions of Syria are now as safe to travel through as most countries in Europe or America; but there is no doubt that, when one deviates to any considerable extent from these beaten tracks, he takes his life in his hand.

In Scripture Lands contains 150 illustrations from original photographs by the author. Many of these possess great pictorial excellence, while others, which would defy all attempts at inducing artistic effect, such as photographs of mummies or the Cave of Machpelah, still possess much interest. In our estimation, the pictorial gems of the book are those which serve to illustrate what forms probably the most attractive literary descriptive matter in the volume—those chapters in which Dr. Wilson narrates his visit to the most wonderful city in the world, Petra. This city of the Edomite is situated in a gorge in the rocks not far from Mount Hor. Owing to the jealous hostility of the neighbouring natives, very few travellers have been enabled to visit the "Rock City of Seir," all the principal structures of which, unlike those in other cities, are not constructed of quarried stone, but are excavated from the rock. The gorge leading into Petra was so narrow that two could not walk abreast. "Its perpendicular sides vary in height from four hundred to seven hundred feet," and these walls are occupied by ranges of temples and homes for both living and dead. Many of these temples are singularly beautiful, adorned with fine Corinthian and other columns, and, like the theatre, which is capable of seating over three thousand persons, are all cut out of the solid rock. Of these the finest, in our estimation, is the *Khuznah*, although the *Deir* (or Convent) and *Stairway* are also pictures possessing great merit.

The "taking" of Petra was attended with some danger, as the inward progress of the travellers was disputed by the Bedouins, who, after extracting nearly the last farthing in their possession, eventually left, although the party was kept under close surveillance during four days—all the time they were permitted to remain in the rock-bound city. But it was well and thoroughly taken before leaving. The pictures of the Sea of Galilee and its immediate surroundings (of which there are several) are highly interesting. Those acquainted with the Southern States of America, and who know Lake Harris, in the centre of Florida, will learn with, perhaps, some surprise that the world-famous Syrian sea and the lake we have mentioned are of precisely similar dimensions. We deduce this from our knowledge of the one compared with the figures given of the other by Dr. Wilson.

The literary portion of the work is most excellent, and, to students of the Sacred Scriptures, will prove invaluable. It is quite free from that lackadaisical gush which characterises many of the books written on the Holy Land. The publishers have got up the work in the daintiest style, and, taken all in all, *In Scripture Lands* is a valuable and delightful volume.

Light.

By Sir H. Trueman Wood. London: Whittaker & Co.

The author treats, in the opening chapter, of the nature of light, and discusses the corpuscular theory, the undulatory theory, wave motion, the speed of light, and similar topics. The subjects of reflection, refraction, colour, and the spectrum, follow, and their treatment prepares the reader for interference, diffraction, spectrum analysis, optical instruments, phosphorescence, and fluorescence. In the chapter devoted to double refraction and polarisation we have the explanation of these phenomena, whether obtained by reflection, by the Nicol prism, or by the tourmaline. The chapter devoted to the "Chemical Effects of Light" deals in the main with its action in the production of photographs, and the reader here learns that the visible spectrum is very far from representing the spectral totality, for, as proved by the researches of Abney and others, while invisible rays extend beyond the red end of the spectrum to a distance at least equivalent to the whole length of the visible spectrum, those beyond the violet end are known to extend to a greater distance still. Sir Henry gives several examples of the chemical effect of light upon various bodies. The treatise forms one of *Whittaker's Library of Popular Science*, and contains numerous illustrations, and cannot fail to prove useful and instructive to a large body of readers. It is beautifully got up.

The catalogue of the Dresden Art Furniture Company contains a large number of collographic illustrations, with prices, of the photographic accessories manufactured by the firm. These are all in the best taste. We are also in possession of samples of the Company's woollen

backgrounds, which are very light, are easily cleaned, do not crease, and are absolutely "even" in the shading. Mr. Oscar Scholzig, of Dashwood House, is the Company's agent in this country.

Les Nouveaux Procédés de Tirage.

Par L. Mathet. Paris: Société Générale d'Editions, 24, Boulevard Saint-Germain.

The author of this little work, who is recognised by our Parisian *confrères* as a high authority upon all photographic matters that he treats of, details, in the course of this little volume, the working particulars of the collodio-chloride, gelatino-bromide, platinotype, ferro-prussiate, carbon, and photo-collographic printing processes. It is a thoroughly useful and practical *brochure*, and quite up to date.

Die Negative Retouche.

By Hans Arnold. Leipzig: A. Hartlebens Verlag.

This is a work of some 480 pages, embellished with fifty-three explanatory illustrations, which deals in the fullest and most lucid manner with the art and practice of retouching. It is without doubt the most exhaustive, as it is unquestionably the most voluminous, work on the subject extant.

The Practical Telephone Handbook.

By J. Poole. London: Whittaker & Co.

In this volume the author details the most recent methods of telephonic working. While keeping in constant view the requirements of telephone *employés*, he gives ample information as to its nature and working to the users of the system and the public generally. After several pages devoted to the explanation of such technical terms as the electric current, resistance, conductivity, insulators, potential, volts, ohms, ampères, &c., we are next treated to a history of telephones, from the most primitive to the most improved. The author then takes us over signalling apparatus, switches, and switch-boards, exchange systems, outdoor construction, long-distance working, and underground work. He concludes with a description of miscellaneous telephone apparatus and applications. The book contains many illustrations and a copious index.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,029.—"'Victoria Stands.' An Improved Stand for Crystallised and other Glass Photograph Stands." M. Fromme.—*Dated November* 4, 1891.

No. 19,056.—"Improvements in Reflectors and Appurtenances used in Electric Light Photography." H. Van der Weyde.—*Dated November* 4, 1891.

PATENTS COMPLETED.

A Rule and Square for Use in Cutting Lantern Slides to Register Correctly.

No. 20,869. David Lionel Salomons, Bart., Broomhill, Kent.—*October* 3, 1891.

A special form of rule or square, with a movable graduated blade, to be employed for cutting the frames of mounted slides to register correctly in multiple lanterns. The term "register" is well understood to all lanternists, and therefore need not be here defined.

When several slides form a set, careful registration is needed, and no special tools or means now exist for so doing. Single slides not in sets also require cutting to register, likewise sets or single slides, which are blocked so as to abut against the lantern-stage runners. Other slides abut against the stage stops.

My invention consists of a square, the head of which is fitted to slide along the blade, and remain at a right angle at all parts of its traverse. This head is fitted with any suitable arrangement by means of which it may be clamped in any desired position.

One face only of the blade is used, so both edges may be bevelled, each bevelled edge having any suitable scale upon it, or one only may be used if desired, but preferably one edge is divided into eighths and sixteenths of inches and marked, as is usual, with an eighth scale, the other edge having an ordinary inch scale divided into eighths and sixteenths.

The zeros of each scale are placed in a line with one another at the centre of the length of the blade, or at least four inches from one end, the best length for the blade being twelve inches.

The scales run on either side of zero, and are marked each way from it.

To use the square, one instance may be given. Suppose the optic axis of the lantern lens system is made by the adjustment found on well-made lanterns to be three and a half inches from the stage stop; then all picture slides and others must have their frames cut so that the centre of the glass slide picture is three and a half inches from the end of the slide, which is to abut against the stage stop. Lay the rule down upon the centre of the slide in the long way of the latter; then, by shifting the slide about in a suitable manner, a position is rapidly found, when the extreme ends of the picture will indicate similar readings on each side of the zero upon the one-eighth inch scale. Now push up the head of the square in contact with the slide on the side away from the one to be cut. On the inch scale see where three and a half inches is in respect to the slide on the end to be cut, or added to if too short. This will indicate how much wood or other material must be removed or added to the slide to make it register.

All other dimensions in the other directions of the slide may be similarly adjusted.

Improvements in Photographic Dishes.

No. 19,358. Edmund Squire Norcombe, 97, Islington-row, Birmingham, Warwickshire.—*October* 10, 1891.

My invention obviates the use of numerous dishes, frames, and various contrivances for the removal of the picture from the dish during the process of development, and consists—Firstly, of a dish made of transparent glass, with a groove inside, parallel with the bottom, in two or more sides, which, when the dish is held up with a picture therein, either to drain off the liquid or to examine the progress of development, secures the picture from falling out, as the picture necessarily slips down into the grooves when the dish is raised. I effect the same object by the use of rows of "nipples" in place of the grooves, and also purpose to make dishes with such grooves or nipples of any material, whether transparent or opaque, capable of being used or combined for the purpose. Secondly, my invention consists of an open frame, flanged on the lower outer edge, to be used in manner hereafter described when the pictures are taken on "films."

Improvements in the Method of and Apparatus for Producing Photographs, and in Optical Lanterns for Displaying them, or the like.

No. 19,402.—Albert William Scott, Ashcombe-road, Weston-super-Mare.—*October* 10, 1891.

This invention for improvements in the method of and apparatus for producing photographs, and in optical lanterns for displaying them or the like, has for its object to photograph persons, objects, scenes, or the like, and to project images of the same on to a screen by a limelight or other suitable means, either in a single colour, light and shade, or in its true colours, as may be desired, and also to exhibit complicated dioramic effects on a screen or otherwise: and consists essentially in photographing the object to be exhibited in three or more images, each produced by rays of light, of one colour (simple or compound) on a sensitised plate, and in then projecting on to the screen each image in the particular colour corresponding to it or in any colour or in light and shade, and causing these images to exactly register on the screen, so as to show a single image in its true colours, or in any colour or colours, or in light and shade.

In one method of carrying this invention into practical effect, the object is photographed in four places on the same plate, each photograph being produced by rays of light of one colour only—viz., red, green, blue, and violet—the rays of light from the other colours being stopped by coloured plates or other well-known means. Each photograph is produced by a separate lens or combination of lenses, the diaphragms in the lenses being properly proportioned according to the sensitiveness of the plate to the rays of light acting upon it. The four lenses are immovable with respect to each other, and the camera is provided with partitions to prevent the rays of light passing through one lens from affecting the images corresponding to the other lenses. The lenses are operated together, and are covered by one large cap, so that all the images are exposed for the same length of time. The plate is developed in the ordinary manner, and should be made equal in density and details. A positive is then obtained from the plate, preferably by some process giving great brilliancy and contrast. This positive plate is then ready for use in the special lantern to be presently described. It is, of course, in black and white, apparently destitute of colours.

The lantern for projecting the four images in their own or other desired colours on to the screen, so that they exactly register to form one picture, is provided with either the same set of lenses used for obtaining the said images, or with a similar set, behind which is a weak focussing or registering lens, then the plate containing the image to be projected on to the screen, then a condenser, consisting of a frame of four convex lenses, then a frame containing the four coloured screens which impart the same or other desired colour to rays emanating from the image as those by which it was originally taken, then the ordinary lantern condensers, throwing parallel beams of light, behind which is arranged a powerful limelight.

It will readily be seen that a lantern constructed as described above may be used for most complicated dioramic effects by covering up one or more of the four lenses. Also that the images may be taken by three or more separate apparatus, and be also projected on to the screen by three or more lanterns adjusted so that the images all register on the screen, and that when taking the negatives, instead of increasing the size of the diaphragm according to the sensitiveness of the plate, the time of exposure may be increased. The coloured screens are preferably of gelatine plates stained with suitable dyes.

The lantern and camera may be supported by means of rods passing through holes in plates, fixed at or near the bottom of the box, which is used for packing the lantern or camera, and having spikes taking or screwing into holes in plates fixed at or near the top of the box.

Photographs of persons taken by my improved apparatus give four (or other number) of slightly differing images from which to select.

The claims are:—1. A multiple camera for producing photographs, provided with a colour screen, so that different pictures or images are formed corresponding to the different colours of the screen and the natural colours of the objects or view substantially as described. 2. A multiple camera for producing photographs, provided with a colour screen, so that different images are formed corresponding to the different colours of the screen and of the natural colours of the object or view, and whose lenses are provided with diaphragms having openings corresponding to the sensitiveness of the plate to the action of lights of the colours of the corresponding parts of the colour screen substantially as described. 3. A lantern slide in black and white, having three or more images, similar in outline, but with differences of local density, corresponding with the colours of the original object, view, or design, substantially as described. 4. An optical lantern having one focus of light, and capable of producing three or more pictures in different colours on a screen, and provided with means for

causing the said pictures to register on the screen substantially as described. [Other claims have special reference to a sheet of drawings which accompanies the specification.]

IMPROVED FOCUSSING ATTACHMENT FOR PHOTOGRAPHIC INSTRUMENTS.

(Communicated by Frederick Quimby, Quincy, Massachusetts, U.S.A.)

No. 19,714. JOHN PITT BAYLY, 18, Fulham-place, Paddington.—*October* 17, 1891.

IN the taking of photographs the camera is first brought to focus, and then the sensitised plate inserted and exposed.

In focussing the camera, as is well known, the camera is brought to proper adjustment, determined by the representation of the picture to be taken on a focussing screen, which, at the time, and also the vision of the operator, are shut off from all light, except that coming through the lens of the camera. Heretofore this has been accomplished by means of a focussing cloth enveloping the operator's head and the camera.

The object of this invention is to dispense with the focussing cloth as heretofore used, with all its attendant and well-known advantages, and to that end it consists, in substance, in the combination with the focussing screen of the camera of a hood or bonnet surrounding and attached to it on all sides, preferably detachably, attached by screws or otherwise, and having at its end opposite to the screen two separated and projected sockets at which to place the operator's eyes, and such, for illustration, as are used in opera and field glasses, and all so that while the operator is focussing the camera, the focussing screen is shielded from the light, except such as enters thereto through the lens of the camera, substantially as hereinafter described.

Furthermore, the invention consists in an attachment of the hood or bonnet, whereby it can be held in the hand, or rested on the nose, or secured about the head of the operator, but in all cases without enveloping the head.

IMPROVEMENTS IN BOXES, FRAMES, OR RACKS FOR STORING PHOTOGRAPHIC PLATES AND THE LIKE, AND FOR WASHING, DRYING, AND OTHERWISE TREATING THE SAME.

No. 19,934. JOHN BOULTBEE BROOKS, 115, Great Charles-street, Birmingham, Warwickshire.—*October* 17, 1891.

THE object of my invention is for the purpose of making a frame into which can readily be placed the glasses or negatives during the process of washing, drying, storing, or other like usages, and is especially applicable when required to be used in a darkened room, where it is difficult to see the divisions in the frame.

I will describe my invention in connexion with a washing rack or frame. I construct a frame, preferably of metal, with raised parts or divisions standing up prominently at each side, opposite one another. These divisions are so constructed that the spaces are wider at the top, so as to very readily admit the plates or glass, and taper near their base, so as to fit the glass and keep it upright when it is slid into position. I then insert this frame into a washing box or trough, the water being admitted into one end of the box, which has an outlet at the lower part of its other end.

The projecting divisions facing each other readily guide the glass into the taper grooves in the dark, without hesitation and loss of time, which cannot be done when the divisions are level on the top. I apply the same method for drying, storing, and other purposes, with the addition, if desired, of pitching the frame so as to cause it to drop at the corners.

In like manner I construct boxes for holding plates, also racks for negatives. The drying and washing boxes may be so constructed that the one box will take various sizes of plates.

Where economy of space is desired, as in storing and boxing plates, negatives, &c., the partitions are formed so as to receive plates both from the top and bottom, or from both sides of the box.

AN IMPROVED MAGAZINE DETECTIVE HAND PHOTOGRAPHIC CAMERA.

No. 20,653. SARAH TUCKER, Nethway, Cotton-lane, Moseley, near Birmingham, and WILLIAM JAMES SPURRIER, Queenswood-road, Moseley, near Birmingham.—*October* 17, 1891.

THE object of our invention is to produce a magazine photographic camera by machinery with such precision as to bring a really useful camera within the reach of all. Our camera consists of a metal or other suitable material body, fitted with the necessary lens, shutter, and fittings, and a magazine to contain a supply of rims or frames for the sensitised dry plates. This latter, when not in use, is carried in the camera, which is provided with a door to admit the same. In constructing our camera, to the top is secured an upright rim, with a catch or catches, into which fit the corresponding projections of the slides of the magazine or plate box, which is constructed to contain from six to twenty-four or more dry plates, with a blank or block of greater thickness than the plate rims into which the plates are inserted. To this blank or block is attached an arm, extending to each side of the magazine, provided with points extending below the rim of the lid. Between the said arm and block is inserted an inner lid, having a slot to allow the block, with indicator, to pass from one end of the magazine to the other. Each end of the bottom of the magazine opens with a sliding motion, allowing the outlet or inlet of the plate. Attached to these slides are the necessary projections; so that there shall be no loose parts subject to be mislaid, the lid of the magazine is jointed into the body of same by means of an elongated bearer and slotted joint parts. The magazine fits into the upright rim on the camera, and the projections on the slides fit into a catch or catches on the sliding cover, also on the camera. The shutter, of known construction with the exception of the thumbpiece by which it is actuated, is enclosed in the camera. For the purpose of readily carrying the camera by the hand, we provide a loop handle of such length as to allow it to be turned either over the camera or magazine, the ends of which are attached one to either side and at the top of the camera by means of a long joint. We also provide a focussing screen, which is jointed to the bottom of the camera, whereon it will lie, and can be raised into position by a suitable catch.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 16 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 17 ...	North London	Wellington Hall, Islington, N.
,, 18 ...	Bury	Temperance Hall.
,, 18 ...	Hyde	
,, 18 ...	Manchester Camera Club	Victoria Hotel.
,, 18 ...	Edinburgh Photo. Club	5, St. Andrew-square.
,, 18 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

NOVEMBER 10,—Ordinary meeting, Captain Abney (Vice-President) in the chair.

Messrs. L. Latrobe Bateman, C. E. Webber, A. B. Webber, T. H. Harding, H. Foster, and A. V. Elsden were elected members of the Society.

The report of the Committee on the affiliation scheme, which recommended the Society to proceed with that scheme, was adopted.

The CHAIRMAN presented the medals to the successful competitors at the recent Exhibition, and regretted the absence of the President of the Society (Mr. Glaisher), who, on these occasions, always said the prettiest things in the prettiest possible way. Mr. Colls was the only medallist who personally received his award at the hands of the Chairman.

Addressing Mr. Perkins (who received Mrs Main's medal on that lady's behalf), Captain Abney expressed his personal gratification at the lady's success, and congratulated her on her Alpine photography. He was sorry that Mr. W. J. Wilson was not present to receive his medal; he saw a great deal of him in former years at South Kensington, where, he believed, he did a great deal of his dry-plate work. The Autotype Company's medal was handed to Mr. Sawyer, the Chairman remarking that the Company must now have a large collection of these medals.

Mr. LEON WARNERKE then read a paper on *Photo-Technical Education on the Continent*, with lantern-slide illustrations. He said that during the past summer he had been in Belgium, Austria, Germany, and Russia, and had taken notes with pencil and camera to illustrate his subject. First of all he would give the reason why the Council had asked him to read such a paper. We had no establishment in this country which gave instruction in photo-technical education, and as a photographic institute had been suggested, it was necessary, in order to obtain the best thing of the kind, to examine what other countries had done in this respect. He would begin with Berlin, where since 1864 classes in the various branches of photography had been held at the Government High School under Dr. H. Vogel. By the aid of several plans, reproduced as lantern slides, Mr. Warnerke described the arrangements of the building into laboratories, studios, printing-rooms, &c., and also gave details of the scale of fees and the number of students attending the various classes. Passing on to the High School at Vienna, conducted by Dr. J. M. Eder, Mr. Warnerke paid a high tribute to that *savant* for his zeal and learning, and remarked that the success of such an institution depended largely, if not entirely, upon the individual conducting it. He mentioned that Dr. Eder, with whose writings and experiments the world had long been familiar, was only thirty-eight years of age. There were forty rooms of the Vienna High School set aside for photographic work, collography and other photo-mechanical processes receiving a very large share of attention. A number of views of these rooms, together with several plans, were exhibited, by which the arrangements made for the study and practice of photography could be seen and understood. The fees appeared to be very moderate, and the attendance of pupils was a large and increasing one—many of them coming from distant parts of the world. Mr. Warnerke then described the facilities for obtaining photo-technical education in Belgium, where photography was taught in connexion with what is called the Industrial Schools Department. M. Charles Puttemans was in charge. The proportionate number of scholars attending the courses was a large one, and excellent appliances and lecture-rooms were provided. Views of the room in which the Brussels Congress met were shown, as also one of the glass studio, the arrangement of which had been carried out according to the suggestion of Mr. H. P. Robinson. In Ghent, added Mr. Warnerke, there was probably the finest school of photography in Europe; and he concluded by remarking that in Russia photography plays such an important part that instruction in it is obligatory with certain Government officials.

The CHAIRMAN thought there would not be time to adequately discuss the most elaborate and interesting paper they had just heard, as, supposing we attempted to apply it to England, the details would have to be carefully studied. He therefore considered that it would be better to adjourn the discussion until the next ordinary meeting, when they would have digested a little of the food they had had that night. He himself had a poor digestion. No doubt Mr. Warnerke, in preparing the paper for publication, would further elaborate it, and on future occasions would go to Rome, Zürich, and other centres of technical instruction.

Mr. MACKIE asked when the report of the Lens Standard Committee might be expected?

The CHAIRMAN replied that the Council was not in a position to say. It had been kept back on account of the Brussels Congress, as they did not wish to show any bias in the matter. They were quite willing to take the opinion of foreigners; therefore it would not be published until after the report of the Congress. The Society's delegates' report to the Council, regarding the work which was carried out, including the decision of the Congress regarding lenses, had to be prepared, and then it would be open to the Committee of the Society to issue their report.

CAMERA CLUB

NOVEMBER 5,—Mr. L. Warnerke in the chair.

Dr. J. J. ACWORTH read a paper on *The Action of Light and Heat on the Haloid Salts of Silver*. The lecturer gave a demonstration to show that the effect of heating bromide paper before and after exposure to a powerful light have reversed results.

Messrs. Elder, Patterson, and the Chairman followed with remarks.

Subsequently Dr. Acworth handed round specimens, and read a description of Professor Schirm's enamel-like process of printing, which had been exhibited at the last Convention at Bath.

On Monday, November 9, Mr. Lyonel Clark continued the course of elementary lectures with further remarks on lenses.

Monday, November 16, will be a members' lantern evening at the Club. Mr. J. M. Brownrigg will exhibit a selection of slides.

On Thursday, November 19, Mr. G. L. Addenbrooke will read a paper on *Aluminium and its Application to Photography*.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 5,—Mr. Beckett in the chair.

Messrs. Paul Foward and James Ellis were elected members of the Association.

Several prints on alpha paper exhibiting a considerable variety of tones were passed round for inspection by Mr. Beckett, jun.

Mr. P. Everitt produced a home-made actinometer for platinotype printing. He had made a negative on a lantern slide of one of the sets of letters in Vere Foster's copying-books, covered with thin sheets of tissue, added one by one for each letter, which proportionately diminished the light.

The subject for the evening was *Treatment by Development to Produce Variations in Density;* but before this was reached the CHAIRMAN, in connexion with Messrs. Hurter and Driffield's theory as to the impossibility of altering gradation after exposure, exhibited two plates which Mr. Cowan had sent him, and which he (the Chairman) had developed. He thought from the results obtained that it was possible to alter the gradation after exposures. Each exposure was double the one preceding it, and the density proceeded in the same proportion, although one plate had been treated with the minimum quantity of pyro and the other with the full quantity.

Mr. DEBENHAM said that nobody disputed that variations in density could be produced, but that variations in proportionate density could, and he did not think from the examples before them that it was proved the gradation was not proportional.

Mr. COWAN was of opinion that if the fog strip which appeared at one end of the denser plate were removed the results would be alike. He showed slips exposed identically with the Chairman's, and cut from the same plates. They were not backed, and the results by measurement exactly brought out the correctness of Messrs. Hurter and Driffield's theory.

Speaking to the subject for the evening, Mr. DEBENHAM remarked that when great density has been required the commonest method was to use an extra amount of pyro in the developer; but it was a limited method, as by adding more it does not give the increase of density looked for. With hydroquinone, a small amount of bromide, and caustic alkali, one could get remarkable amount of density; on the other hand, perhaps, eikonogen gave thin negatives. Pyro, if used in moderate quantity, may give thin results from dense negatives, but if the pyro were kept down the bromide must not be kept down too much. He did not think it mattered whether ammonia or soda were used; most people probably used ammonia. He hoped some night to bring some results which would show that Messrs. Hurter and Driffield's statement must be taken with considerable limitations, and that we can alter the gradation as well as the density of our negatives.

Mr. BRIDGE passed round a negative to illustrate the ease with which black and white results for photo-mechanical purposes could be got. He regretted, in answer to several questions, that he was unable to give the system of development beyond stating that pyro was used. It was taken on an ordinary plate, not specially prepared for the purpose, and had not been backed. It took four minutes to develop.

The negative was a remarkably good one, and Mr. COWAN remarked that the plate had evidently had a thick film. To get such a result he should use a well-restrained pyro developer and a minimum quantity of ammonia, and he would get such density in a minute.

Mr. WELLINGTON said that to get a really hard negative (assuming correct exposure) the best means were to use a strong developer with extra bromide; to get a soft one from the same exposure, a dilute developer, the first consisting of four grains of pyro, four minims of ammonia, and eight grains of bromide to the ounce; the second, pyro, one grain; ammonia, one minim; bromide, one grain. For line-work negatives use a slow plate, and give the shortest exposure.

Mr. EVERITT asked whether it was possible to get a dense negative of a black and white subject, supposing eight to be the normal exposure, and you gave it only one.

Mr. BRIDGE said of course not; to produce such a result the plate must have a "sufficient" exposure, which it would not have with one second.

Mr. EVERITT also asked whether the size of the molecule of deposited silver would be altered by development.

The CHAIRMAN remarked that it was said eikonogen gave a finer deposit than any other developer.

Mr. WELLINGTON, however, thought not. With a short exposure the particles were coarse, and were not altered by development. With slow bromide plates a normal exposure and a normal development gave a black image. Increase the exposure and you get fine particles of reduced silver, still increase it and you get a red image of finer particles. The colour, in fact, depends upon fineness of deposit. Red images may, however, by prolonged development, become brown and then black.

Mr. HADDON thought that developers ought to be divided into two classes, in which the formation of the image was due to the reducing action of the developer itself, and the other in which certain chemicals in solution dissolved portions of the silver bromide, which was then deposited to help form the image. Ammonia and bromide were both solvents of silver bromide.

Mr. DEBENHAM inquired whether there was such a quantity of bromide in a developing solution sufficient to dissolve enough bromide of silver to seriously affect the deposit?

Mr. HADDON thought there might be.

Proceeding, Mr. DEBENHAM said, when one used pyro and soda one ought then to get less intensity than with pyro and ammonia. Mr. Haddon had said that ammonia and bromide used with pyro dissolved bromide of silver in sufficient quantity to make a notable difference in the formation of the deposit, but it appeared to him that these dilute solutions would dissolve very little. He referred to a method for remedying over-exposure first published by Mr. W. B. Bolton some years ago, and which he used successfully. This consisted of stopping development at a very early stage, flooding the plate with a ten per cent. solution of bromide of potassium, and then reapplying the developer, when the image would gain density.

PHOTOGRAPHIC CLUB.

AT the annual general meeting held at Anderton's Hotel, Fleet-street, E.C., on Wednesday, November 4, the following gentlemen were elected as officers for the ensuing year:—*Trustees:* Messrs. W. Bedford and Frank Haes.—*Committee:* Messrs. F. P. Cembrano, jun., Edgar Clifton, R. P. Drage, E. W. Foxlee, J. Guardia, H. M. Hastings, J. Nesbit, E. A. Newell.—*Curator:* H. E. Davis.—*Recorder:* Mr. Thomas Bedding.—*Librarian:* Mr. C. D. Hesse.—*Hon. Secretary and Treasurer:* Mr. F. A. Bridge, East Lodge, Dalston-lane, London, E.

HOLBORN CAMERA CLUB.

NOVEMBER 6,—Mr. W. Stevens in the chair.

Mr. F. J. COBB opened a discussion on *Printing*. He showed four negatives, from each of which he had taken four prints (bromide, platinotype, alpha, and silver). He gave numerous hints in working these various processes.

Mr. GOLDING was of the opinion that to produce good results a worker should be thoroughly conversant with the various printing processes now extant. The print must be made to suit the negative. A negative that will give a bad print by one process will yield an excellent print by another process. Many amateurs, other than beginners, thought that when the plate was developed and fixed they had done their work. But it was not so. The photographs are judged by the prints, and it was therefore to the printing of the negative that amateurs must devote their attention.

An interesting discussion followed, in which the Chairman, Messrs. Bayston, Ebsworth, Amery, and other members took part.

A prize had been offered by Mr. Hodges for the best picture taken at the last Club outing, and it was announced that Mr. Fred. Brocas was the winner.

On Saturday last forty members and friends sat down at the annual dinner of the Holborn Camera Club, held at Anderton's Hotel. Mr. H. Raphael took the chair. An excellent dinner was provided, to which the members, it is needless to add, did justice to. Various toasts followed.

A visitor proposed "The Holborn Camera Club," coupling with it the name of Mr. Fred. Brocas, as the originator of the Club.

Mr. F. J. COBB (the Secretary), in responding, apologised for the absence of the President, who was unable at the last moment to attend. He then went on to speak of the work of the Club during the present year. The Club was in a very prosperous condition. The number of members had increased, not only numerically, but in workers. If the Club was to succeed at all, they must have enthusiastic workers. They did not want ornaments.

Mr. BROCAS, in supporting the Secretary, said that when he first mooted the idea of having a London central photographic society, social as well as scientific, his friends were not over-sanguine as to the result. He himself thought he would succeed, and in that, he thought, laid the whole secret of his success. To succeed in a thing, one must have no other thought than that he is going to succeed.

On Friday, the 13th (to-night), Mr. T. C. Hepworth will give a lantern demonstration.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

NOVEMBER 9,—The President (Mr. J. W. Marchant) in the chair.

An exhibition of members' lantern slides was given to an audience of about 200 members and friends. The views depicted were of a most varied character—ice-bound rivers and trees covered with the winter's rime, alternated with hill, valley, and streamlet basking in the summer sun; cathedral aisles and cloisters, with the bustle of seaside popular resorts; quaint little old-world nooks and corners in provincial cities charmed the eye, and were followed by the solitude of glens and tarns deep hid in the recesses of Welsh and Scottish mountains. Some 230 slides were thrown upon the screen. The Fry Manufacturing Company sent a number of slides, made from the late O. G. Rejlander's negatives.

The next meeting of the Society will be held on November 23, when Mr. F. E. Jones will demonstrate the working of hot bath and sepia platinotype paper. Visitors, professional or amateur, will be heartily welcome.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

NOVEMBER 6,—Mr. J. Weir-Brown in the chair.

Mr. W. LOW SARJEANT gave a demonstration on the uses of the limelight for the optical lantern, with appliances. Mr. Sarjeant said that the uses of the oxy-hydrogen light ought to be known to all those present that evening, as it would prove useful to those who wished at any time to take it up. The limes which were most suitable for this work were the Nottingham limes, but were, as a rule, very badly formed. The Excelsior limes were rather soft, but well made and truly turned, this being a great advantage. When the lime is placed

on the holder it should be about one-sixteenth of an inch from the nozzle of the mixed jet. Mixed and blow-through jets were then described and demonstrated. The blow-through jets were the safest to use; but, as now gas was supplied in bottles at about 1800 pounds to the square inch, it was perfectly safe to use the mixed jet. The optical arrangement of the lantern was next described, and as to the best method of obtaining the best results from illuminant, the slide being placed in front of the condenser, so that the diverging rays of light just take the whole of the slide. Regulators were next described, Mr. Sarjeant advocating that no one should operate without one, as one could then work with greater security. To test the amount of gas in the bottle a pressure-gauge was necessary. These were constructed to give a very high pressure; and, when using on a gas bottle, the tap of the bottle should never be turned on full, as this, coupled with any grease that might be on the gauge screw, would probably ignite the gas, and so cause an explosion. About five feet of gas was quite sufficient for an evening's entertainment. The heat of the oxy-hydrogen jet was shown by the combustion of a piece of steel wire. It was always well, after having used the lantern, to turn off the oxygen first. The construction of the lantern followed, with instructions for centering the light, and also several carriers.

The Chairman, Messrs. Wild, Hurst, Carter, Marriott, and Boord joined in a discussion which followed.

On Friday, November 13, the Autocopyist Company had kindly undertaken to give a demonstration on *Mechanical Printing*.

BRIXTON AND CLAPHAM CAMERA CLUB.

November 5,—The President (Mr. A. R. Dresser) gave a paper on *Toning Lantern Slides*, illustrating his remarks by showing some of Fry's slides toned to various colours. The great advantage of his method was that the plates could be cleared of the tone entirely, and re-toned again and again, and until the desired colour is obtained. The lecturer did not advise this process for every slide, it being more suited to plates that consisted largely of heavy clouds; and in proof of this Mr. Dresser showed, by means of the lantern, some very fine sea pictures.

RICHMOND CAMERA CLUB.

November 6,—The monthly lantern night. Mr. Ardaseer presided at the lantern, and showed slides by himself and Messrs. Ramsay, Kelsey, Davis, Carolin, and Arthur Hunter, those by the last named including some highly interesting scenes of Central African travel from negatives taken by a relative of Mr. Hunter, who had made the Dark Continent his hunting-ground.

Several new members have lately been elected.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

November 4,—The President (Mr. Andrew Pringle) in the chair.

Mr. G. Davison gave a lecture on *Art*, with many useful hints in taking a photograph, and pointed out the special kind given by a pinhole, illustrating same by handing round a large number of fine prints taken with a lens and without.

Next meeting takes place November 18, Mr. Andrew Pringle on *Bromide Enlarging*.

TOOTING CAMERA CLUB.

November 4,—The President, by the aid of the optical lantern, exhibited a large number of slides made by members and friends.

Mr. W. E. Bond was elected a member of the Club.

The next meeting will be held on the 27th inst., when the evening will be devoted to lantern slide making by various processes.

BATH PHOTOGRAPHIC SOCIETY.

October 29,—Mr. George Powell in the chair.

A report of the places visited by the Society during the excusion season was read by the Hon. Secretary, and a letter from Mr. G. H. Wood, who presented some books for the library.

The Chairman announced the receipt of a large group photograph of the "Photographic Convention of the United Kingdom," presented by the Hon. Secretary, Mr. W. Middleton Ashman.

Mr. Philip Braham, F.C.S., then delivered a lectured on the subject of *Light*, dealing more especially with effects produced, as phosphorescence, florescence, diffraction, interference. These phenomena were severally produced before the audience, and in the case of the two latter were exposed to a sensitive photographic plate and developed on the spot. Mr. Braham's experiments occupied the whole evening.

At the November meeting the Rev. E. A. Purvis will treat on *Enlarging by means of Artificial Light*.

ROCHDALE AND DISTRICT PHOTOGRAPHIC SOCIETY.

November 3.—Annual Meeting.—Mr. R. M. Jones in the chair.

Election of officers:—*President:* Mr. J. A. Bright, M.P.—*Committee:* Messrs. T. P. Spedding, Hoyle, Jones, O'Neil, Blanley, and Beaumont.—*Treasurer:* Mr. T. Leach.—*Secretaries:* Messrs. W. & S. Ingham, 30, Freehold-street.

The Treasurer's and Secretaries' reports were read by the Rev. T. P. Spedding, and described the winter lectures and summer excursions as having been very successful and well attended.

It was decided that the Society join with the Art Society in their exhibition, which is to be held in January, the Chairman urging upon the members to make a good show.

During the evening several prints of the places visited during the summer were shown by Mr. Hoyle, and Mr. T. Leach also exhibited one or two prints on the Ilford printing-out paper. The Rev. Mr. Aldridge, vicar of Facit, handed round two volumes of hand-camera pictures.

LEWES PHOTOGRAPHIC SOCIETY.

November 3,—Mr. J. G. Braden in the chair.

Mr. E. Brummit was elected a member.

Mr. C. E. Collins, of East Grinstead, gave a graphic account of *A Shor Tour in Scotland*, illustrated with lantern slides. Many of the slides wer unique in character, consisting of groups of sea-birds, which inhabit th islands on the west coast of Scotland, and one slide of a wild heron's nest wit young. Views of Inverness, Edinburgh, &c., were also shown.

The Hon. Secretary suggested that an album should be sent to member a great many of whom resided in the country, to enable their work to be see and criticised, and it was resolved to refer the subject to the Committee a their next meeting.

The President showed a slide which suffered from halation and another o the same subject, in which the evil was entirely avoided by simply backing th plate with black paper coated with glycerine.

The Committee have arranged for a series of lantern evenings on the thir Tuesday in each month during the winter, in addition to the ordinary meetin on the first Tuesday.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

November 3,—Mr. B. J. Taylor in the chair.

Two new members were admitted.

Mr. T. G. Hibbert gave a successful demonstration of *Lantern Slide Makin by Reduction in the Camera and Artificial Light*.

ROTHERHAM PHOTOGRAPHIC SOCIETY.

November 3,—Dr. Baldwin (President) occupied the chair.

The annual members' competition awards were announced as follows:— Class A, six untouched negatives: 1, Mr. H. C. Hemmingway (Hon. Secre tary); 2, Mr. E. I. Hubbard (Vice-President). Class B, six negatives an prints resulting from Society's excursions in 1891: 1, Mr. Hubbard. Class C six albumenised silver prints: 1, Mr. W. Mason. Six gelatino-bromide prints 1, Mr. Hemmingway. Six prints (any other process): 1, Mr. Hubbard Class D, six lantern slides: 1, Mr. G. T. M. Rackstraw (Vice-President); 2 Mr. Hemmingway. The prizes in Classes A and D, amounting altogether t 2*l.* 2*s.*, had been given by the President. The Judges were Mr. B. J. Taylo Mr. George Bromley, and Mr. Ernest Beck, respectively the President, Vice President, and Secretary of the Sheffield Photographic Society; and a vote o thanks was unanimously passed to them for their services. The competitio work was afterwards on view.

The Fry Manufacturing Company lent a series of beautiful zoological slides chiefly from negatives by Mr. Gambier Bolton, and they were displayed b means of the oxy-hydrogen lantern worked by Mr. Leadbeater, the Treasurer.

MIDLAND CAMERA CLUB.

November 6,—Dr. Hall Edwards (President) in the chair.

Fifteen new members were proposed, which will make the total membe ship sixty-three.

The Hon. Secretary announced receipt of gifts from the following:—S. G Mason, two centre tables for the main room; Hall Edwards, sink for the dar room; and the Hon. Secretary, trays and accessories for the same.

The Council have decided that on every Monday evening there shall be a informal smoking and conversational evening, at which some members of th Council will endeavour to be present.

The President then read a paper upon *The Aims and Objects of a Photo graphic Club*, in which he dealt with the social, scientific, educational, artistic and other duties. Amongst these he referred to the duties of a club towar the public, and stated that the Council had resolved to offer the services of t Club to charity schools, Board schools, and the like, in the way of lanter lectures or in loaning slides; and that he was in communication with th Kyrle Society of the town with respect to this.

In the discussion that followed, the Hon. Secretary said the President ha sat rather heavily on the social elements, and thought they should be sti more cultivated than he indicated.

Professor Allen suggested the borrowing of the Yosemite Valley set o slides, as likely to afford members the opportunity of seeing the wonders o this marvellous region, which, perhaps, none of them might ever have th opportunity of visiting.

Mr. W. Bentley thought the President and Hon. Secretary really mean the same thing as regards the social side.

The President, in replying, said that he meant the degeneration of the Clu into mere smoking concerts and the like, at which the smoke and drink wer greater objects than photography. Replying to Professor Allen, he said the would do their best to obtain the loan of the slides.

The Hon. Secretary then read a short practical paper upon *The Registra tion of Lantern Slides*, showing examples of his methods.

It was announced, among other matters, that Professor Allen had promise a short paper upon *Nitrogen in Photography*, and a longer one on February upon *The Philosophy of Restraint in Development;* Dr. Leach upon *Th Keeping Qualities of Gelatine Dry Plates;* the President upon *Micro-photo graphic Work*, and others.

OXFORD PHOTOGRAPHIC SOCIETY.

November 3,—The President (Mr. E. A. Ryman-Hall) gave a *Lanter Demonstration of Hand camera Work*. The slides were very fine, especiall some views of the Lake District, and some snap shots of the strong mar Sandow, upon Brighton beach. Some views of Cumberland wrestlers elicite much applause.

The demonstration was greatly appreciated by the members and their friends of whom a large number were present.

Correspondence.

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

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the EDITOR.

SIR,—The article in your JOURNAL on Dallmeyer's objective has, I will admit, been the immediate cause of my not delaying my German patent any longer. I was, however, already last spring occupied with trials for obtaining large images by combinations of aplanatic objectives with concave lenses, and was only prevented through business, mostly of a private nature, from completing the system out and out. It was only in September that I found time to complete my system, and have the necessary lenses ground by the means of which I could satisfy myself that my idea was destined to succeed, and I had intended to devote the coming winter to settle the precise construction, when I read of Mr. Dallmeyer's labours in the same direction, and observed that they must arise from a similar idea, though there is absolutely nothing mentioned about the construction of his intended lens. I therefore asked you to publish in your valuable JOURNAL a *description* of my objective, in order to show that mine was independent of Mr. Dallmeyer's. I should regret if, according to Mr. Dallmeyer's reply, he thought that I disputed his invention; all I claim is the first publication, for I could not possibly know whether Mr. Dallmeyer's idea was older than mine.

I hope, therefore, that the subject will not give rise to any quarrel between me and Mr. Dallmeyer, whom, as an optician, I esteem much, for he will readily admit that I have worked out the idea of combining a convex and concave system of lenses *independently*, and before I could know anything of his being occupied with the same matter, and an acknowledgment on his part of this fact will allay, I hope, any difference between us on this account.—I am, yours, &c., DR. ADOLF MIETHE.

Potsdam, November 9, 1881.

[Accompanying Dr. Miethe's letter is a 5 × 4 print of the towers of Potsdam, taken at a distance of two miles, with the camera racked out eleven inches, the distance between the lenses in the combination being five inches.—ED.]

MR. HENDERSON'S DEMONSTRATION.

To the EDITOR.

SIR,—I am sure the thanks of the whole photographic community ar due to Mr. A. L. Henderson, for so freely giving to them the results of his many years' experiments and "hard labour."

Mr. Henderson has been my sheet anchor for years past. In the old collodion days, when working as an amateur, I pinned my faith to him, and was not disappointed. Why the old, sleepy formula for wet plate bath did not take a second place in the ALMANAC (at least for studio work), has always been a mystery to me. Where the former, even at its last, required ten seconds exposure, the Baryta bath required but five seconds, and stand rough handling too. This bath, in conjunction with his "teetotal" developer" (with alum to bring specific gravity of bath and developer equal), was a crowning success. And in recent years, as a professional, I have followed Mr. Henderson with great satisfaction. After boiling and stewing with alternate success and failure, the simple ammonia method came as a real blessing. Starting with silver of my own make, and the other salts of known value, I can now produce successive uniform batches, giving negatives of the highest quality, with beautiful gradation of tone.

And here I would like to ramble. A slow or rapid plate, giving clearest shadows and "sparkling high lights," and which bears any amount of ammonia and rough dealing, is as inferior to one coated with an emulsion in which the gelatine is on the verge of decomposition, and about to give up its bromide of silver in its extreme exalted sensitiveness, as a coarse, unfeeling, vulgar man is to a refined, educated, sensitive gentleman. A poor simile—the only one of the moment. Let the former plate be used for its inferior black and white work, and the latter for its superior half-tone work. Mr. Henderson stated (while in America, I think), he would not put this extremely delicate plate in the market. Silver and gold forbid! Fancy such a plate in the hands of any one who chooses to buy, and perhaps buy his developer as well, pour it on and then off, and, thinking it looks queer, fix, to see if that will put it right! The ultimate end of that delicate plate being pieces of broken glass and quivering gelatine, with a being looking down on its death, uttering "Plates no good!" and expletives dying away in mutterings from Hades itself. Sacrilege indeed! The profession is killed by the trade! Moral: Make your own plates. Coming to Mr. Henderson's newest method. I have attempted two emulsions, and proved extremely cruel to them. The first actually gave me a coarse emulsion, reducible by development alone. The second was so fine as to resemble a stain more than anything else, and I was happy, until applying the developer. I found it also reducible without light. I wonder if my carbonate *was* converted into bromide of silver?

I have only seen the first report of Mr. Henderson's demonstration in JOURNAL, his answers to queries, and Editor's notes on same, and am looking out for something more in ALMANAC or JOURNAL before trying again. When I say I am so deaf as to be unable to hear a conversation going on close to me, you will, Mr. Editor, have some idea of the immense value to me of your JOURNAL, and all literature pertaining to the art. Hence my desire to thank Mr. Henderson publicly for the benefit I have derived from his labours, and shall continue to gratefully pick up the crumbs that fall from a master's table.—I am, yours, &c.,

30, *Walker-terrace, Gateshead-on-Tyne,* GEORGE WOOD.
November 10, 1891.

RE BLISTERS IN PRINTS.

To the EDITOR.

SIR,—If you think the following remarks worth inserting in your JOURNAL I shall feel pleased that I have, perhaps, helped a little in the matter under discussion. I believe the chief cause of paper blistering in the washing baths is due to using water charged with minute air bubbles, which occurs during cold weather, and especially when strong cold winds are prevalent. The air bubbles settle on the back of the paper, break, and air is forced through the most porous parts; the paper soon afterwards swells, by becoming more soaked, and the air cannot escape.

To avoid blisters during cold weather I find the best plan is to use water from a boiler, and allow it to cool until it becomes lukewarm. The prints should not be hastily rinsed, or fresh air bubbles will form. When fixed pass the prints through two baths of lukewarm water. The paper, by that time, has become thoroughly saturated, and can be washed for an hour or two afterwards under a tap of cold water, as usual, without any danger.

Perhaps, if paper were prepared at the back with a suitable size, it might be an improvement.—I am, yours, &c., C. R. LENTHALL.

Reigate, Surrey, November 7, 1891.

P.S.—Paper slightly albumenised is not liable to blister, on account, I think, of the air passing right through.

MR. VAN DER WEYDE'S EXHIBITS.

To the EDITOR.

SIR,—Annie E. Blake's condemnation of Mr. Van der Weyde, which you print in last week's issue, might be left for that gentleman to answer, except that, in true feminine fashion, she appeals to the bystanders to endorse it under pain of being banished from the company of "just-thinking" persons if they fail to do so. It is, therefore, as a mere looker-on that I protest against both her fallacious argument and her expectation of our swallowing it. I suppose her to be a just-thinking person herself—that is, one who just thinks and then jumps to a conclusion, but not by any means one who thinks justly, or she would not yield to the temptation of (figuratively) flinging a stone at the head of a man, as she does in the last part of her letter, where she imputes to Mr. Van der Weyde motives which he would be the first to repudiate, and which those who know him will be the last to give him credit for. It appears to me that, if he did wrong, it was not, as Annie E. Blake would have it, by an error of judgment, but simply by a mistake. The whole purpose of her letter is to try and prove, by a quotation from his own letter, which she characterises as a confession, that he did *knowingly* last year send an ineligible picture for competition to the Pall Mall Exhibition. This she utterly fails to do, and being aware of the insipid quality of her argument, she tries to compel our acceptance of it; and, of course, all "just-thinking" persons will retain it with due thankfulness, whilst those who "just think" a little longer will take the opposite course.

After bringing my mind to as "just" a focus as possible upon the paragraph which Anne E. Blake cuts from Mr. Van der Weyde's communication made to your JOURNAL in October, 1890, I must say that I cannot discover anything that can be construed into an admission, or, as the lady calls it, a "confession of guilt" (rather strong words for a lady). That paragraph appears to me to contain such a lucid explanation of his conduct that I do not know what words of mine can make it clearer, but perhaps I ought to anticipate any objection by giving my own version of it, which I will now proceed to do.

So far far from jumping at plums, Mr. Van der Weyde informs us that he had "no idea" of exhibiting at Pall Mall that year, but that he was "particularly requested to do so." Yielding to persuasion, being rather actuated by a desire to oblige than to grab at the "plum," just as some lady's mouth was watering for it, he sent a large picture "which, in the hurry," he "quite forgot" had been already exhibited at Drapers' Hall. This was returned to him, and he expressed regret for the mistake, and explained to Mr. Cocking that he had no other picture which he cared to send that had not already been shown either at the Crystal Palace or in the City. Now we come to the point where Annie E. Blake seems to have stumbled, and where, I suppose, she pretends to discover the alleged con-

fession. "He" (Mr. Cocking) "told me he did not think there would be any objection to the Palace." Being once more pressed to furnish an exhibit, as room could yet be found, if the "pictures were not too large," Mr. Van der Weyde tells us he "accordingly" sent two small photographs.

It is a pity Mr. Van der Weyde does not mention (in so far as the excerpt goes) whether these pictures had already been exhibited elsewhere, but certainly we might consider it sufficiently implied that one or both had been shown at the Crystal Palace, and if this view be accepted as the correct one, we are not justified in concluding that he persistently and knowingly continued, even after one had been sent back to him, to send up works which were ineligible for admission, but rather that from a sheer wish to gratify the Committee he forwarded two pictures, one or both of which had been exhibited at the Crystal Palace; but, as that place is so far away, it can scarcely be said to be in London, although, to be very accurate, it is just within the Postal district. Now, this consideration being backed by the opinion of no less a person than the Secretary of the Society, that "*the Palace would not be objected to*," was no doubt sufficient to warrant Mr. Van der Weyde in sending the photographs. There was no attempt to impose upon the Committee, who had power to decide whether their rules could be strained a point in order to admit them.—I am, yours, &c., F. Wilcockson.

23, *Goodge-street, London, W., November* 9, 1891.

To the Editor.

Sir,—As the lady who boasts that she was the "first person who last year called attention to the fact" of my having sent for competition a picture which I well *knew* to be inadmissable, and who then demanded that "an example should be made" of me, now appeals to "every just-thinking person" to pronounce me "guilty on my own confession," I would beg the indulgence of your readers while I again intrude this affair, in order to point out the absurdity of this lady's virtuous, but uncalled-for, indignation.

In the first place, I would ask whether, even if I had last year read the rules of the Photographic Society (which I had not), was I not justified in relying upon the Secretary for their interpretation?

Secondly, considering I had no intention, and was unprepared last year, to exhibit at Pall Mall, having sent everything I could spare to Edinburgh, and that it was only at the urgent request of the Committee and Secretary that I found something at a few hours' notice, may I not be given credit for having been actuated by a spirit to oblige, instead of "yielding to the temptation of a plum in the shape of a possible medal?"

And, thirdly, in regard to my reasons for resigning. I would point out that I did so *only after* seeing repeated in the photographic journals, and left uncontradicted, the very plausible explanation given in the *Daily Graphic* why the Pall Mall jury should ignore an exhibit which, but a month before, had been awarded, at the much larger and more comprehensive exhibition at Glasgow, the gold medal for special excellence, and by a jury partly composed of Academicians.

This explanation, *which the "Daily Graphic" obtained, word for word, from one who seemed to be an official of the Society*, implied that the Pall Mall jury . . . . . believed, without proof, and without using the common politeness to write to me for corroboration or denial, that *this year* I must have *knowingly* (considering my last year's experience) attempted to defraud my competitors; and I would ask, could the possible loss of one of the Society's silver medals, which have been so liberally bestowed in the past, weigh for one moment with any "just-thinking person" as against an imputation of this sort?

In conclusion, I would ask my brother-photographers that, considering the pugnacious tone of this lady's letter, and that, to keep up her "tempest in a teapot," she will probably have the last word, even if she was answered till doomsday, they will allow me to ignore all further attacks from any quarter, as time is precious to a worker, and that they will credit me with not having done anything so contemptible and unprofessional as this lady so strenuously tries to fasten upon me.

With sincere apologies for the length of this letter,—I am, yours, &c., *Regent-street, W., November* 11, 1891. Henry Van der Weyde.

[As we were present at the Press view of the Society's exhibition, we are in a position to affirm most positively that the individual from whom the lady-representative of our daily contemporary received her information was not, and never has been, an officer of the Society.—Ed.]

KEEPING MIXED DEVELOPERS.

To the Editor.

Sir,—It is a known fact that developers do not keep when mixed on account of the oxidation taking place. I have constructed a bottle from which a given quantity of developer may be abstracted by a very simple manipulation, and in which a mixed developer will keep good for months. The bottle or apparatus is called the "Bourdon" bottle. Will you kindly publish the description of my invention in your valuable Journal?—I am, yours, &c., E. Bourdon.

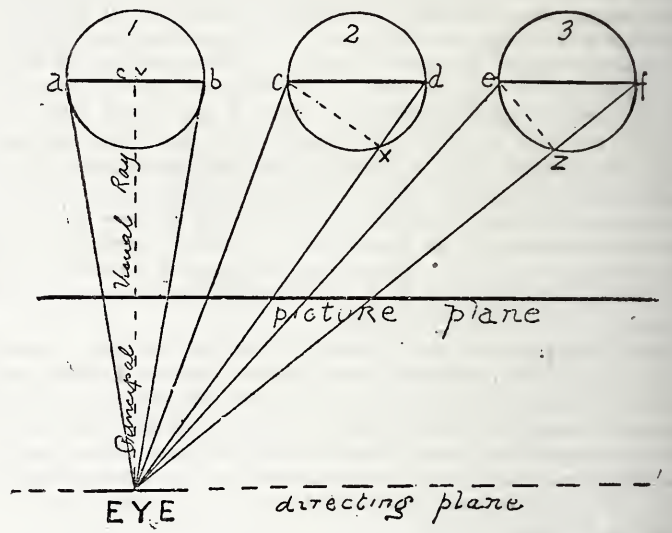
Geshitthof an der Staatsbahm, Opoenno, Bohemia.

PERSPECTIVE AND THE PHOTOGRAPH.

To the Editor.

Sir,—Allow me to thank you for giving my letter a place in your last week's issue, and also to further trespass on your courtesy, for, while so kindly acceding to my request, you very gently sat on me in your foot-note, and have slightly misquoted me, which latter, I am sure, was unintentional.

The accompanying sketch will, I think, simply illustrate what I said last week, and, I trust, bring it within (our) comprehension.



Figs. 1, 2, and 3 are vertical sections of spheres. Fig. 1 is so placed that its centre coincides with the centre of vision, *c v*; Figs. 2 and 3 are at short distances to the right, and on a level with Fig. 1.

The tangential rays from "eye" form, with the vertical section 1, a *right* cone; and, the diameter of its base, *a b*, being horizontal, and parallel to the picture plane, its perspective representation will appear its exact length (to scale, of course); but, in sections 2 and 3, the bases, with the rays from "eye," forming *oblique* cones, the diameters, *c d* and *e f*, although horizontal and parallel to the picture plane, will be represented as perceptibly shorter than *a b*, and *e f* shorter than *c d*, in proportion to the difference in the altitudes, *c x* and *e z*, of the triangles, "eye" *c d*, and "eye" *e f* respectively.

The deduction thus arrived at is simply that the horizontal diameter of a circle, which is parallel to the picture plane, becomes shorter in its perspective representation, as its distance from *c v* is increased, right or left, and so *approaches* in form the curve of an ellipse proportionately as it becomes nearer the edge of the picture plane; and, by the same ruling, the contour of a sphere will *approach*, in form, that of a spheroid.

I hope now, Mr. Editor, that you will admit the truth of my statement: that we are not dealing with any *section* of a cone, oblique or parallel; but with the *bases of oblique cones* in the cases 2 and 3, and that Mr. W. E. Debenham was in error, or, in artistic parlance, "on the wrong tack." This with due deference and respect to you, Mr. Editor, and Mr. W. E. Debenham, and trusting that neither will feel the slightest offence. Thanking you again in advance—I am, yours, &c., Henry Flather.

Scarborough, November 9, 1891.

[While sorry to differ from our correspondent, we still hold that the position occupied by Mr. Debenham is impregnable. If, in the above diagram, 1, 2, and 3 are spheres, then their projection on the picture plane has nothing to do with the sectional lines *e* and *f*, for example, but with lines drawn from the point of sight to the outside of the circle.—Ed.]

THE INSTANTOSTAT.

To the Editor.

Sir,—You may be disposed to notice, editorially, my application of the Gyroscope (hitherto little more than a scientific toy) to the purpose of preventing movement of the hand-camera during exposure.

The new appliance is called the Instantostat, and it consists essentially

of two thin circular metal discs, one of which is parallel, and near to the upper or lower side of the camera, and the other is parallel, and near to the back or side. These discs rotate, in their own planes, between centres about vertical and horizontal axes respectively, and therefore in planes at right angles to each other.

The act of making the exposure first releases a spring which throws the discs—one rests edgewise on the other—into extremely rapid rotation, and since each disc preserves its own plane of revolution in space, the camera cannot be turned either vertically or horizontally without the application of quite considerable force.

It is well known to users of hand-cameras that the rotational movement is the only one which causes trouble. This motion is prevented by the Instantostat, and if the camera be loosely held—poised rather than gripped—there is no difficulty in obtaining exposures of more than a second's duration.

The appliance has, of course, relatively greater power over a light camera than over a heavy one, and would seem to be, therefore, peculiarly applicable to those forms which are not weighted with a magazine of plates; but on the other hand, heavier discs may be used in the plate-carrying forms without a relatively greater increase of weight, whilst *the quantity of motion*, upon which the *efficiency* of the apparatus solely depends, can be increased by using a stronger spring.

There is every reason to expect that the apparatus will be looked upon as a highly interesting application of a very curious scientific toy.—I am, yours, &c., W. E. CROWTHER.

Government School of Science and Art, Londonderry, November 9, 1891.

[Our correspondent's letter reminds us that over thirty years ago Professor Piazzi Smyth, at that time Astronomer-Royal of Scotland, when on his way to Teneriffe, on the Peak of which island he established an observatory, employed what he designated "a free revolver stand" on board the vessel by which he and his astronomical instruments were being conveyed to their destination. Notwithstanding the tossing of the vessel, this huge gyroscope, which was kept in motion by several seamen, proved sufficiently steady for him to erect a telescope thereon for observations at sea. The application of this principle to photography was suggested at the same time.—ED.]

FILLEBROOK ATHENÆUM PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I shall be obliged if you will allow me to remind any who intend to exhibit that they should write at once for entry forms. These should be returned, filled up, by Tuesday next, November 17, and exhibits sent in by the 24th.—I am, yours, &c., JOSEPH W. SPURGEON, *Hon. Sec.*

1, *Drayton Villas, Leytonstone, Essex, November* 9, 1891.

Exchange Column.

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

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, complete for 1890 (quite clean), for background or head-rest.—Address, J. D. TRENGOW, East-street, Crowland, Peterborough.

Will exchange dress-coat and waistcoat, two pairs of gloves and tie (worn twice), also black diagonal coat (height 5 feet 8½ inches, shoulders 43½ inches), for a rectilinear lens by good maker.—Address, BAILEY, 7, Oak-grove-road, Croydon-road, Anerley.

Wanted, hand camera (quarter-plate), also whole-plate rapid rectilinear lens by good maker; will exchange any of the following for same:—Balustrade and pedestal; ditto, larger, in one piece; interior backgrounnd or Rembrandt vignette ditto, gradnated.—Address, BALLEY, Lime-grove, Bideford.

THE Shropshire Camera Club's programme for the winter session is as follows:—November 20, a series of slides representing the "White Mountains" of America will be shown. 30, Mr. H. H. Hughes will give a *Demonstration in Bromide Printing*. December 9, a Series of American Slides will be shown. 21, Series of American Slides illustrating "Boston," also a Display of Woodbury Slides. January 11, 1892, Annual Meeting of the Club. February, Lantern Slide Exhibition in the Music Hall. March 9, *Demonstration on Lantern Slides made from Kodak Film Negatives.*

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:

J. Stuart, Glasgow.—*Three portraits of the Right Hon. H. Campbell Bannerman.*

E. M. Gwynn, Canterbury.—*Portrait of Miss J. E. Godden, of Whitechapel, London.*

Dennis, Smith, & Co., Nottingham.—*Two portraits of group of the Rev. Canon Macdonald, Canon Smith, and Rev. R. Blackett.*

HENRY SUTTON.—Thanks; both in our next.

N. GILLESPIE.—Try tartaric acid for the purpose.

F. ARMSTRONG (Bloemfontein, Orange Free State).—Received, with thanks.

FRANKLIN WELLS.—Apply to the secretaries of the societies you name; their addresses will be found in our ALMANAC.

REECE.—As your prices are somewhat low, our advice is to raise them from fifty to sixty per cent. for platinotype work.

J. S. TEAPE.—Many thanks; but we had already made the discovery, although too late for our last issue. See sub-leaders in present number.

CAPTAIN GOAD (Babooghur).—1. We are pleased to hear you succeed so well with the plates and developer you name. 2. Early in December.

M. J. W.—Unless the rubber on the roller squeegee is very soft, one with the tongue, to be used as a scraper, will best expel the air when enamelling prints.

JAS. UNWIN.—It will all depend upon whether the copyright has been vested in the firm you name by the sitter. If not, then you may safely copy the picture.

H. W. BENNETT.—1. A well-constructed doublet will give practically as brilliant an image as a single lens, although in theory it will not. 2. Not necessarily. 3. Yes, over a limited field.

MANX.—The firm of Goupil now work other processes than that which originally made their reputation. They employ an etching process for intaglio plates, and "process blocks" for relief printing, and possibly others.

J. C. C. asks, how the very "quickest pictures" are to be produced?—The reply is, use the most rapid plates, the quickest shutter, and a lens with the largest angular aperture, such as a Petzval portrait lens of the "baby series."

COPYRIGHT.—Remit the amount named to our publishers, who will register the picture for you. The copyright is already yours, as the producer of the picture; and, by registering it, you can recover against anybody infringing it.

L. ARNSTEIN.—This correspondent complains of the non-return of some specimens. We have written to the offending party, and if our correspondent does not receive the specimens in the course of a few days we shall be glad if she will inform us.

D. MCANDREW.—The six large gas bags you have are now of little value, even supposing they are as good as new, which, by the way, is somewhat doubtful if they were purchased six years ago. Cylinders have now quite superseded bags for most practical purposes.

CONDUIT asks our opinion on the merits of the flash and the electric lights for studio work, because he has heard different opinions expressed. The electric light is far the preferable of the two, even when the other is used under its best conditions. The flashlight has some advantages for large groups, however.

W. GEORGE.—If the plates fog immediately the developer is applied, when they have not been exposed in the camera, it is quite useless to expect to obtain negatives upon them. Discard all that batch and procure others. The maker has been out of business six or seven years, so that it is quite possible that they were good plates when issued.

C. A. J, writes: "Is coating dry plates by machinery so patented that I cannot take out another patent? My invention is quite different from anything that has been done before. What I want to know is, if coating plates by machinery is any one's exclusive right?"—There are several patents for coating gelatine plates mechanically, but any one can take out as many patents as he likes for other machines provided they do not infringe any patents already in existence. A principle cannot be patented.

A. HARVEY.—If you fail to get sufficient density with the formula issued with the plates, try increasing the proportion of pyrogallic acid, say, from one to two grains more per ounce of developer.

PROVINCIAL PHOTO writes as follows: "I do a good deal of work away from home (taking groups, landscapes, and the like) which necessitates my keeping a horse and trap to drive to the places. My name and profession is in conspicuous letters on boards at the sides. The vehicle is used exclusively for business on week days, but sometimes I remove the boards on Sunday and take my family for a drive, as I have been in the habit of doing ever since I have had the trap, now four years. Recently we have got a new tax collector, and he says I must pay a tax for the vehicle because it is used for pleasure. But for the business I should not have the trap, neither could I afford to keep one. Am I compelled to pay the tax?"—As the vehicle is sometimes utilised for pleasure, it is no longer used exclusively for business, which it must be to render it exempt from duty.

JERSEY say: "I have recently been trying to do some carbon printing—first attempts—and my difficulty is to get the pictures, after printing, to adhere to the support (the usual flexible and glass plates). When they are put into the water to develop, they peel off bodily, gelatine coating and all, instead of the paper alone coming away. One of these prints was left in the warm water for a long time, and none of the coating would dissolve. The tissue was sensitised strictly according to the instructions enclosed with it. Can you help me?"—This difficulty arises from the tissue being insoluble throughout, instead of only in proportion to the action of light. Either the sensitising bath was acid or the tissue was dried too slowly. Our correspondent should obtain some ready-sensitised tissue, which he will receive in proper condition, and use that until he gains more experience.

W. EDWARD WRIGHT says: "Will you kindly give me your opinion as to the justice of the following matter? I sent five whole-plate negatives to a firm of mechanical printers, asking for a proof of each to be returned as soon as possible. When they arrived they were 8 × 5 instead of 8 × 6, as I expected. In the meantime 100 mounts, with five openings 8 × 6, had been cut for 500 prints, so that the small prints were useless. I returned the proofs, asking for the proper size, and they reply demanding 5*l.* (that is, 1*l.* each) for the first block, 8 × 5, which is their size, and 2*l.* 5*s.* each for 8 × 6. I am quite willing to pay the latter sum, but not the first. I maintain that they should have written me before doing the blocks, calling my attention to their sizes, and learning my wishes in the matter. They first of all said I ordered 8 × 5; but, on my contradicting that, they admit that I only said proofs. At the same time they will not proceed unless I pay the 5*l.* I say that, if I had wanted them either larger or smaller than is customary, I should have said so. I may mention that I sent also a 10 × 8, which they returned the usual size quite satisfactory."—If 8 × 6 were ordered, you would be perfectly justified in refusing to pay for a smaller size.

CHROMO.—"As I understand chromo-typography, it is done by making (for four printings) four negatives of a coloured subject, say, one for red, one for yellow, one for blue, and one for black, that is, supposing these were the leading colours. After making the collotype plates, and printing the colours in their proper order, I fail to get such nice results as I see published. I can get very good effects by stopping-out in each negative certain parts which would otherwise take on colour that I don't want. Now, is it possible, or ought it to be possible, to make negatives that will print without stopping-out? Knowing the impossibility of making a negative of a coloured subject that will only print the blue, and one that will only print the red, and so on, I fail to see how printing in colours can be effected without the stopping-out to which I refer. All the articles I have read certainly convey the idea that the pictures which they describe were made without stopping-out certain parts, and I must admit that the finished prints don't show that the stopping-out has been used. Of course, certain coloured subjects require less treatment in this respect than others, but what I wish information on is, Is it possible, or is it the practice, to produce negatives in all cases that will give only the colours required and no other?"—In all probability our correspondent's want of success is due to inexperience. Good results have been produced without stopping-out by taking the different negatives on plates sensitised for the particular colour desired, and using suitable coloured screens. All who do this class of work carefully preserve their methods to themselves, hence no works are published on the subject. Several patents for chromo-typography, &c., have been taken out, the specifications of which can be consulted at the Patent Office.

THE Lantern Society's next meeting, on November 23, will be a lantern evening for members and their friends.

THE annual dinner of the Photographic Club will take place on Wednesday, November 18.—25, Monthly Lantern Meeting.

MESSRS. WALTER GRIFFITHS & CO. (LIMITED), of Birmingham, have appointed the Fry Manufacturing Company as their London agents.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—November 19, Competition Lantern Slides.—November 26, *Protection of the Negative Film during Printing.*—December 3, *The Exaggerated Perspective of Wide-angle Lenses.*

WE are sorry to learn of the death of Mr. F. W. Hepburn, photographer, of Grahamstown, South Africa, which occurred recently in London while he was on a business visit. Mr. Hepburn had a large practice, and was a most capable artist.

THE Oxford Photographic Society's winter programme is as follows:—1891: November 17, *Collodio-Bromide Emulsion Making*, Mr. H. Minn. December 1, *Autotype*, Mr. H. M. Phillipps. 1892: January 5, *The Development of Plates* Mr. C. C. Cole. April 19, Exhibition of prize slides.

NORTH LONDON PHOTOGRAPHIC SOCIETY, Wellington Hall, Islington, N.—Next meeting, Tuesday, November 17, 1891, *Bromide Printing.* As it is hoped that this subject will be opened by Mr. F. A. Bridge, a large attendance is expected in the more convenient room at the above hall which has now been secured for this Society's meetings. Visitors are invited.

THE Society of Photographic Cabinetmakers held their second annual dinner on Saturday last. The number of workmen engaged in the photographic cabinet trade in London is stated to be about 135, 110 of which are members of the Society. A feature of the evening was the presentation to Mr. Johnson the retiring Secretary, of a silver watch in a morocco case. The speeches were of no photographic interest.

THE report of the Technological Examinations, 1891, held under the auspices of the City and Guilds of London Institute, has just been issued. Eighty-five candidates presented themselves for examination in photography, and of these sixty-five passed and twenty failed. In the honours grade, thirteen candidates competed, and of these four gained a first class, five a second, and four failed. In the ordinary grade, seventy-two competed, and of these thirty-one gained firsts, twenty-five seconds, and sixteen failed

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).—The following are the arrangements for November and December:—Friday, November 13, *Mechanical Printing*, by the Autocopyist Company. 20, Lantern Night, *Through the Norwegian Fjords*, Mr. J. A. Carter, M.A. 27, In School of Art Room, *Appliances for Lantern Slide Making by Reduction.* December 4, *Kallitype*, Mr. J. Lewis. 11, *Collodio-bromide Lantern Slide Making*, Messrs. A. H. Allen and W. Low Sarjeant. 18, Lantern Night, Members' Slides.

A MEETING of the Council of the National Association of Professional Photographers was held on Monday last at Anderton's Hotel, when there was a full attendance, Mr. Whitlock (Birmingham) in the chair. The appointment as Hon. Secretary of Mr. J. O. Neill, of Birmingham, was confirmed, and an important resolution on the subject of wholesale houses supplying indiscriminately trade lists to any one applying for them was passed. A vote of thanks was passed to Messrs. Elliott & Son for their new list, and taking the lead in dealing *only* with photographers. It was decided to hold the annual meeting in London in February next, when *all* photographers will be welcome.

THE Oldham Photographic Society's syllabus of lectures for 1891-92 is as follows:—November 26, *The Optical Lantern: Its Construction and Use*, Mr. J. A. Furnivel (Manchester). December 17, *Hand-camera Work, &c.*, Mr. J. W. Wade (Manchester). 28, Annual Dinner. 1892: January 6, Annual Soirée and Dance. 28, *Through Cheshire and North Wales.* Mr. J. Davenport (Manchester). February 11, Prize Lantern Slides. 25, Prize Lantern Slides. March 17, *Through Switzerland and over the Simplon to Italy*, Mr. C. G. Wood. 31, *Bits of Devonshire Scenery*, Messrs. W. Thompson and J. Brooks. April 14, *Holiday Reminiscences in Normandy*, Mr. T. Widdop. 28, *Rambles along the Sunny Shores of the Riviera*, Mr. J. T. Lees (Dukinfield). May 26, Exhibition of Members' Transparencies.

THE winter fixtures of the Richmond Photographic Society are as follows:—1891: November 13, Discussion, *On Halation*, to be opened by Mr. J. S. Teape. 20, *Opals and Ivorytypes*, Mr. Herbert Fry. 23, Annual Dinner. 27, Demonstration, *Collodio-bromide Emulsions*, the President. December 4, *Lenses*, Messrs. Taylor, Taylor, & Hobson's illustrations. 11, Lantern Night. 27, Demonstration, *Enlarging and Printing on Bromide Paper*, Mr. R. L. Kidd. 1892: January 1, Lantern Night. 8, *Notes on the Photographic Society's Exhibition*, Mr. P. Ennis. 15, *Conversazione.* 22, *Home-sensitised Paper*, Mr. Ardaseer. 29, *Manipulation of the Optical Lantern*, the President. February 5, Lantern Night. 12, *Photographing Pottery by Gaslight*, Mr. C. E. Hodgkin. 19, *Makeshifts*, Mr. Faulkner. 26, *Finishing in Monochrome*, Mr. W. H. Durham. March 4, Lantern Night. 11, *Toning with Salts of Platinum*, Mr. Ardaseer. 18, *Home Portraiture*, Mr. A. C. Hunter, jun. 25, *Architectural Photography*, the President. April 1, Lantern Night. 8, *Pictorial Composition*, Mr. C. H. Davis. 15, Demonstration, *Retouching and Finishing*, Mr. E. Morgan. 22, Demonstration, *On Platinotype Printing.* 29, *Developing en route*, the President.

DUBLIN SKETCHING CLUB EXHIBITION.—This Exhibition consists of sketches, pictures, and photographs, solely the work of members of the Club. The Club was formed in 1874 by a few gentlemen interested in art, and since that time it has steadily increased, till now it numbers nearly 200 members. The Exhibition this year shows advance in all its branches, particularly in its display of photographs. The Hon. Treasurer (Mr. Oldham) has some nice artistic bits; also, the President (Mr. Tresilian) shows well-chosen views of the Donegal coast in platinotype. Mr. John L. Robinson, R.H.A., owing to a stay on the Continent, does not show his usual number of photographs. The largest collection is by Mr. Kennan (professional), who has some artistic work, amongst which we notice *Waiting for the Chief*, a 15 × 12 instantaneous view taken from the steps of the Dublin City Hall on the occasion of Mr. Parnell's funeral, showing the multitude of people massed in front and extending far away in the distance, nearly all with uncovered heads and upturned faces, watching the coffin as it was just being carried down the steps to the hearse. We congratulate the Sketching Club in their recognising photography as one of the handmaids of art, and on their giving it a worthy place in their Exhibition.

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AN ELECTRO-PHOTOTYPIC PROCESS.

THE demonstration given by Mr. Henry Sutton of his process of engraving, during the present week, to a large number of experts in electrotyping, block-makers, illustrated newspaper men, and others, calls for a few words, not of criticism—for we may as well say here that the demonstration was successful throughout—but of cognate explanation. First of all, we may state what Mr. Sutton's process is, and how it is worked now that he has had time to get it more consolidated than was naturally to be expected when he first brought it out at the Camera Club Conference in April last.

What we witnessed on Monday was the following:—An ordinary gelatine dry plate was placed in a dark slide, a screen of finely ruled lines being in front of the sensitive surface, although not in contact with it. This was then placed in a camera, and an exposure made, the print to be reproduced being lighted by strips of burning magnesium—for the day and place were too dark to permit of daylight being utilised. The negative was then developed by pyrogallic acid rendered alkaline by sodium carbonate, the restrainer being ammonium bromide. After having been developed, fixed, and washed, the surface water was removed by pads of paper. These operations were necessarily conducted in a darkened room adjoining, in presence of a selected Committee. On being brought out to daylight, the plate was submitted for examination, and it was seen to be a negative of the usual sort; close inspection showed the grating by which the printing grain was to be subsequently imparted.

Mr. Sutton then lighted a gas stove, on the top of which he placed a porcelain-lined dish, on which the negative was laid face up. As it became warmed, the previously flat surface of the negative was seen to rise in ridges corresponding to the amount of silver forming the image, and in three minutes this part of the operation was completed. All that remained now was to render the surface a conducting one by plumbago, or the other and well-known means capable of being employed for this purpose, and place it in a solution of copper sulphate to obtain an electrotype, which when mounted upon a block of wood was then ready for being printed from along with ordinary type. This, in all but the making of the electrotype, which requires several hours, was the process witnessed by us, and, as stated, the demonstration was successful throughout.

While writing this, we are not yet aware of the precise claim made by Mr. Sutton in his patent. We imagine, however, that it will consist in the application of the ruled screen to a gelatine plate, the image on which is to be placed in relief according to the manner just indicated. About ten years ago, Mr. J. W. Swan observed that the surface of a gelatine negative could be brought into relief by a final drying by heat, and he, at that time, obtained a patent for its application to printing purposes through the agency of an electrotype mould obtained from it after the surface had been rendered conducting. But if we remember aright, there was no suggestion of the ruled screen to be used in connexion with his invention. It may be said that this is only a small matter, but the success of many inventions depends largely upon small matters, and in the present instance it is the screen, by which a *cliché* is obtained, which eventually yields a block capable of being worked in the ordinary typographic printing press.

As regards rapidity of production, we are not aware of any system that can vie with that of Mr. Sutton. Every one knows with what rapidity it is now possible to take, and to develop and fix a negative; and, as we have shown, the succeeding operation, with the exception of the electrotyping, occupies only a few minutes. But if the inventor succeeds, as he expects to do, in obtaining a stereotype casting from the negative, then will it be possible to place the whole of the operations, from the receiving of the photograph to the handing over the block to the printer, within the compass of an hour.

There is, too, an advantage in producing the block direct from the negative—direct, that is, from the glass plate on which the negative is taken. So far as we recollect, M. Placet was the first to adopt this method. His engraving process, it may be remembered, consist in varnishing the negative with bichromatised gelatine, and when dry exposing the same to light through the negative, and then washing away the unaltered gelatine by tepid water. This yields a surface in a degree of relief corresponding to the penetration of the light through the gelatine coating, and from such uneven surface an electrotype is obtained. The great beauty of some of Placet's engravings leads us to wonder why the process is not more generally employed, for, as we proved experimentally when it was published, there is no difficulty whatever in working it. The ink-holding tooth (we are now referring to his photogravures) was imparted by chemical means, and we gave the requisite conductivity to the surface by three different methods—viz., by graphite or plumbago, by rubbing it with fine bronze powder, and by brushing it over with nitrate of silver, which was then reduced to the metallic state by methods well known. With Placet's process for producing surface blocks we are less acquainted; but it seems obvious that, without a grating screen, which was not applied to it, its uses would be restricted.

LIGHTING THE SITTER.

YEAR by year, almost, we might say, week by week, one of the most frequent questions put to us is, "What is the best form of studio for portrait work?" We have on former occasions done our best to indicate the lines that ought to guide the would-be studio-builder; but, as a matter of course, many

particular cases arise where free choice of aspect and site is impossible, and the best has to be done with existing conditions, on which valuable advice may be given.

Many of our readers are familiar with the old jest, usually fathered upon an Hibernian, where the making of a cannon is described as taking a long hole and surrounding it with iron. If this description were applied to the building of a studio, it would exactly represent the leading idea. Thus: "Take a large hole open to the sky, cover it with glass, and surround it with a studio." The actual forms of existing popular studios are as varied almost as the names of their proprietors, and we would especially predicate that, for all practical purposes, the particular shape or principle upon which a studio is constructed is a factor of no importance as regards the artistic effect obtained, provided there be enough light to start with. The student should obtain a few examples of work by the best men, and of varied styles, and try to so arrange his light as to produce similar effects. A living model is far better for this purpose than plaster casts, which usually have classical features, and give no suggestions as to the treatment of those idiosyncrasies of feature that are so useful to the artist—for he can tone them down—and so provoking to the photographer, because, instead of toning down, he gets them more pronounced. A model of some sort obtained, he, or she, should be illuminated in every possible way, and the face carefully examined. It is most singular to note how, upon close observation, an alteration of even a couple of inches forward or backward will be seen to make a thin face appear haggard, or merely thin, and in taking such faces, if the retoucher is looked to to soften and make by his work the effects that should primarily have been brought about very light, modelling the likeness will be as feeble, and the needless expense great.

Now, to obtain perfect results, we must point out that it is by no means sufficient to have sets of blinds or screens either opaque or semi-transparent only. Both kinds must be available.

We would at this stage of our argument point out that we are referring to daylight alone. If the electric light be used, and especially if it be applied *à la parapluie*, the necessity for screens is practically nullified, and reflectors only are needed.

Many years ago a secret system of lighting the sitter was sold at a high price. It is betraying no confidence to say that all that was possible under the tuition is equally obtainable by a head-rest on hoop or skeleton framework or two. These latter are covered respectively with white gauze, or thin calico, or other similar fabric, and another with pale blue. Attached by a rod to a head-rest with well-contrived adjustable motions, one or other of these screens was placed in the position (to be found by experiment) for best producing the desired results. Indeed, we may say that such adaptations of the secret method were purchaseable in open market some time ago.

In the mad races for speed and cheapness combined now being run, all such arrangements for assisting the production of work of the highest quality stand a poor chance of adoption or of success, unless some popular and successful photographer's name is connected with them. When this is the case there is a run after Mr. Rembrandt's roof, Mr. Janssen's side-light, Mr. Angelo's system of blind-hanging, Mr. Teniers' top-light, and so on *ad nauseam*, till the next popular craze turns the photographic mind on a new channel. If structural alterations have been brought about in following the great idea it is not often rearranged, and is, in consequence, held up for imitation whenever opportunity offers, and so real truth becomes shrouded. We wish to point out that no system whatev will obviate the necessity for observation and practice, and th adaptation of means to a particular end—the best effect of ligh for each individual sitter. We must confess that we ar induced to make these comments through a vivid feeling c their force and appositeness produced by the account given t us by a lady of her recent experiences at one of the grea studios on the Continent. Overhead arrangements there were of course, which she felt it difficult to describe; but wha most attracted her attention was the fact that the chief artis had in the studio five assistants, each provided with a larg fan, which he moved and held to reflect or to shade in accord ance with the instructions of his chief. We are, of course, no suggesting this as the latest new method to copy, but mor especially as giving point to our advice that systems of lightin should not be for one moment thought of as being able o themselves to ensure pictorial or artistic treatment. Go to th living model, illuminate it in every way, give careful though to the results, and eventually, if there be an underlying artisti faculty, power will be obtained to treat each subject rapidly pictorially, and artistically.

COLLODION EMULSION WITH CHLORIDE OF SILVER FOR TRANSPARENCIES.

The advantages to be looked for in collodio-chloride plates for development are, principally, the total absence of the various defects alluded to in connexion with the "printing-out" emulsion; and, although the process cannot at its best be considered a rapid one, it is reasonable to expect a decided increase of rapidity. Against these must, of course, be reckoned the additional trouble of washing and drying the plates after coating, for by the development method it is impossible to dispense with the operation of washing each film, unless, indeed, the emulsion itself be washed, when the additional trouble is merely shifted to another stage of the preparation of the films.

The trouble arising from the crystallisation of the decomposition salts is, of course, altogether obviated by their removal, which is necessary on altogether different grounds, whether the emulsion be prepared with excess of silver or of soluble haloid. In the first case, even after a very careful washing to remove the excess of silver, it is not always easy to prevent some slight veil which, though perhaps of no great moment if the subject be a negative, is fatal to the brilliancy of a transparency; but, if the slightest trace of silver be allowed to remain in the film, the inevitable result will be fog and utter ruin to the picture. When, on the other hand, the soluble haloid is in excess, collodion is less accommodating than gelatine, and a very small trace indeed suffices to practically destroy the sensitiveness of the film if present during exposure. Even if the equivalents be as nicely balanced as it is possible by careful trial to attain, the retarding influence of the decomposition salts must be reckoned with, and an imperfectly washed film will never give a really good result with any length of exposure. So great is the retarding action of the soluble haloids and the nitrates in collodion, that a plate may be exposed and developed without producing any result, and then, after well washing, re-exposed and developed into a good picture. The want of thorough washing forms, perhaps, one of the chief causes of failure with collodion emulsion plates.

For these reasons, if for no others, the necessity for well washing each film after coating is absolute, though it is not

ssarily a lengthy operation if properly performed. The course is, when preparing a number of plates, if only half zen, to allow each to set thoroughly, which it will do while her is being coated, and to then lay it in a dish of clean r to soak for a few minutes, or until, by the even flow of water over the surface, the ether and alcohol are seen to been removed. A rinse for a few seconds under a tap, or ouring water from a jug, will then complete the process, if the water be lukewarm so much the better; but, as the e cannot well be *over*-washed, it is generally better to allow plates to soak for some time in two or three changes of r, the last of which may be warm, when all fear of soluble ter remaining may be dismissed.

s hinted above, the emulsion itself may be washed if erred, that is to say, poured out into a dish and allowed to n the same manner (though in a thicker layer) as in coat- the individual plates, and washed, in bulk, to rid it of its ble salts, after which it is dried and redissolved in ether alcohol. This method, however, involves greater care in preparation of the emulsion, as well as in the choice of erials, especially the pyroxyline, and the washing must be h more protracted and thorough owing to the greater mass the consequent slower diffusion of the crystalline matter. drying, too, is a delicate and troublesome operation with- special facilities, and, finally, a double quantity of solvents be used, as the first lot are wasted in evaporation. Still, the efit of the extra trouble will be appreciated in the finished lsion, which requires only to be poured on to the plate allowed to dry spontaneously.

'urning to the formula for the emulsion, we may pause for a nent to consider whether it is worth while relying upon a of chloride of silver alone. That such a film is practicable eyond doubt, though, as the result of his experiments ards of a dozen years ago, the late Mr. H. B. Berkeley came he conclusion that nothing was to be gained by substituting ride for bromide, but rather the reverse. His attention turned, however, more to negative work, and he found that this purpose chloride plates were slow, and with pyro elopment gave unsatisfactory images. For transparency k of the class for which chloride plates are suitable, how- , the question of exposure is of less importance, while the nensely superior facilities we possess at the present day in way of developers place pure chloride plates in an entirely rent position as compared with the period we allude to.

t the same time it must not be denied that chloride of r alone is essentially a slow medium, and, in order to take ntage of its colour-giving power, it must be made slower , that is to say, the exposures must be still further increased, rder to bring the film within the power of the feeble loper it is necessary to use. Bearing these facts in mind, , the reader will elect whether to try the formula we shall or to pass it over.

he pyroxoline is the first consideration, but does not con- te so serious a matter as in those processes where the ost rapidity is sought after. Any good sample, with a tation as suitable "for wet plates," will answer perfectly . Hopkins & Williams supply such a one—or did—at a ing an ounce, or most of the leading photographic dealers stock a suitable article. If, however, the emulsion is to washed," we should recommend, in preference, Hopkins and iams's, or Rouch's, "high-temperature" pyroxyline, which s correspondingly more. The solvents consist of methylated r preferably of s.g. ·720, though s.g. ·730 may be used if the higher grade cannot be obtained, though in London, at any rate no, difficulty need be experienced in that respect. With the ·730 ether it will be necessary to use greater care in mixing, and to use the minimum quantity of water in dissolving the silver. If good, clean, and strong methylated spirit can be obtained, it will answer every purpose; but, as it is becoming increasingly difficult to secure these qualities, it will be better to procure the pure article of s.g. ·805 to ·810, the extra cost of this being nothing in comparison with its superiority over a dubious sample of methylated. On no account, however, should the "spirits of wine" of the pharmaceutical chemist be accepted as pure alcohol, as it contains far too large a proportion of water.

Chloride of ammonium would be the best salt to employ, were it not for its comparative insolubility in alcohol; but it may be combined with the calcium salt, which is itself freely soluble, and increases the solubility of the other. The following may be taken as a standard formula :—

Pyroxyline	25 grains.
Ether s.g. ·720	2½ ounces.
Alcohol s.g. ·810	1½ „
Chloride of ammonium	12½ grains.
Chloride of calcium	12½ „

Dissolve the chlorides, which should be perfectly dry, in the alcohol, in a bottle of suitable dimensoins, then introduce the pyroxyline, pulled into loose tufts, and, when thoroughly wetted, add the ether, and shake until dissolved. In all probability, except in the case of "high-temperature" cotton, the collodion will be quite clear; but, if not, it does not matter at this stage, as the emulsion can be filtered after sensitising with less risk of upsetting the combining qualities of the chloride and silver used.

To sensitise, weigh out seventy-two grains of nitrate of silver and dissolve it, in a test tube or small glass flask, in half a drachm of water. It will be necessary to use heat for this purpose, and the safest plan for one inexperienced will be to immerse the tube or flask in a vessel of boiling water, agitating it gently until the crystals are dissolved. Have ready in a lipped measure glass one ounce of alcohol, and, when the silver is dissolved, add about half a drachm of alcohol and reimmerse in the boiling water until thoroughly mixed and warmed; then go on adding successive small quantities until half an ounce has been used. This is to prevent the precipitation of the silver by the too sudden chill that would occur if the whole were added at once.

Now pour the alcoholic solution of silver a little at a time into the chlorised collodion, shaking vigorously after each addition, and after the whole has been added wash out the tube or flask with the remaining half-ounce of alcohol, immerse it for a minute in the hot-water vessel and then add the washings to the emulsion, which will now be made up to five ounces in volume. The sensitising may safely be performed in a room lighted with ordinary lamp or gas, though it is not necessary to expose the emulsion too long or too close to the light. Examined between the eye and the light, the emulsion will now be little more than opalescent and almost transparent, exhibiting only a slight milkiness when viewed in bulk, and if a few drops be poured upon glass it will scarcely show a trace of visible silver. In this state it must be put away in the dark to ripen for at least twenty-four hours, at the end of which period it will be ready for use though it still gives an extremely thin film, scarcely visible when dry.

The plates are thoroughly cleansed by washing, and are finally polished with powdered talc, and, after dusting, are coated with the emulsion and washed as already described, after which they are reared up on clean blotting-paper in a cupboard or box protected from light or dust, to dry. The films, it must be remembered, whether wet or dry, are exquisitely tender, and will not bear the slightest touch; therefore greater care must be taken of them than gelatine plates. When dry they should be stored in grooved boxes, or have strips of cardboard placed between their edges.

The films resulting from this emulsion will be found, as already stated, very slow, though the quality of the image is very fine; they are, in fact, only suitable for contact printing, very good artificial or day light being used. But if a quicker plate be desired, while still retaining the good properties of the chloride, an admixture of bromide may be made. Indeed, it is questionable whether the colour properties of the chloride are not actually better utilised in the mixed film than in the pure state, since the greatly enhanced rapidity renders it possible to employ much weaker or more powerfully restrained developers without unduly prolonging the exposure, as would be the case with plain chloride.

There is a very great deal of latitude with regard to the proportions of bromide and chloride to use, but it may be borne in mind that, as the bromide increases, so does the rapidity, while after a certain point is passed the distinctive characteristics of the chloride are gradually lost. After numerous experiments, we have come to the conclusion that the best combination of conditions is found in an emulsion in which half the silver is converted into chloride and half into bromide, though, of course, these figures may be varied at will, if only the relative combining equivalents of the soluble bromides and chlorides are kept in view. The following is the formula we recommend for the chloro-bromide emulsion:—

Pyroxyline	259 grains.
Ether	2½ ounces.
Alcohol	1½ ,,
Chloride of ammonium	12½ grains.
Bromide of cadmium (crystal)	36 ,,

The items are the same as in the previous formula, with the exception of the substitution of bromide of cadmium for the chloride of calcium. The cadmium salt must be the ordinary crystals, not *anhydrous*; if the latter be used, only thirty grains will be required. The sensitising is performed in the same manner, and with the same quantity of silver as before, and the resulting emulsion will be both denser and "creamier," as well as deeper in colour by transmitted light. The additional sensitiveness does not necessitate any greater care in the matter of light, as collodion emulsions containing excess of haloid are practically insensitive.

The best methods of development will form the subject of a closing article.

In another column we print a letter from Mr. Andrew Pringle, the Honorary Secretary of the Maddox Testimonial Fund Committee. To the appeal therein made we have the greatest pleasure in adding a cordial endorsement, as well as every hope for its success. With such a good cause, and such a committee, we have little doubt that the result of the appeal will be satisfactory to all concerned in it.

Fraudulent voting in connexion with municipal elections is, it seems, not unknown in some of the American cities. There the voters are sometimes in the habit of taking the good old piece of advice to poll early—and often. To expose the tactics of these "repeaters" as they are termed, we see that a certain candidate's friends who ar that their man is to be injured by such tricks, will call in the ai of the camera. They have arranged to have several persons round he places where fraud is expected armed with hand cameras. At ht the photographers will have assistants, with flashlights, to help t n. Electioneering in this country, happily, needs no such form of o- tection from corrupt practices.

The Geological Photographs Committee, appointed by the Bi sh Association in 1889, for the collection, preservation, and syster i registration of photographs of geological interest in the United K g- dom, has recently issued a report from which we gather that s photographs have been received and registered up to the mon of August last. About half the British counties are as yet unre e- sented in the collection; and, as regards the other counties, cons r- able work has yet to be done towards the completion of the sch e. The Secretary of the Committee, Mr. Osmund W. Jeffs, of 12 Qu 's Road, Rock Ferry, Cheshire, asks for lists and details of photogr hs of geological character already in existence; names of societie or persons who may be willing to further the objects of the comm ee in their own district; or particulars of localities, sections, boul s, or other features which it may be desirable to have photographed A circular giving instructions for the taking of geological photogra s, &c., can be had by applying to him.

At the last meeting of the Camera Club we noticed that Mr. E. J. Humphery demonstrated a new method of applying the lig of magnesium burnt in oxygen to photographic purposes. The appar us for taking portraits consists of a glass globe charged with oxyge in which the magnesium wire is ignited, the globe being swung du g exposure. With an exposure of fifty seconds, platinotype prints re made from portrait negatives to another form of the same light. he intensely powerful light resulting from the combustion of magnes m in oxygen has, of course, been well known for a long time, and w re under the impression that its application to photographic purpos is no novelty. On September 30, 1882, Mr. J. Y. McLellan, of Glas w, secured provisional protection for "Improvements in Artificial Li ht Apparatus," the invention having for its object "the . . . applica on in photography of the intense light obtainable by burning magne m in oxygen." Substantially Mr. McLellan's apparatus appears to ve been very similar to that described by Mr. Humphery.

In the *Journal of Analytical and Applied Chemistry* Mr. D B. Bisbee describes an easy way of obtaining ammonia-free water, n- sisting of acidulating the water, before distilling, with sulphuric d. The acid holds all ammonia in the retort, and the first portions of he distillate are thus ammonia-free. The nitrous and nitric acids til over, however; but, if nitrate-free water be treated in the a ve manner, pure water is at once obtained.

The recent eclipse of the moon, so far as observations made in is country were concerned, was only a partial success on account o he frequent passage of dense banks of clouds across the satellite. t- withstanding the difficulties thus created, Mr. Peek, the Edinb gh City Astronomer, secured a series of nine photographs, giving he lunar disc a diameter of four inches up to the time of the begin g of the total phase, while, after the total phase had taken place, se a other photographs were taken. From the first contact with he shadow until the beginning of the total phase it was intende to take, at five-minute intervals, one series of photographs by m n of a camera attached to a thirteen-inch equatorial reflector, a a second series from the end of total phase till the last contact with he earth's shadow; but the weather upset these and other arrangem ts to an almost fatal extent.

A correspondent, Herr E. Bourdon, writing in last w k's Journal, tells us that developers do not keep when mixed bu a count of oxidation taking place. He has constructed a bottle f m

ich a given quantity of developer may be abstracted, and in which nixed developer will keep good for several months. Agreeably to r correspondent's request, we willingly published the description of "invention" (*sic*). From this "description," however, we are aid that his invention has been anticipated several times already.

ON BLISTERS.

may be fairly said blisters we have always with us in a greater or s degree. The reasons assigned for them and the remedies proposed e very much the same from one decade to another. They make eir appearance without any apparent cause, and depart in the same satisfactory manner. All sorts of remedies are tried without effect, d the plague vanishes mysteriously as it comes, just anticipating at last experiment that would be bound to be effectual, leaving us much in the dark as ever.

With the introduction of highly albumenised surfaces came blisters, hich were at first attributed to two causes—the imperfect adhesion the albumen to the paper, and the only partial coagulation of the bumen by the silver bath. These may either be in combination or parate, at any rate they may be set down as the predisposing causes blistering aggravated by various other conditions that may exist at e time they make their appearance, as density of solution, tempera- re, and so forth. Paper used too soon after albumenising will metimes show blisters, that when kept for some time quite loses is tendency, and that without any other treatment whatever.

The surface of the paper before albumenising may be more pellent at one time than another owing to its sizing, rolling, or me reason that only the manufacturers are cognisant of. We uld easily understand if the surface of the paper was very hard d non-absorbent there would be less probability of the albumen lhering closely to it than if it was otherwise. Then, again, some nds of albumen are more adhesive than others, and contain more less fatty matter. The time the albumen is kept and the additions ade to it may all have their effect, prejudicial or otherwise, and er which the photographer has no control; he can only judge by sults, that are sometimes very annoying and disheartening, setting l his remedial attempts at defiance.

There are other causes than these primary ones, yet dependent on em, and these are the density and temperature of solutions in which ints are rapidly placed one after the other. Blisters are rarely ticed until, or after, fixing. Providing the paper has a tendency blister from a partial coagulation of the albumen, a too-warm ning bath will further develop the fault, as will also the preliminary ashing. Note: Keep the temperature low, as warm water will move some of the partially coagulated albumen much more rapidly an cold, and the longer the prints are subjected to its action the eater probability of blisters; it also has a tendency to separate the per from the albumen if imperfectly attached. The difficulty of tting to know the reason of the blistering of any particular sample paper is very great, as it may be only some sheets and not others at are affected, and the experiment may be tried on a perfectly und sheet with misleading results. Mr. Bishop's suggestion of iling water, however effective, would be impracticable with much the ready-sensitised paper on the market, as the size would be dis- lved out, and the prints would be as difficult to handle as if they ere blotting-paper, and most photographers know what wet blot- g-paper is. Some of the ready-sensitised paper is almost un- anageable if only warm water is used, and boiling water with ch would be simply destruction. The best remedy I have tried as suggested by Mr. Richmond, and that is putting the prints, *dry, rectly* out of the printing frames into methylated spirit for a few inutes. Methylated spirit, as a remedy, had been suggested years o, but with this difference. Mr. Richmond puts them into it dry, fore any washing or toning takes place, and this makes all the fference. Formerly the prints were immersed in the spirit after eliminary washing and toning, when the harm was done. It was a od plan, nevertheless, as it restricted the spread of the evil, and, ith only slight tendencies to blister, stopped them. But Mr. chmond's plan went to the root of matters, and acted as a pre- ntive in the best sense of the word. Moreover, it is vastly more onomical, the same spirit being available over and over again till ed up; whereas, when wet prints were put in, the spirit soon be- me so dilute as to be ineffective altogether. It is a plan I by far efer, as, so far as I have tried, it has answered its purpose.

Incidentally I may mention that the reduction in the strength of e fixing bath, in order to stop a blister plague, leads to another uble, the non-fixation of the prints themselves. No matter how long time they remain in it, the silver compounds do not get thoroughly dissolved out, and yellowing of the prints soon begins. Then, again, the gradual reduction of the density of the hypo solution by the addition of water has its inconvenience, by unduly adding to the bulk when the water solutions are retained for precipitation. If Richmond's method is ineffectual, I doubt if any, save getting a different sample of paper, will be of any use. EDWARD DUNMORE.

CONTINENTAL NOTES AND NEWS.

THE Vienna Photographic Society has, at the instance of Professor Luckhardt, decided upon perpetuating the memory of Petzval in two different and distinct ways. One is by the erection of a statue, at a cost of 500 florins, and the other is by procuring the naming of one of the streets of Vienna by his name.

IN a communication to the *Photographische Correspondenz*, Herr E. Valenta claims that experiments relating to photography with lead iodide, described recently in the pages of this JOURNAL, had previously been made by Liesegang, and that as much as forty years ago Schönbein, Roussin, and Schmiedt had shown acted on by light in the moist state gives up its iodine, and passes into the condition of oxide of carbonate.

AN enterprising photographer of Jerusalem-strasse, Berlin, has adopted the following distinctly unpleasant method of pushing his business. He got up a prospectus on the same sort of paper as the official telegrams, and enclosed in an exactly similar envelope, similarly stamped. These he inserted into the letter-boxes, and through the chinks in the doors of various houses, to the great annoyance, we understand, of the recipients.

A CASE has come before the Courts of Berlin in which photography has once more proved itself to be a valuable ally of judicial investigation. A clerk in the employment of a certain banking firm was accused of having put into circulation a bill of exchange without affixing to it the stamp legally required. This he declared before the Court that he had in due course done, but suggested that it had been subsequently removed. The bill in question was handed for examination to Dr. Bein, judicial chemist. On photographically enlarging the part to which it was alleged the stamp had been attached, no trace of adhesive material could be discovered, and Dr. Bein demonstrated the validity of his negative by comparison with papers to which a stamp had been attached only for a moment, and in which traces of the adhesive material were plainly discernible.

THOUGH it is always rash to state that any particular application of photography is really a novelty in the full sense of the word, we think we are, nevertheless, justified in claiming this attribute for a recent invention of an Austrian gentleman who is both a sportsman and amateur photographer—Baron Victor Kalchberg. It consists in arranging a small instantaneous camera of aluminium, and very light on the barrel of an ordinary fowling-piece. The apparatus is designed to have the shutters liberated by the fall of the hammer, and before the explosion of the charge. The Baron's object is, apparently, to obtain on each occasion a record of how much he has missed by, as the camera, being arranged with its axis exactly parallel to the barrel, the object, when hit, should appear exactly in the centre of the field of view. This is all very well, but we venture to think that, if Baron Kalchberg laid "dead on," say, a woodcock or snipe that was crossing, and which then might appear in the middle of his photographic plate, it would be mighty few pellets that he would get into him. The "Sunday sportsman" has for a long time been a very comic personage in Germany, and an excellent subject for the comic papers; but, in his new development with a photographic camera stuck on the end of his gun, he will be too "distinctly precious."

EIKONOGEN which has become green, or even black, may, it is said, be restored to its pristine whiteness by taking a hot solution of sulphite of soda—four parts of the latter to ten of water—to which the eikonogen is added to saturation point. Allow to cool, and agitate the flask so as

to prevent the formation of large crystals. When quite cold, throw the mixture on a filter, when, according to M. A. Buguet, the eikonogen will be perfectly white.

Positive prints in ordinary writing ink may be made, according to a writer in a French contemporary, by the following method. Albumenised paper is sensitised on a six per cent. bath of bichromate of potassium, and, when dry, a print is taken in the frame. The picture is washed and then developed by brushing over it common writing ink, which must be done quickly. After being washed and dried, the picture is said to pass from a violet black to a warm tone by prolonged exposure to the light.

The *Revue de Photographie* publishes a warm appeal on behalf of the Maddox Fund, and offers to subscribe 100 francs towards it. At the same time, the *Revue* acknowledges receipt of 100 francs from Messrs. Lumière, of Lyons. Probably our excellent contemporary will take note of the formation of the foreign Committee, at Southampton, to which we referred last week. *Helios*, which is published at Brussels, also inserts a similar appeal, and expresses its willingness to receive subscriptions. The Editor offers to subscribe twenty francs towards the fund.

The Amsterdam Photographic Exhibition, which was recently opened, seems, according to a correspondent who visited it, to have been "run" on curious, nay, novel lines. The pictures arrived in greater numbers than the officials evidently expected, for there were so many of them that hanging was the exception rather than the rule, and thus the "most admired disorder" prevailed. In the room where the exhibition was held we are told that a "Bodega" was installed. Messrs. F. P. Cembrano and W. Clement Williams are among the successful exhibitors from this country.

According to *El Provenzal*, of Marsella, a photographer, by name Mr. Henry, has invented an apparatus for taking submarine photographs. The "vasty deep" is illuminated by an electric lamp, and the exposure of the plate is effected by automatic means. We are unable, without considerably more detailed particulars of the invention, to discuss its practicability. Submarine photography, however, is no novelty. If we remember aright, Mr. E. G. Carey, one of the engineering staff of the Forth Bridge, made some attempts in this direction on the foundations of that structure, which were not altogether void of results.

At the Imperial School of Photography in Vienna, which received such eulogistic notice from Mr. Leon Warnerke the other night at the meeting of the Photographic Society of Great Britain, a series of trials of the newest reducing agent, para-amidophenol, have been made. It was found that this substance fully justified all that Messrs. Lumière had claimed for it. One result of these experiments has been to induce a firm of manufacturing chemists to turn its attention to the commercial production of para-amidophenol, so that, in all probability, it will soon be placed within common reach. At present it costs, we believe, something like threepence a gramme—roughly, between seven and eight shillings an ounce.

M. G. Mareschal in the *Photo Gazette* describes M. Enjalbert's automatic photographic machine in a simple manner, which, especially with the aid of the drawing given, could be understood without any violent intellectual effort on the part of the reader. M. Enjalbert has been experimenting on this subject for over ten years, and had one of the machines in the Paris Exhibition, but the authorities would not let it be worked. The ferrotype positive process, which is employed, enables advantage of the magnetic properties of iron to be taken—indeed, it is by electro-magnetism that the plates are coated, sensitised, exposed, developed, washed, and fixed. There is to be a company formed to exploit this undoubtedly ingenious machine, specimens of which are actually at work in several parts of Paris. We are sorry to hear it—for the Company's sake!

The *Revue* mentions a curious case of the reversal of the image on paper. A Dr. B., of Neuchâtel, left in his dark room for several days a printing frame containing a negative in contact with a piece of sensitive paper. Upon his return, he was surprised to find that the paper had received a negative impression. The writer in the *Revue* says that the picture was sent to him, and that, upon being passed through a combined toning and fixing bath, only a feeble positive impression remained. He throws doubt upon the dark room having been absolutely deprived of actinic light, and then proceeds to ask how the negative image could have been formed. He prefers to suppose that the *cliché* was incompletely washed after fixation.

He argues that the molecules of silver on the negative form so many centres of attraction for hyposulphite of soda or silver, so that a half-washed negative has much more hypo attached to the opaque parts than to the transparent parts. Such a plate, dried and placed in contact with sensitive paper, naturally prints off a negative image in the absence of light, as the decomposition of the silver chloride on the paper would be proportional to the quantity of hyposulphite in contact with it, the opaque parts decomposing more than the transparent. If, in addition to this purely chemical action, a feeble light be allowed to gain access to the negative, a weak, positive impression would also be obtained which would remain after fixation. It is easy to conceive how the negative picture would disappear in the fixing, since, being probably formed of silver hyposulphite, it is simply dissolved off by hyposulphite of soda, leaving behind the salt reduced by light to form the faint positive.

DEVELOPMENT.

[A Communication to the China Camera Club.]

It is with some diffidence that I venture to address you upon such a time-worn subject as developing, particularly since I have no new and complex mixture to recommend to you as the Hitchcock developer. The subject was first suggested by Mr. Emens; and, since it is one to which I have given some particular attention, I have thought a few words concerning the specific action of the developer constituents might interest those of you who are not chemists.

I shall speak only of alkaline developers for gelatino-bromide plates and, while I shall strictly refrain from making comparisons between the various developers in use, it is well to explain how such comparisons can be made in practice. For this purpose I prefer to expose a plate in the camera upon any subject having a considerable gradation in light vertically, but of one general character horizontally—one in which there is shadow, and the foliage and sky are good. The plate is then cut vertically into two or more strips, and these are developed in the solutions to be compared. We thus have a practically uniform exposure over the plate, and the results are due to the development alone.

It was in this way that I found, in the early days of eikonogen, that this developing agent would give all the delicate gradations of pyrogallol with a smaller proportion of alkali; and more extended and varied experience has fully confirmed that conclusion. The fact is of importance here in Shanghai, where in warm weather the gelatine is prone to soften even when the solution is weak in alkali.

The alkaline developer consists essentially of three active agents:—

First.—The reducer—pyrogallol, eikonogen, hydroquinone, &c.

Second.—The alkali—sodium carbonate, ammonia, &c.

Third.—The preserver—sodium sulphite.

The function of the first is to reduce or decompose the silver compound in the gelatine film producing metallic silver, which then appears under the microscope in the form of minute opaque particles. But this decomposition only takes place when the alkali is present; and so nicely balanced are the chemical forces here involved, that the reduction only takes place when the proportion of alkali exceeds a certain limit. A gelatine plate, which has not been exposed to actinic light, placed in a solution of alkali and pyrogallol, remains white until the proportion to the former is sufficient to affect decomposition of the silver compound, when the plate blackens all over. This is "chemical fog." When a plate is exposed to light and placed in a weaker developer, it also turns black all over. Such a plate is said to be "light-struck." The light has therefore produced a change in the silver compound of the film, which renders it more easily reduced by the developer. It is obvious, therefore, that by exposing a plate in the camera we can develop a picture in which the lighted parts become black, the deepest shadows remain white, and intermediate gradations of light are more or less correctly reproduced. This

egative." With this knowledge we are in a position to establish, mentally, the proper proportions of the ingredients of a developer.

first we have to consider the exposure of the plate in the camera, e composition of the developer must be changed to correspond with ghting of the plate. This being true, the expression we so often "a properly exposed plate," is only correct as regards a developer particular composition. For it is an unquestionable fact that uration of the exposure can be varied within very wide limits—om one or two seconds to ten or twelve, and equally good negatives ced with different developers.

this result can only be obtained with great care and skill, and it us for us to so adjust the time of exposure and the composition of veloper that good pictures are obtained without changes in either, ver the character of the subjects may be. In other words, What be the properties and composition of what we may designate the il developer?

s question brings us to a more careful consideration of the functions h of the constituents of the developer. The nature of the change ht about by light has long been a subject of discussion among sts. My own experiments, published in two articles in the *American ical Journal*, have demonstrated the fact, which has been disputed century, that light reduces silver chloride, producing free chlorine ietallic silver. This fact has, no doubt, an important bearing upon ubject before us, but much delicate work requires yet to be done a satisfactory explanation of photographic operations can be given. g these up in the same order as before, we may, for convenience, yrogallol as the type of all the reducing agents used in alkaline pers. This substance reduces the silver compound in the film ver the latter has been exposed to light as already described. But xtent of this reduction, in other words the density or colour of the here the reduction takes place, depends upon the intensity of the action, and upon the proportion of pyrogallol in the developer. a solution strong in pyrogallol gives a strong and dense reduction. k solution gives a feeble and thin film. Consequently, if we have a t which is full of gradations from absolute black to strong, brilliant the developer should have such a proportion of pyrogallol as will ill density to the white, perfectly clear blacks, and the intermediate as true to nature as possible. If we find, as development proceeds, he high lights are not developing black enough, we correct this fault ling more pyrogallol. If they develop too strong, if the contrasts of nd shadow are exaggerated, we reduce the proportion of pyrogallol. ich for the function of the reducing agent in the developer—it con-lensity.

t, as regards the alkali. The alkali starts the action of the reducer ontrols the progress of the reduction. It is therefore a natural quence that the stronger the alkali the more energetic the action e. It also follows that, if a plate be insufficiently exposed for an ry developer, it can be fully developed by one containing more

The only limit to the proportion of alkali is the resistance of the f gelatine. Gelatine softens when treated with a strong alkaline n; but, if we could make sensitive films with some substance which s would not affect, the necessary time of exposure could be greatly d. The limit would then depend upon the stability of the silver und itself. We therefore conclude that a normal developer should n such a proportion of alkali as will bring out the lights and ws of a picture in their true relative intensity. For an under-d plate use more alkali; for over-exposed, less.

s far all is clear enough, and, were it not for a very remarkable, and unexplained, action of light upon sensitive silver compounds, the s of development would always be a very simple operation. This ntly erratic action of light is a reversal of the primary effect which ught about by continued exposure. If, for example, it requires seconds to produce a good negative, an exposure of somewhat longer on—perhaps of ten seconds—will yield a positive picture. A still exposure causes a second reversal, and we get a negative; after nother positive. A practical demonstration of these effects is by ans easy, because we do not know, except from numerous trials, ng to make the successive exposures. I have seen the first reversal l times on plates brought to me by others, but they have always ccidental, and a source of great astonishment to those who made

The same result can also be produced by a momentary exposure plate to diffused daylight after proper exposure in the camera.

', as to the bearing of all this upon development. It is obvious eversal by over-exposure involves a reduction of density in those of a negative which should be nearly opaque, since in the reversal must become the thin or transparent parts. We observe this effect incipient stage very frequently in our negatives which have thin skies. Thin skies are the result of over-exposure of those parts of the negative. They cannot be avoided when there are deep shadows in the subject. Only when exposures are very quick do we get clouds in our pictures, because the sky and cloud-light is so very strong that all gradation of light is lost on the plate. If we expose too lon upon the subject itself, the same reversing effect begins, and, while th high lights grow thin by over-exposure (reversal), the shadows grow stronger and stronger, as the weak light acts for a longer time. Thus our difficulties multiply, for it is impossible to give always a correct exposure, and, even if we could do so, there are often such strong contrasts in our subjects that before the shadows are well exposed the high lights tend towards reversal. The negative will therefore be flat and thin. This effect must be controlled in the development, and with certain limits this is possible. We have seen that pyro controls density, and alkali the energy of the action. Now, over-exposure for a strongly alkaline developer may be under-exposure for a very weak one. Therefore, knowing that the plate is over-exposed, use a developer weak in alkali, that it may act slowly, and use an extra proportion of pyrogallol to give increased density. Under-exposure is treated in the opposite manner. In this the contrasts are too strong. The high lights are usually exposed very well. They develop black and opaque. They should therefore be brought out with weak pyrogallol. But the shadows do not come out well, therefore use stronger alkali. We observe, therefore, that the special efficacy of a developer, whether for common work or for particular purposes, depends upon both the absolute and the relative proportions of its two principal constituents. If, now, you ask me to give a formula for the most perfect developer for amateurs, I would say that it is not possible to choose between many in use.

There is another compound of great value in development; but, since it is not an essential constituent of the developer, we will dismiss it with a few words. I refer to bromide. The action of potassium, sodium, or ammonium bromide is quite the same. The bromide restrains the action of the developer. If we use a bromide, we must also use more alkali than would be necessary without it. To a great extent one may avoid the use of bromide by reducing the alkalinity of the developer. But the chemical action of bromide is too complex to permit of discussion at this time.

We now come to the third-mentioned constituent, the sulphite of soda. The influence of sulphite upon the process of development may be neglected in this discussion. It is used primarily as a preservative of the solutions. An alkaline solution of pyrogallol rapidly absorbs oxygen from the air, and becomes dark red. When mixed with a due proportion of sulphite, this change is prevented or retarded. By the use of an excessive quantity of sulphite, developers can be made to keep for a long time. This is the secret of preparing the solutions which are sold in the shops; they contain very much sulphite. The question then arises, How much sulphite should be used? I would reply, Just as little as possible. I have experimented some upon the point, and I find that a proportion of one part of crystallised sodium carbonate to one and two-third parts of sulphite (in crystals) will keep the solution in good condition during prolonged development, and prevent yellow staining of the film.

But I never keep a pyrogallol developer mixed, not even a solution of pyrogallol. The proportion of sulphite recommended will not preserve the colour indefinitely in warm weather. My stock solution consists of sodium carbonate and sulphite dissolved in water, and when required for use I weigh out the necessary quantity of pyrogallol and add it to the solution. It dissolves instantly, and thus the strength of my developer in pyro is always known. There is no deterioration and loss of pyrogallol by keeping. For amateurs this plan possesses great advantages. Not only is there economy to recommend it, but the composition of the developer is always under control.

I believe I was the first to recommend a strong solution of sodium bisulphite as a preservative for the developer. A saturated solution of sodium carbonate in water is first made. Through this a current of sulphurous acid gas is passed until no more is absorbed. The solution thus prepared is preserved in small (one or two-ounce) glass-stoppered bottles. About one dram of such a solution added to ten ounces of developer (if my memory serves me right) will preserve the colour perfectly during development.

R. Hitchcock.

—*Anthony's Photographic Bulletin.*

PROPOSED TESTIMONIAL TO DR. R. L. MADDOX.

We have received the following letter in reference to the above:—

Cromwell House, Bexley Heath, Kent,
November, 1891.

Dear Sir,—The discovery of the gelatino-bromide process has, beyond doubt, conferred benefits upon the art-science of photography which it is

difficult to over-estimate, and has been largely instrumental in helping forward every department of scientific progress during the last few years. The amateur and professional photographer, the manufacturer, the man of science—indeed, every individual class in the community—has unquestionably gained, directly or indirectly, by this important discovery, which every photographer knows is due to the experiments of Dr. R. L. Maddox, originally published nearly twenty-one years ago.

But the services of Dr. Maddox to science have not been confined to the province of photography, for in the microscopical world he has also made his mark, being, in fact, an Honorary Fellow of the Royal Microscopical Society—no small honour. Whatever Dr. Maddox has done for science has always been without hope of recompense, and without attempt to turn his discoveries to pecuniary profit; he has given all freely and gratuitously. He has now attained a ripe old age, and has for many years been a martyr to a most painful disease. Further, much of what was left for his declining years was made away with by an unscrupulous trustee, and now our benefactor finds himself in need of comforts that might soothe his later years. A proposal has been made to celebrate the coming-of-age of the gelatine process by some acknowledgment to its originator, and the idea has been welcomed by many as a means of testifying to Dr. Maddox our gratitude to him for his free and valuable gift to the world.

It is hoped that the result of this appeal will be worthy of the services rendered by Dr. Maddox, and will be at once a credit to us as photographers, and a real boon to the recipient. Already a firm has come forward in a very handsome manner, and other offers of help have been made, and there is no doubt that this example will be followed by many who have reaped the benefit of Dr. Maddox's ability and generosity.

A strong and earnest Committee has been formed for the purpose of conducting the business of the Testimonial, and their names are given below.

Subscriptions will be received by Mr. Francis Cobb, Riverdale, Twickenham, London, S.W., and cheques should be crossed '& Co., a/c of The Maddox Testimonial Fund.

I am yours, &c.,

ANDREW PRINGLE, *Hon. Secretary.*

MADDOX TESTIMONIAL FUND COMMITTEE.

JAMES GLAISHER, F.R.S. (President of the Photographic Society of Great Britain), *Chairman.*

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A. HADDON.	DR. A. B. MERCER (New York.)	SIR H. TRUEMAN WOOD.
		F. YORK.

Treasurer—FRANCIS COBB. | *Hon. Secretary*—ANDREW PRINGLE.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,377.—"Improvements in or Connected with Photographic Cameras." P. H. CROUCH.—*Dated November* 9, 1891.

No. 19,442.—"A Means of Steadying Photographic Cameras in Space during Exposure." W. E. CROWTHER.—*Dated November* 10, 1891.

No. 19,471.—"Apparatus for Developing, Fixing, and Washing Photographs." J. WAGNER and G. BREDIG.—*Dated November* 10, 1891.

No. 19,565.—"An Improved Method of Producing Coloured Photographic Pictures." J. BURGESS.—*Dated November* 11, 1891.

No. 19,574.—"Improvements in Apparatus for Use in Connexion with Flashlight Photography." F. W. BROADHEAD.—*Dated November* 11, 1891.

No. 19,601.—"Improvements in Hand or Other Cameras." W. BEYER.—*Dated November* 12, 1891.

No. 19,623.—"Improvements in or Relating to Dark Slides or Double Backs for Photographic Cameras." E. H. P. HUMPHREYS.—*Dated November* 12, 1891.

No. 19,706.—"Improvements in Apparatus for Washing Photographic Prints and Negatives." H. HOLCROFT.—*Dated November* 13, 1891.

No. 19,767.—"An Improved Photographic Vignetting Attachment." Communicated by A. J. Lamborn, W. Nuneviller, and W. Knebber, jun. Complete specification. W. W. HORN.—*Dated November* 14, 1821.

SPECIFICATIONS PUBLISHED.

1890.

No. 16,620.—"Photographic Apparatus." WILLIAMS & EDWARDS.—Price 8*d.*

No. 18,882.—"Producing Optical Illusions." Communicated by Rautmann. HEDICKE.—Price 8*d.*

No. 20,392.—"Optical Illusions." MORGENSTERN.—Price 6*d.*

No. 20,774.—"Photographic Camera Dark Slides." PITT & HUDSON.—Price 8*d.*

No. 21,059.—"Photographic Negatives." Communicated by Jordan. REDFERN.—Price 6*d.*

1891.

No. 13,799.—"Developing Photographic Pictures." OLVIK & MORKEN.—Price 6*d.*

No. 16,094.—"Producing Photographic Pictures." MATHIEU.—Price 4*d.*

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC APPARATUS.

No. 16,620. SAMUEL DICKINSON WILLIAMS, Moorlinch House, Clytha-park, Newport, Monmouth, and WILLIAM ALBERT EDWARDS, 3, Sydenham-terrace, Weston-super-Mare, Somersetshire.—*October* 17, 1891.

HITHERTO, in photographic cameras, it has required several movements to accomplish the processes necessary for taking an instantaneous view or otherwise, and as the ultimate condition, with its obvious advantages in photography, and particularly in the description of work done by hand cameras of the tourist or detective class, would appear to be that the one general movement necessary for setting the shutter should also suffice for the purpose of simultaneously putting a plate into position for exposure, or *vice versâ*, on object of our present invention therefore is to provide a means whereby this condition may be conveniently and economically fulfilled. We consequently in the first place, and according to one plan of our invention, claim as novel the application to a camera of mechanism for automatically doing by one general movement, when operated, the following things:—

1st. The setting of the shutter preparatory to opening the lens.

2nd. The putting of the plate into position for exposure.

3rd. The proper disposal of any plate which may have been previously exposed.

Or our invention so arranges the camera as to enable the several operations to be performed independently of the shutter mechanism. To carry out the foregoing, and according to the first plan of our invention, we construct the camera with the plates in holders or sheaths, which latter we construct with side slips forming hooks or guides at the top corners bent outwards, which act as supports and guides as hereinafter described, and pivot holes at the bottom ones. A mechanical slide (operated by a draw-pin projecting from the camera frame) is furnished with pivots, which run into the pivot holes of the back plate-holder on the rod being pulled out, tilting the whole of the plates (and pulling sheath twelve from its temporary support), and thus making room for it to be brought forward underneath the remainder. When the plate is drawn sufficiently forward to be quite clear of the remainder, a stop on the slide operates a lifter hinged at the bottom of the camera; the said lifter raises the plate about half-way towards an upright position, when it is held by springs. The rod is then out to its full extent. On being pushed in, the hooks or guides on the holder slide up the sloping channel until it is nearly upright, when the pivots are drawn from their holes, leaving the plate free to be finally pushed home by the slopes on the slide on its being driven back. A quarter-turn of a button secures the rod by engaging in a stop, making everything firm for exposing, this operation being repeated until all the plates are exposed.

We also provide a new universal view finder, which ensures the object being in proper position on the plate at the moment of exposure. In cameras hitherto it has been necessary to have two separate finders—one for horizontal views, and the other for vertical views. Instead of this, we place, essentially at one top front corner of the camera, a tube containing at one end a lens and at the other end a mirror, with a ground-glass screen each at the proper relative angles, the whole working in a second tube or holder in order to allow of the first being rotated upon its axis to the extent required; or the lens may be a fixture, and the mirror and screen movable. It is obvious there are different ways of carrying out our idea in this respect, which essentially is the rotation of the mirror.

AN IMPROVED APPARATUS FOR THE DEVELOPMENT OF PHOTOGRAPHIC PICTURES.

No. 13,799. OLE PEDERSEN OLVIK and HANS OLSEN MORKEN, both of Stördalan, Norway.—*October* 24, 1891.

OUR invention relates to apparatus comprising a bath and dark tent for the development of photographs, whereby the sensitive plate is not exposed to any injurious light, nor to the action of extraneous substances, as the plate is not touched during the development.

The nature of the invention will be better ascertained from the claims, which are:—1. A developing bath, consisting of a frame, with a fixed transparent coloured plate in the bottom, and a similar sliding plate in the top, both protected by sliding covers, a door with indiarubber covering held in a close position by a fastening, and a funnel, and outlet-tube, substantially as and for the purpose set forth. 2. The use in combination with the developing bath of an inspecting device consisting of a frame, case, tube, and shutter, with crank handle, substantially as and for the purpose set forth. 3. The use in combination with a developing bath of a dark tent, constructed on the same principle as an umbrella, with ribs and runner notches, held in position by stop spring upon the stick, having a handle and a ferrule, the tent being further provided with mufflers, an opening, a transparent plate, a translucent plate, and a cloth substantially as and for the purpose set forth.

A NEW OR IMPROVED PROCESS FOR PRODUCING PHOTOGRAPHIC PICTURES HAVING COLOURS RESEMBLING THOSE OF THE OBJECTS FROM WHICH THEY ARE OBTAINED.

No. 16,094. VICTOR MATHIEU, 155, Fenchurch-street, London, Middlesex.—*October* 24, 1891.

MY present invention has for its object a new or improved process, by which pictures or prints are obtained from properly prepared photographic negatives such pictures being coloured so as to resemble the person, landscape, or object from which the negative was in the first place obtained.

In order to put my invention in operation, I take in the usual way a photographic negative of the object, pictures of which are to be reproduced, such

negative being obtained preferably upon a glass or other plate, or surface so sensitised as to be as nearly as possible orthochromatic, that is to say, to produce in the resulting prints shades of tone corresponding with the different apparent degrees of light of the object.

After this negative has been "retouched," in the usual well-known way, where necessary, a print is taken from it, in the ordinary way, upon a suitable paper, preferably one so prepared that the gradations of shade in the negative are accurately reproduced in the print. The print is passed through the usual processes of toning and fixing, the former being carried on until the print assumes a black colour, as nearly as possible resembling that of a good engraving. It is then mounted, whilst still wet, upon a frame by which its subsequent treatment is facilitated, and it is allowed to dry. When thoroughly dry the back of the print is treated with alcohol, applied a sufficient number of times in succession, in order to coagulate the albumen, and upon it is then poured a mixture of alcohol and Venice turpentine, the relative proportions of which in the mixture may be varied more or less, but which preferably consists of equal parts of each.

The print is then subjected to a strong heat in a hot-air oven, the air being allowed access to all parts of it alike.

When dry, another coating of the mixture of alcohol and Venice turpentine is applied to the print, and it is again dried, and so on in succession until a sufficient number of coats have been applied, which may vary more or less as may be found advisable, a greater or less number being used, the print being subjected to the baking process between each coat or layer, but at a somewhat diminished temperature, until, when dry, the print is found to be crisp and absolutely transparent, but without any tendency to crack or break.

It is then preferably coated with a varnish of isinglass, upon which the colours are then applied.

For this purpose oil colours of suitable character and consistency are used, applied in the ordinary way with a brush, and it is not found necessary to follow with the colours the exact details or outlines of the different-coloured parts, as it is sufficient if the colours are confined roughly within the required limits.

It is not necessary to use a large number of shades of colour, unless in pictures of a complicated nature and of a very great variety of shades, the varying depths of tone in the photographic print themselves modifying the effect of the colours seen through them. Thus, for example, the same colour—vermilion for instance—would be available to reproduce the brilliant colour of a flower, and the subdued tone of a dark red curtain, its brightness being modified in the latter case by the density and character of the photographic picture through which it is seen.

Whilst, therefore, the effect produced by the colours is perfect, the process of applying them is very simple and cheap, and requires little or no skilled or artistic labour.

After the colours have been applied as described, the print may be retouched, if required, in the usual way, upon its face, preferably with alcoholic solutions of dyes or colours, and after a further application of heat, by which the permanency of the colours is ensured, it can be mounted in any suitable way, and may, if necessary, be protected by one or more coats of any suitable varnish.

I do not confine myself to the precise details of the process, which may be varied more or less according to the circumstances and conditions in which it is used. For instance, the proportions of the materials forming the coating by which the prints are rendered transparent as described, as well as the number of times that they are coated, may be varied more or less, and the temperature at which the prints are dried as described may also be varied, nor do I claim generally the application of colours to the back of a more or less transparent photographic print; but,

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The process for producing coloured photographic pictures, consisting in first treating with alcohol photographic prints prepared as described, then applying to their back a sufficient number of coats of a mixture of alcohol and Venice turpentine, the prints being baked in a stove between each such application, and, when dry, applying oil colours at the back, and subsequently drying them, all substantially as described. 2. In the preparation of coloured photographic pictures, the method of baking such pictures in a suitable oven, after each application of the mixture by which they are rendered transparent, substantially as described. 3. In the preparation of coloured photographic pictures, the application to the prints rendered transparent as described of a coat of isinglass varnish at the back, to receive the colours, substantially as described.

Improvements in and relating to Photographic Camera Dark Slides.

No. 20,774. Joseph Pitt, 12, Belchers-lane, Bordesley-green, near Birmingham, and William Hudson, 118, Gooch-street Birmingham.—*October* 24, 1891.

Our invention consists of a shallow box, with flange running round its outer edge, and can be made in wood, metal, or *papier mâché*, metal preferred. In this box we solder or secure a rim, allowing a margin round it, so as to allow lid (hereafter mentioned) to fall into. This rim is to hold sensitive plate. The lid is now arranged so as to fall into box and over rim and sensitive plate, the lid being hinged on one side of box by means of wire passing through box from side to side, the lid working freely on its hinge; hinge also forming lever outside box, enabling operator to raise lid when dark slide is in position in camera, and so expose sensitive plate, and dispensing with cap on lens. To enable operator to make instantaneous exposures, we fix elastic springs to lever and dark slide. The lid is kept closed by a catch, which can be released at will of operator, thus forming an instantaneous shutter and dark slide combined, and can be attached to any camera.

Improvements in or connected with the Production of Photographic Negatives.

(Communicated by J. M. Jordan, Philadelphia, U.S.A.)

No. 21,059. George Frederick Redfern, 4, South-street, Finsbury, Middlesex.—*October* 24, 1891.

The object of this invention is to effect the permanent marking of names, titles, or other matter upon photographic negatives in a more acceptable manner than usual.

The ordinary plan of marking titles upon photographic negatives is to print the title upon a strip of gelatine or other transparent film, and then to secure this strip upon the face of the negative—a plan which is objectionable, because of its inconvenience and expense, and because of the liability of the strip to become detached and lost.

In carrying out this invention, therefore, I print the title directly upon the face or film side of the negative, the title, of course, appearing in reverse in order that it will read properly upon the print.

For the purpose of printing the title I preferably use rubber type on account of the unyielding character of the surface upon which the impression is made; but these types are formed and set up in a manner the reverse of that adopted in ordinary printing, that is to say, each type has its letter or character facing to the right instead of to the left as in ordinary type, and the type is set up successively from right to left, instead of from left to right as usual, so that a reverse impression upon the negative will be produced.

Any desired matter other than the title may be imprinted upon the negative in the same way.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 23 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 24 ...	Great Britain (Technical).....	50, Great Russell-st., Bloomsbury.
,, 25 ...	Burnley	Bank Chambers, Hargreaves-street.
,, 25 ...	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 25 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26 ...	Burton-on-Trent	The Institute, Union-street.
,, 26 ...	Halifax Photographic Club	Mechanics' Hall.
,, 26 ...	Liverpool Amateur.....	Crescent Chambers, 3, Lord-street.
,, 26 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 26 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 12,—Mr. J. Traill Taylor in the chair.

Mr. A. S. Newman was elected a member of the Association.

On behalf of Messrs. Hurter & Driffield, Mr. Cowan presented the Association with a copy of their work on measuring the rapidity of sensitive preparations, &c.

The subject for the evening was, *Can Halation be avoided by Staining the Film in any way?* and Mr. W. E. Debenham said that he had made some experiments in staining films with saffron and logwood respectively, but in both cases it increased the exposure. The stains were sufficient to prevent halation in cases where it would have occurred but for the stain; but an interior would have had considerable halation. Logwood gave the plate an inky stain.

The Chairman pointed out that the subjects given to halation are those which can stand long exposure. The rapidity of the plate was immaterial.

Mr. Weir Brown had recently been shown some results obtained by dipping lantern plates in ammoniacal erythrosine. The subject was a ruined abbey, looking through one of the windows, and the architecture of the windows was perfect and the distant landscape well rendered, without the least trace of halation.

Mr. A. Haddon suggested that staining the film would tend to produce thin images, as the stain would, of course, prevent light action on the deeper layers of the film. A stain would certainly stop a large proportion of the actinic rays. Could not a thin coloured substratum be employed for the purpose of preventing halation?

Mr. Debenham had not found staining produce thin images, although there might be some tendency that way.

Mr. T. Bolas said ruby glass might be coated with emulsion, but then the negatives would have to be stripped.

The Chairman remarked that Mr. Henderson had recommended the coating of yellow glass.

Mr. Everitt inquired whether a plate in which there was plenty of iodide would not answer?

Mr. Bolas suggested the addition of some neutral salt to the emulsion, such as chromate of lead. Of course, means would have to be found for getting it out of the film after exposure. Red iodide of mercury, again, might do. Any stain would diminish sensitiveness.

The Chairman, at the close of the discussion on the subject for the evening, referred to the system of Blanquart-Evrard of giving certain effects to photographs. Having washed the negative, he delayed fixation, and, masking the plate, exposed it to light, when a decided intensification took place. He had wondered whether it was the result of a catalytic action which produced this density, and had thought of watching the atoms under the microscope by a beam of light, and see, under a high power, how they behaved.

Mr. Debenham inquired if others had noticed that old collodion negatives became more intense by keeping? Whatever the proper gradation may have been, amateurs, years ago, produced intense negatives, and photographers soft ones; and negatives which were all right at the time, and gave good prints, now gave chalky ones.

Mr. F. A. Bridge had had a similar experience.

The Chairman, alluding to Selle's uranium intensifier employed in collodion times, said he had seen in an American journal mention of the fact that a similar process for toning bromide prints was being introduced. Old negatives so intensified became denser, and he would like to know whether bromide prints might not possibly behave in the same way.

Mr. Weir Brown mentioned that the Association's Curator had a uranium-toned print, which would put the point to the test.

Several questions from the box were read out, which, with one exception,

had been answered at previous meetings. The exception was, "Can a larger back lens be fitted to an ordinary portrait lens at small cost for optical lantern use?"

The CHAIRMAN, with the aid of the blackboard, pointed out the advantages which would be gained in using the back lens of a half-plate portrait combination for the purpose.

This concluded the business of the meeting.

CAMERA CLUB.

ON Monday, November 9, Mr. Lyonel Clark gave the second lecture in the course of elementary lessons to members. The subject was *Lenses*.

On Thursday, November 12, Mr. E. J. HUMPHERY read a paper on *Photography by Artificial Light*. Captain Abney occupied the chair. There was a very large attendance of members and visitors, about 120 being present. Mr. Humphery described and gave a demonstration of his new methods of applying the light of magnesium burnt in oxygen to photographic purposes. The demonstration was received with much enthusiasm. The apparatus for taking portraits consists of a glass globe, charged with oxygen, in which the magnesium wire is ignited, the globe being swung during exposure. Platinotype prints were made from two portrait negatives by exposure to another form of the same light, the exposure being only fifty seconds.

During the evening Captain Abney showed a continuous flash-lamp, produced by M. Nadar, of Paris; and the Hon. Secretary handed round a lantern-slide carrier, introduced by Messrs. Perkins & Co., in which, by a simple device, all danger of marking the surface of the slide by the fingers was obviated.

On Monday, November 23, Mr. G. L. Addenbrooke will give a lecture on *Cameras and Tripods*.

On Thursday, November 26, Rev. F. C. Lambert, M.A., will read a paper on *Some Analogous Aspects of Painting, Music, and Poetry*, and will furnish musical and pictorial illustrations.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

A MEETING of the Council was held November 9 at Anderton's Hotel, Fleet-street, London, the President, Mr. H. J. Whitlock, chairman. There was a large meeting of the Council, representatives from the North, Midlands, Yorkshire, Devonshire, London, &c., being present. The appointment of Mr. D. J. O'Neill, of Birmingham, as Secretary, was unanimously confirmed.

Considerable progress was made with the general business of the Association, occupying the Council several hours, and a further meeting was held on November 10. The vexed question of certain firms of "enlargers" supplying private persons entirely outside the pale of professional photography with trade lists and trade prices was carefully considered. These firms for a long time past have been doing the work indiscriminately for the public at the same price charged to the professional photographer. The Council desire to bring this great injustice and unfair dealing to the notice of these firms, with a view to a proper trade list for materials and work being issued for the protection of professional photographers. The Secretary was instructed to inform these firms of this decision. There is a strong determination on the part of members and the profession generally to do business only with those firms who deal fairly with them in this vitally important matter. The Secretary was instructed to convey the thanks of the Council, and promise of support, to several firms who have already issued lists protecting the professional from such unjust dealings.

The first annual meeting of the Association will be held on the second Thursday in February, 1892, at half-past seven p.m., at Anderton's Hotel, Fleet-street, London, at which all professional photographers will be heartily welcomed by the Council.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 17,—Mr. J. Traill Taylor in the chair.

Questions having been asked from the question-box as to the use of Scott's Warm Air Saturator, elicited a variety of opinions as to its usefulness, but without any definite result.

The Chairman brought forward a circular to be issued with reference to the proposed public recognition of the services of Dr. R. L. Maddox, in connexion especially with the discovery of the gelatino-bromide process.

Mr. F. A. BRIDGE then gave a demonstration of the process of bromide printing—defining the process as consisting of exposure, development, and clearing, washing, fixing and washing again. For development he preferred ferrous oxalate to any other developer, his formula being—

No. 1.

Oxalate of potash	2 pounds.
Hot water	3 quarts.
Acetic acid	6 drachms.
Or, Sulphuric acid	2 ,,

No. 2.

Protosulphate of iron	2 pounds.
Hot water	2 quarts.
Sulphuric acid	1 drachm.

With a bromide of potassium solution, one in forty, to be used according to necessity. This formula was stated to be almost identical with that given by the Eastman Company. Formulæ for pyro development and for hydroquinone were also given, but these were not recommended, the ferrous-oxalate process giving more rapidity of work, and producing better tones. Coming back to exposure, which was the keynote of all good printing, the lecturer insisted that the light used should be proportioned to the character of the negative, weak negatives being printed in a weak light, and even then often under ground glass, with in extreme cases opal. For fixing, the best bath was hypo: three ounces to the pint of water. Some had recommended the addition of ammonia, but its value was very doubtful. The great need in fixing was plenty of solution, plenty of time, and then permanency might be looked for, even though the final washing might not be so thorough as usual. Should reduction be found necessary, a good formula was—

Hypo solution	10 ounces,
Water	30 ,,
Red prussiate of potash	1 drachm,

but it must be used with great care, the action being very rapid. A great advantage in bromide printing was the facility with which good prints might be obtained from almost all kinds of negatives, the process allowing of dodging to a large extent. Cloud printing was not difficult, but required especial care in adjustment of masks, and in judging the relative printing value of the subject and cloud negatives respectively. Referring to the question of permanency, some very beautiful large prints were shown which were several years old, and were as beautiful as when first printed. Mr. Bridge then proceeded to expose and develop several prints, mixing the developer, iron one, oxalate six, bromide of potassium a few drops. The exposures were to the gaslight in the room the average time being five seconds, using Eastman's quick paper, which he preferred to slow paper, as giving by far the best result. The developments were in all cases successful, and a few prints were afterwards developed by hydroquinone, to show the difference in time and working. Remarking on the resemblance of bromide and platinum prints, it was shown by comparison that it was almost impossible, by any casual examination, to detect any difference. It was also noticed that length of soaking in water before developing was considered by the lecturer to increase the softness of the prints, and for line subjects, and where great contrast was desired, it was best to use some old developer mixed with the new.

The lecture and demonstration, which combined humour with instruction in Mr. Bridge's usual happy manner, were much appreciated by a largely attended meeting, and at the close elicited a hearty vote of thanks.

A general conversation on the subject ensued, after which Mr. Parfitt showed a gas byepass elbow, for regulating the light of any burner instantly.

A lantern-slide competition was resolved upon, and also a lantern-slide exhibition, to which ladies should be invited.

HOLBORN CAMERA CLUB.

NOVEMBER 13,—Mr. A. J. Golding in the chair.

Mr. T. C. HEPWORTH, F.C.S. (President), gave a lantern demonstration. Nearly one hundred slides were shown. The first showed the difference between slides printed by contact and printed by reducing the same negative. The next showed slides on the various makes of slides, chloride and bromide, home-made and bought, &c. The next were a large number of slides of the Isle of Man, mostly geological, showing rocks, &c. These were followed by the concluding portion of the demonstration, a number of London street scenes. Amongst the latter was one entitled *Caught in the Act*, showing a man standing on the back of a water-cart, pouring water into a large milk-can, whilst standing near was a cow. Mr. Hepworth said it had been said that he had posed the subject, but it was not so. He had come upon it accidentally while out with his hand camera. Mr. Hepworth pointed out the lessons learnt from the slides, showing the weak points of the slides as well as the strong points.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 13.—Technical Meeting.—Mr. Bilton in the chair.

The Secretary exhibited a plate showing the result of improper drying of the emulsion.

Mr. Whitear exhibited two negatives, showing the effect of placing brown paper between the films in packing after exposure.

Mr. Holmes showed some prints on aristotype, celerotype, and the new Ilford paper; and members considered the tones on the latter superior to the others.

Mr. Rogers showed the Graphic hand camera, made by the Stereoscopic Company, and one made by himself on the same lines with improvements.

Mr. Winter showed a new pattern of single dark slide for films, very thin and light; and a focussing screen, to be used in combination with the same.

Mr. Varden showed a hand camera designed and made by himself, with swing back and a novel method of inserting and changing plates; also a new tripod of his own design, specially suited for cyclists.

Mr. Leslie Selby showed some platinum-toned prints on silk.

Mr. Hodges explained Mr. Humphery's new method of printing on platinotype paper by artificial light.

Mr. J. D. England doubted the originality of the idea.

RICHMOND CAMERA CLUB.

NOVEMBER 13,—Mr. Cembrano in the chair.

The discussion on *Halation* was opened by Mr. J. S. TEAPE, of the London and Provincial Photographic Association. After demonstrating that the case of halation formed no exception to the rule that "prevention is better than cure," Mr. Teape proceeded to show the results of various backings for plates with which he had experimented. He first showed a prism coated on one face in sections with (*a*) sienna, with dextrine; (*b*) sienna, with gum; (*c*) caramel, with glycerine; and (*d*) caramel and sienna, with gum; showing that (*a*) and (*b*) had perfect reflecting power, (*c*) and (*d*) scarcely any. The spectroscope showed that caramel intercepts the green rays and all beyond. Mr. Teape then handed round negatives and prints resulting from his experiments with the different backings mentioned, showing conclusively that caramel, with glycerine, was the most effectual, and that caramel and sienna, with gum, was nearly its equal, and, being more quickly dried, more convenient; while sienna, with dextrine, came very well through all but the most severe tests. Mr. Teape concluded his dissertation by giving formulæ for the backings he had used.

Mr. Ramsay showed the results of experiments with Dr. Cornu's formula (essence of cloves, &c.), and with a backing of black paper attached with glycerine; the former being effectual, but the latter of little, if any, use.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

NOVEMBER 13,—Mr. Edward Lovett (President) in the chair.

Mr. W. LOW SARJEANT passed round some lantern transparencies that had been developed by the new developer, "para-amido-phenol-chlor-hydrate," and he had found it splendid to work, beautiful gradations of tone from black to grey, and absolutely clear glass in the sky. Though expensive in the first offset, he thought it quite as economical as pyro, as the developing solution can be used over and over again.

The Autocopyist Company then demonstrated before the members the method of working their line and half-tone process for the production of photographs and diagrams.

At the conclusion the CHAIRMAN said that it was the intention of the Club to illustrate, if possible, their transactions from year to year, and this particular process, by what he had seen demonstrated before them that evening, was one that could be looked upon favourably as perpetuating in their transactions diagrams, &c., to illustrate the papers.

IPSWICH PHOTOGRAPHIC SOCIETY.

NOVEMBER 11.—After preliminary business and election of new members, the HON. SECRETARY read a paper on *Bromide Printing*, which he illustrated by a series of prints from his own negatives; the influence of duration of exposure and variation of developer, as well as the treatment advisable in the case of "dense" or "thin" negatives, were demonstrated by this means. The majority of Mr. Hill's experiments had been made with Eastman's permanent bromide paper and the ferrous-oxalate developer; but some fine prints, developed with eikonogen, were much admired.

Mr. J. Howson, of the Britannia Works Company, has promised to give a demonstration of their new printing-out paper.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 11,—Mr. W. J. Harrison, F.G.S., in the chair.

Mr. JONES gave a lecture on *A Trip to Belgium, Holland, and the Field of Waterloo*, illustrating same with 130 slides from negatives taken by himself. Afterwards a number of slides by Mr. Wilkes were shown.

LEEDS PHOTOGRAPHIC SOCIETY.

NOVEMBER 5.—Mr. W. CLEMENT WILLIAMS (Hon. Secretary of the Halifax Photographic Club) delivered a lecture on *Some Aspects of Marine Photography*. Marine photography, Mr. Williams said, was often looked upon as a sort of happy-go-lucky kind of thing. Everything comes to him who waits, and in this kind of work it was necessary to wait. Day after day he had gone down to the seashore in the hope of bagging a picture or two, only to be disappointed, for in this kind of photography it was absolutely necessary that the sea and sky should be taken at the same time; no fudging or double printing could ever produce a proper combination of sea and sky. In addition to an art knowledge, a ready decision was wanted, for effects must be caught at once or lost perhaps for ever, and the best effects were to be obtained during the autumn months—the clouds were then at their best. Sunset pictures, Mr. Williams said, were difficult to develop, and, indeed, patience was required to develop any kind of marine study. In addition to marine views proper, harbours, quays, the sands, &c., should be carefully looked over for picturesque studies of fisher folk, &c. One of the chief difficulties here was to obtain a natural pose, and to get people to understand that the genuine picturesque costumes of the fishermen and fisherwomen were required. Too often they wanted to rush off, wash themselves, and appear in their best clothes, when, needless to say, all their picturesqueness disappeared. Mr. Williams dealt at length with technical matters necessary for this special kind of work.

NOVEMBER 16.—Lantern exhibition. The pictures shown by the aid of the lantern were contributed by the members of the Society. The views represented places of interest on the east coast and various parts of Yorkshire, the English Lake District, Herefordshire, Buckinghamshire, Scotland, Wales, and the Continent, &c. As the views were exhibited, Dr. Jacob explained the features of interest. The Leeds Private Orchestral Society, under Mr. Stainland Hall, performed selections of music in the course of the evening. Mr. A. Pearson and the Hon. Secretary of the Society, Mr. S. A. Warburton, had charge of the lantern.

This Society is in a great measure responsible for the arrangements now being made for the International Photographic Exhibition, which is to be held in the Municipal Art Gallery from December 7 to January 9, and which will, it is believed, be one of the largest and most interesting in the provinces.

MANCHESTER PHOTOGRAPHIC SOCIETY.

NOVEMBER 12,—Mr. Abel Haywood, jun., President, in the chair.

Five new members were elected, and the PRESIDENT then delivered the following address:—

PHOTOGRAPHIC GOSSIP: A SURVEY OF SIXTEEN YEARS' ADVERTISEMENTS IN THE PHOTOGRAPHIC YEAR BOOKS, 1864 TO 1880.

Some, perhaps, of my hearers will agree with me that the advertisement pages in the photographic annuals are pretty nearly as interesting and instructive as the pages devoted to literary intelligence. The displayed pages of the advertisement-sheets possess one signal advantage over the latter, that of being readily taken in at a glance, so that, by turning over those for any year ever so cursorily, one may see pretty plainly to what stage the art has advanced, and old hands, like some of us are here, will find our memories of the past revived more by the old and ever familiar announcements than by the communications of correspondents, most of whom, and whose communications too, are quite forgotten. Many of the advertisers in the books covering the sixteen years we are going to glance at must live in the history of photography, and, when the perfect history comes to be written, the Macaulay who indites it will certainly not neglect the consideration of mere advertisements, any more than his great namesake disregarded neglected pamphlets, ballads, and handbills.

The Photographic Society of Great Britain commenced its existence under the title of The Photographic Society of London in 1853; our own society, the second on the list of the photographic societies of the world, began in 1855. THE BRITISH JOURNAL OF PHOTOGRAPHY, first as a monthly, was commenced in Liverpool in 1854, becoming a weekly paper in 1859. The *Photographic News* was launched in 1858, and it was in 1864, or nine years after the establishment of the Manchester Society, that the Year Books were commenced.

1864 is the year of the publication of the collodio-bromide process by Messrs. Sayce & Bolton, of Liverpool; but, though several dry-plate processes had been published, and were to some extent used, there is no sign in the advertisements of the earliest Annuals of anything more advanced than wet collodion being popular. Thus, in the small number of advertisements the almanacs of this time contained, the chemicals advertised are such as collodions, black varnish, cures for disordered baths; no such substance as "pyro" seems to be mentioned (though in one of the handbooks under the charge of the librarian it will be found advertised at 2*s.* 6*d.* per drachm). Hypo figures at 5*d.* per pound in one announcement. Among the makers of apparatus, many still familiar names appear—in 1866 Dallmeyer advertises "Rectilinear" lenses; Ross has "Actinic Doublet" lenses (the title "Rapid Rectilinear" not having yet been invented); and Grubb & Voigtlander contribute. Among camera makers there are Hare, Meagher (who advertises a Kinnear camera), Fallowfield, Jabez Hughes, Sawtry, Newton, of Liverpool; and our townsman, Mr. Billcliff, advertises a frame for opal printing. F. J. Cox has a "Plain Mahogany Camera," $4\frac{1}{4} \times 3\frac{1}{4}$, for 14*s.* only, and there is another advertisement from Manchester, by H. Petschler, with (Manchester Photographic Company) in brackets. Several of our older members will remember well this active and enthusiastic man. Mawson & Swan and Thomas seem to be the principal makers of collodion. Within the next two years Rouch advertises a picture of his premises, evidently the same building his firm now occupies, and Blanchard & Shew's advertisements appear. Among the cameras every one advertises "binocular" ones, for we are in a time when the stereoscope was the most popular occupant of every drawing-room table. We have Squire's lenses, which, I think, are not known now, and there is a page advertisement which appeared for many subsequent years for the Amateur Photographic Association, which had for its objects "the printing and interchange of the produetions of amateur photographers, in order that many interesting and valuable negatives still buried in the plate-boxes of amateurs may be brought to before the notice and placed within the reach of the public." Of this Association the Prince of Wales was the president, and an archbishop, a marquis, a viscount, and three earls were vice-presidents. The subscription was a guinea, none but amateurs were to be members, but persons not photographers were permitted to subscribe. At this time enlargements by electric light are advertised. "Developing Tents" and "Field Cameras" are in abundance.

In 1866 Mawson & Swan advertise carbon printing, and announce that a work on Swan's Carbon Process, by W. Simpson, will be shortly published. In 1867 the Autotype Company appear as "sole proprietors of Swan's patent for printing in carbon," and they grant licences to use the patent process in consideration of an annual payment of 10*l.* The same year the Photographic Relief Company (Limited), Woodbury's patent, announce that, "the work being conducted under the personal superintendence of the inventor, may be thoroughly relied upon;" Pumphrey, of Birmingham, advertises 3000 slides; and Negretti & Zambra have a "new frame for printing stereoscopic transparencies."

The year 1869 was an important one; the dry plate was making way. The Liverpool Dry Plate Company advertise their plates, commencing with $4\frac{1}{4} \times 3\frac{1}{4}$ at 3*s.* 6*d.* per dozen, 5×4 at 5*s.*, $6\frac{3}{4} \times 3\frac{1}{4}$ at 6*s.* They announce, too, that "all plates are issued with coloured backs to prevent blurring by reflection." They are manufacturers also of bromide collodion for Major Russell's rapid tannin, and the collodio-bromide process in a semi-sensitive state as recommended by Mr. Carey Lea for the preparation of collodio-bromide plates. [Major Russell's plates, it may be explained, were collodiou sensitised in a bath, washed, and then flowed over with a solution of tannin, and, lastly, dried.] Huggon & Co. advertise "collodion for the dry-plate process." Pyro now appears in one announcement at 2*s.* 6*d.* per ounce. C. E. Elliot, in advertising Eagle paper, albumenised for a thirty-five grain silver bath, says: "Unfortunately there are a number of unprincipled dealers who send out other papers when the 'Eagle' is ordered, and the reputation of the 'Eagle' is greatly diminished." Fry commences to advertise enlargements, and Geymet & Alker, Paris, have vitro-enamel photographs and materials for the same. From the same foreign city there is an offer of a velocipede for the tourist and photographer for seven guineas. In this Year's Book we have Robert Humpson, late Pyne, advertising. In Payne's day I entered the ranks of the photographers, and I am reminded how far I am advanced on the journey of life when I recall that I knew Mr. Humpson's father, who was an old friend of my father, and who must have been dead at least forty years. By 1873 Robert Humpson's business had become Payne & Chapman. In 1870 another Manchester man appears, whom I once knew very well, and whom we occasionally see here still, J. Rogerson, of Gaythorne. This gentleman initiated me into the mysteries of the dark art, and sold me my first camera, about thirty-four or thirty-five years ago. The article advertised by Rogerson in 1870 is a camera "with swinging lens, to obviate the swinging back."

In 1870 Mr. Spencer, London, says he "has recently erected machinery for making pigmented gelatine paper as employed in the processes of Poitevin, Fargier, Blair, Pouncey, Edwards, &c. The graphoscope is advertised by Hare. This instrument, now less known than the stereoscope, had, I am inclined to think, a good deal to do with the decline in the popularity of the latter instrument. Every one can see through the graphoscope, but only the more sensible part of mankind, or those possessing what, in the Lancashire dialect,

is called "nowce" can adapt their eyes to the stereoscope. In this year the Autotype Company say that the purchase from them of apparatus or materials, includes the right to use them without licence (except for the purpose of reproducing works of art for publication). The prints, however, must be marked as being "autotype" ones. By 1873 they annonnce that the exclusive rights in their patents, &c., have been sold to Spencer, Sawyer, Bird, & Co. The same year Vandyke & Brown, Liverpool, announce permanent prints by the autotype mechanical process. The above-named Mr. Sawyer is the gentleman who, some two or three years ago, gave a demonstration here of the process he was so long engaged in perfecting and carrying on, and who has since died.

By 1871 and 1872 Durand has begnn to advertise sensitised paper, as does Cooke, London, the latter under the title of "Permanent Sensitive Albumen Paper." The annonncement continues: "J. Cooke, having entered into an arrangement with Mr. A. L. Henderson for preparing the sensitive paper according to his formula, can now supply it in large quantities." The price was 14*s.* per quire, or 1*s.* a sheet. John Stuart, Glasgow, has "Instantaneous Collodion," and says: "Every photographer engaged in taking children should send for a sample pound of this collodion." C. E. Elliott, Jewin-street, London, has "a new camera of dry plates, which does away with the necessity for the cumbersome changing box or bag, which dry-plate workers are at present compelled to use." Solomon, London, advertises a magnesium light enlarging apparatus. Rouch has a model tent, cameras, and Russell rapid dry plates (quarter-plate, 4*s.*). Among others advertising apparatus are Ross, whose list of lenses now occupies eight pages; Lawley, with second-hand cameras; Grubb, lenses; Fallowfield, new folding camera; George Hare, cameras; and Meagher, who has a new folding camera, illustrated by a block, which is still used under precisely the same title, "New Folding Camera." Mr. Billcliff now announces that he supplies cameras, lenses, papers, &c.

In 1871 Edwards & Kidd, London, advertise heliotypes, photographs printed in printing ink at the printing press; and by the following year the Heliotype Company announce that they have acquired the patents of Edwards & Kidd. Mr. A. L. Henderson continues photo-ceramic pictures.

In 1872 Mr. Spencer announces that his carbon printing material manufactory has been amalgamated with the Autotype Company. Mr. Breeze, of Sydenham, has reduced his transparencies to 2*s.* 6*d.* These are, of conrse, the well-known stereoscopic effect slides, which have never been excelled, and which, as the advertisement says, include "effects in clouds, twilight, moonlight," &c. The slides are, I think, scarce now, but our late Secretary (Mr. Chadwick) had a number of them, purchased, I believe, at a guinea each, which are certainly very beautiful and very ingenious. They display a knowledge of the capabilities and possibilities of the stereoscope which it would be useless to expect now. Mr. H. P. Robinson advertises a book on *Pictorial Effect in Photography, being Hints on Composition and Chiaroscuro for Photographers; to which is added a Chapter on Combination Printing.* The price of the volnme is 8*s.* 6*d.* David Winstanley, Manchester, has an advertisement which presents the man—to those who knew him, at least—as completely as a photograph itself would do. Mr. Winstanley was an eccentric and talented man, but his eccentricity outran his talents. Several here, I have no doubt, knew him well. He died in Manchester about two years ago. Winstanley's advertisement was for enlargements by limelight. It runs as follows: "Mr. Winstanley, believing that all respectable photographers do, by preference, confer the favour of their orders on those who endeavour spontaneously to benefit them, refers the profession to his researches and improvements in photography, as reported in THE BRITISH JOURNAL OF PHOTOGRAPHY and elsewhere, in support of his claims upon their attention." The next year Winstanley announces an amalgamation with Messrs. Myers & Thompson.

In 1873 pyro is down to 4*s.* an ounce; French ditto, 3*s.*; fifteen grains gold chloride is to be had for 2*s.* 3*d.*; and hypo at 3*s.* per pound; sensitised paper, 10*d.* per sheet or 13*s.* per qnire. Most of the names we have seen before are here, and we have our old friend and former President of this Society (Mr. Pollitt) announcing that he has removed to Barton's-court, where he passed the remainder of his business days, and died only three years ago. Mr. Pollitt announces that he continues to supply his "Superior Collodio-albumen Plates" as before. John E. Palmer annonnces new patent chromo-creta photographs, the outcome of four years' study, easy to work; price for teaching and permission to work the same, 10*l.* 10*s.* Edwards, of Hackney, has a new process of enlargement, which he will only sell to professional photographers. George Mason & Company, Glasgow, have a paper termed "Aristographic," reminding one of the more recently introduced aristotype. It is said to combine lithographic printing with photographic printing. "The designs are by first-class artists, and the paper can be had in plain or coloured designs, prodncing most beautiful effects without any extra apparatus." Now appears an advertisement which lasted for years, by a certain R. T. Crawshay, Esq., of Cyfarthfa Castle. This gentleman, "being desirous of encouraging the production of artistic photographs of larger and more important size, &c., offers the following prizes":—50*l.* for three photographs of heads direct, size 20×16, top of head not less than eight inches from the chin. 25*l.* for three second best. 25*l.* for three heads not less than 15×12. 12*l.* for second best. 25*l.* for best enlargements, not less than 20×16, by any method. To take place in November; open to all the world.

In 1874 an announcement appeared that a Crawshay prize had been awarded for enlargements by Edwards' process. Colonel Stuart Wortley's uranium process has a two-page advertisement this year; among other familiar announcements there is one from Anthony, New York, and ferrotype plates. The Graphotyping Company advertise, but their process was not a photographic one. A drawing was made on a smooth chalk plate, in water glass, by which the chalk was so much hardened that the part not operated on could be brushed out, and a relief block, which could be stereotyped or electrotyped, resulted. Several printing processes are advertised in 1874; thus we have the Autotype Company's enlargements; Woodbury Company, who produce from photographers' own negatives prints equal in every respect to silver prints, at less cost, perfectly permanent, and at the rate of 20,000 per day; the Heliotype Company, Limited, and Papyrotype. The latter is said to be "especially suited to subjects in line, such as maps, architects' or engineers' drawings, designs in outline, producing results far superior to ordinary photography, and at much less cost." Then follows a list of books, illustrated by the two processes, among them *Nasmyth's Moon*, which I always thought had been illustrated by the Woodbury process. Woodbury advertises the Scioptieon for the first time. I think Waterhouse diaphragms are also advertised, which I have not noticed before. Retouching seems to come in for the first time in the following advertisement:—"P. C. Stortz, New Bridge-street, Strangeways, Manchester, begs to inform photographers that his late visits to the Continent have convinced him beyond doubt that the successes of the favourite Berlin and Vienna photographers depend greatly on the *modelling on their negatives before varnishing*, a process little known in England. The effects are marvellous, no stippie or varnished surfaces will produce equal results." Then he gives the terms for one lesson, which, including five ounces of "Coating Fluid," is 2*l.* 2*s.* The same person offers to teach "rubbing-in processes," explaining, "though the Vanderweyde and Ferranti-Turner processes have been patented, chalk and powder colours, mixed with pumice stone, or made to adhere to the surface by brushing the background of photographs over with a sticky liquid, have been used in Great Britain and France, and are still valuable in the photographic business." These processes, wet or dry, are taught for three guineas. The Liverpool Company advertise collodion-bromide plates (4¼×3¼ at 4*s.* &c.), and gelatino-bromide plates at the same prices. They also supply a sensitive coated paper, which may be used in the camera or for printing. Mr. Pollitt, in advertising his plates, "wishes to remark that, whilst he does not claim for his plates the highest degree of rapidity, he has no hesitation in saying that, when fairly exposed, according to the instructions in each parcel, a degree of excellence will invariably be obtained which no other process, whether wet or dry, can rival." Ch. Dauvois, Paris, advertises "Waterproof Coloured Rands," whatever they may be, and some silk paper, called "Joseph," whatever that is. Richard Keene, Derby, offers to do a sample enamel from photographers' own negatives for 5*s.* Lancaster has a new binoculograph, which every photographer, professional or amateur, is recommended to obtain. The same house has a vertical vision focussing glass. Jabez Hughes' business is now conducted by J. Werge. and Mr. Billcliff announces that he is a wholesale and retail manufacturer of cameras. Colonel Stuart Wortley's book on dry-plate photography is advertised to be ready in the spring, price one and a half guineas.

1875-6.—By this date we find that in Manchester the establishment at 63, Piccadilly is in the name of J. B. Payne, not Payne & Chapman, and Mr. J. T. Chapman hails from 168, Deansgate, the next year advertising Canon Beechy's collodio-bromide emulsion. Mr. Billcliff thanks his customers for their liberal support during the past fifteen years. Mr. W. T. Briggs advertises enlargements from 65, Oxford-street, Manchester. Mr. W. B. Bolton, Liverpool, will shortly be prepared to supply sensitive collodion pellicle. "This preparation, dissolved in a mixture of ether and alcohol, forms at once an emulsion combining rapidity, certainty, and uniformity of results, with the property of keeping indefinitely, and which may be used wet or dry, without either washing or preservative." Next year Mr. Bolton says that "twelve months' experience in the manufacture of his pellicle has resulted in considerable modification and improvement in the product." He also advertises chlorido-bromide pellicle, according to Mr. Carey Lea's formula. Kennett's patented sensitised pellicle and dry plates are also advertised in 1875. "The pellicle gives the most sensitive plate ever brought before the public." Jabez Francis, Rochford, Essex, has a printing process (all iron) "for heliotype, albutype, or any other type." Lambert, Greenwich, advertises Lambertype—a means of obtaining cheap enlargements; contretype—a means of multiplying negatives and transparencies; "any old positives or negatives may be nsed to produce any number of perfected, quick-acting, enlarged, reduced, or same-sized negatives or positives, during the darkest days, and at a nominal cost. Over-intensity, or weakness of negatives, is no bar to obtaining good prints." The same person advertises chromotype, which is still more wonderful, but which I am obliged to leave. Durand now advertises sensitised paper in the following curiously candid manner:—"Mr. Durand has just succeeded in producing a new sensitised paper of great brilliancy, and which is quite free from certain defects to which his old papers were occasionally liable." Warnerke has "sensitised negative tissue in bands for roller dark slides, or in blocks for use in ordinary dark slides." Ross advertises "New Universal Lenses" and "New Symmetrical Lenses." Liesegang, Düsseldorf, has an "Improved Rotating Camera, for large groups and panoramic views. . . . . It has many advantages over the Pantascopic and other cameras, works very quick (*sic*), without ever going out of order, and gives perfect definition on the whole length of the plate." Morley advertises lenses, cameras, and apparatus, with the same woodcut of a lens with a monogram upon it as he uses now. M. P. Troup, over seven years assistant to J. H. Dallmeyer, advertises lenses. Steinheil's patent aplanatic donble lenses are also announced. Jabez Hughes's business is advertised as Werge's for the first time this year. Frederick Burrows announces retouching this year, and next year as Burrows & Colton. "Their retouching has gained such a reputation, and the quality is so well known, that further comment is unnecessary." They also advertise a retouching desk and a "new work on Retouching."

1877-78.—Mr. Chapman now has "the handiest and most complete photographic price-list ever published;" J. B. Payne appears with two miscellaneous pages; Pollitt continues with his plates, and in 1878 annonnces transparencies, from Professor Piazzi Smyth's fine negatives taken at the Great Pyramid in 1865, 2*s.* 6*d.* each, or set of fifty for 5*l.* 5*s.* 0*d.* These views, which many of us have seen, were taken on wet-collodion plates about the size of a postage stamp by Professor Symth, and, after enlargement to ordinary lantern size by Mr. Pollitt, stood the further enlargement of the lantern perfectly well. Myers advertises Manchester enlargements, as does John J. Dalton, Pendleton. Fletcher, of Warrington, has a "limelight without oxygen." W. I. Chadwick enters the advertising field with his oxygen retort improved patent gas-holder, which "has proved the most efficient apparatus of the kind ever brought before the public." The Liverpool Company have now instantaneous dry plates. Wratten's sell dry plates, and have collodio-bromide emulsion which will keep indefinitely, 20*s.* for twenty ounces; they have also pyro at 2*s.* 6*d.* per ounce, and Rouch has it at 2*s.* 9*d.* French, and 3*s.* 6*d.* English, and chloride gold fifteen grains at 2*s.* 8*d.* Durand still advertises that his old paper was subject to defects. Woodbury Company include Albertype enlargements and lantern slides, and in 1878 they say that in a week or two they will have ready "A Manual of the Carbon Process of Photography, by Paul E. Liesegang." Among

apparatus, Lancaster advertises a "combination lantern," a lantern and photographic apparatus in one. There is also advertised, photographon, a "ladies' camera," so called only from its cleanliness, convenience, and portability. The usual clothes-destroying, hand-staining operations necessary for rendering the plate sensitive, developing the resulting picture, and finally washing it, are effected entirely by mechanical and very simple means within the camera, and are reduced to the mere pulling of a few cords. Write for further information to the inventor and patentee. But that it is a little late, I should be much inclined to do so, for there seems to be no "We do the rest" attending the touching of this button. John Chadwick's patent rolling press or glass bed is advertised by himself, and in the following year by the Woodbury Company. The Sciopticon Company (no longer Walter Woodbury) advertise a scenograph, a cheap form of camera made chiefly of waterproof cloth; the price was 50*s.* for stereo, 35*s.* for quarter. Ross's portable symmetrical lens appears. J. L. Lane, London, advertises improvement in cameras to supersede the sideboard and the present inconvenient mode of turning the camera on its side. There is an extract from THE BRITISH JOURNAL OF PHOTOGRAPHY of December 28, 1877, describing it as a great convenience. Is this the first reversing back? The Amateur Photographic Association still continues to advertise, and, lastly, rubber stamps, for the first time I have noticed them, appear.

1879-80.—It is only now that the gelatine dry plate appears to really be coming into general use. Wrattens advertise revolution in photography. Wet plates entirely superseded both for studio and field work. London gelatine dry plates, instantaneous and ordinary. Exposure required for the instantaneous plate, in good light one-tenth the wet plate, in a bad light one-twentieth to one-fortieth. Price: ordinary, 2*s.* 6*d.* quarters; instantaneous, 3*s.* Swan's plates are said to be "a new power to the photographer, enabling him to take views, portraits, &c., under conditions of light that would with the wet-collodion process have been quite impracticable. Parties may be taken in ordinary sitting-rooms without undue protraction of the sitting. Suitable for what are called 'instantaneous' views," &c. Quarters, 3*s.* Fry's Kingston Special plates of gelatino-bromide in its most exalted state of sensitiveness. "No plates so rapid that can be produced in large quantities as the above." Mr. Prestwich announced that "Archer's collodion speedily superseded the old Daguerreotype, which was for so many years *the* process. Now there is 'another Richmond in the field,' for gelatine will come to the front, and even in this early stage those who have availed themselves of gelatine, and mastered the rapid dry plates, have not only gathered a rich harvest for themselves, but have given great satisfaction to their ever-increasing customers." The Liverpool Dry Plate Company, whose advertisements we have noticed through most of the years we have endeavoured to review, still appears; but it is plain they are about to be distanced by the new-comers. Mr. Pollitt, too, still advertises his list of plates, but he, too, was destined to be outdone in the same way. In apparatus we have the Luxograph patent, the object of which is not explained, but it is evidently to enable the photographer to take portraits at night. The price is 35*l.*, with lenses to work the same. Mr. Chadwick's portable oxygen gas generator is advertised, and his back pressure valves, a registering lantern-slide carrier, and the *Lantern Manual*. Lastly, our friend Mr. Broughton appears with his automatic ethoxo limelight apparatus. For the rest, we shall only be able to give a mere catalogue of generally familiar names:—Huggon's collodion, which has gone through most of our years, continues; Mawson's standard collodion; Thomas's, the latter advertising also Pall Mall plates; Steinheil's lenses; Avery's backgrounds: Lawley's second-hand cameras; Ross's lenses; York's lantern slides; Ordish's albumenised paper; Harvey, Reynolds, & Company; Watson; J. H. Steward, treble and other lanterns; Chapman; Houghton & Son; Billcliff; Photographic Artists' Co-operative Supply Association; Solomon; Hare; Shew; Thomas & Robert Annan, Glasgow, autotype printers; Fallowfield; J. J. Atkinson, Liverpool; Wood's lanterns and slides; Amateur Photographic Association still, &c. Lastly, there appears for the first time the Platinotype Company, whose process is said to be "absolutely permanent;" and, further, "it is the opinion of a photographer who has used the process during the whole of the past season that the cost is less than with silver printing, owing to the great saving of time and labour." With this year (1880), what may be termed the modern period of photography fairly set in; the gelatino-bromide has henceforth been triumphant; and here, therefore, is the natural period for the termination of these necessarily desultory notes.

At the conclusion of the address Mr. T. R. COBLEY read a short paper on the *Ilford Printing-out Chloride Paper*, which he said he considered the best that had, so far, been put on the market. It is especially pleasant to be able to say this, as the new paper is a native manufacture, while hitherto all the similar papers have come from abroad. The new paper is also less than half the price of the foreign. Compared with foreign paper, Mr. Cobley found it to print as quickly, to tone equally well, to allow of the alum bath being dispensed with, and to admit of the printing being stopped at an earlier stage.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

NOVEMBER 11.—Mr. TUCKER, Loughborough, gave a Lecture entitled *A Journey Through Snowdonia*. The execrable weather which prevailed on this date doubtless accounted for a rather small audience, but those who braved the elements were amply rewarded by a series of well-executed slides and a connective *vivâ voce* description, which, coming from one intimately acquainted with the district, went far towards rendering the lecture so complete a success.

The Honorary Secretary presided at the lantern.

HULL AMATEUR PHOTOGRAPHIC SOCIETY.

OCTOBER 29.—Opening address by the PRESIDENT (Mr. E. H. Howlett, F.R.C.S.), who took for his subject the various obstacles in the way of preparing a satisfactory negative. Dealing with the question of "Halation," Mr. Howlett said that for both landscape and interiors it was necessary, to secure the best results, that some system of backing should be adopted. Of all the various contrivances used for this purpose, none are entirely satisfactory. In order to satisfy the legitimate requirements of photographers in this direction, plate-makers would have soon to put a reliable backed plate upon the market. The theory was fully dealt with in its application to both films and plates, and it was pointed out that films were not entirely free from defect as regards halation. Passing on to exposure, the lecturer dwelt on the varying phases of light with clear and clouded skies, and showed that, in contradiction to what might be supposed, the lighting in the shadows was, as a rule, practically identical in both cases, thereby not prolonging the exposure when the sun was veiled by clouds. One of the most important factors in judging the exposure was the colour value of the scene. In photography, as in other work, one must have a thorough grasp of the subject in order to produce the best results. A good actinometer was one of the most valuable aids the amateur could employ. The lecturer next touched upon the researches of Hurter and Driffield in development, and, whilst agreeing with their theoretical accuracy, held that the contention of practical men, that some amount of latitude in exposure is permissible and controllable by after processes, is also true. Retouching, within certain limits was legitimate and admissible in order that the most might be made of certain negatives.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 10.—Monthly Meeting.—The awards in the 1891 competition were declared as under, and the prints were on view. Confined to members. Class 1 (three prints, 5×4 and under): Silver medal, W. E. Cowan; bronze medal, James Brown. Six entries. Class 2 (three prints, half-plate and above): Silver medal, T. O. Mawson; bronze medal, W. I. Tate. Ten entries. Class 3 (one enlargement): Silver medal, F. Park; bronze medal, W. H. Thorn. Four entries. Class 4 (six lantern slides): Silver medal, W. E. Cowan and H. G. Ridgway, equal. Thirteen entries. Class 5 (six lantern slides), open to the world: Silver medals, John Carpenter, London, and G. E. Thompson, Liverpool; bronze medals, P. H. Fincham, London, and J. W. Wade, Manchester. Eighteen entries.

The Judges were Messrs. J. P. Gibson, P. M. Laws, and C. J. Spence.

It is to be regretted that in the Classes for Prints so few members exhibited, and the Executive can scarcely feel encouraged to promote a similar competition in future years.

In the Open Class for Slides most of the principal exhibitors are represented and the work throughout is of the highest quality.

A selection of the 268 slides sent in will be publicly exhibited at the Lecture Hall of the Literary and Philosophical Society, Newcastle, on Wednesday, November 25, at half-past seven p.m.

DOUGLAS (I.O.M.) PHOTOGRAPHIC SOCIETY.

NOVEMBER 14.—Special Meeting.—Prize lantern slides were shown. Messrs. Thomson, Lomas, and the Secretary took charge of the lantern.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THIS Society's thirty-second annual meeting was held in the Architectural Hall, 42, George-street, on the evening of Wednesday, November 4, the President, Mr. H. J. Blanc, occupying the chair. The reports and general accounts of the business of the Society were given by the respective office-bearers, and, being duly audited and vouched, were passed acclamatively. The election of office-bearers and Council was then proceeded with, and the following were appointed for the ensuing year:—*President:* Mr. Hippolyte J. Blanc, F.S.A. Scot.—*Vice-Presidents:* Dr. Thomas W. Drinkwater, F.C.S., William T. Bashford.—*Council:* Messrs. Jas. Crighton, John Stewart Smith, James Jameson, John M. Turnbull, Hugh Auld, W.S., James C. H. Balmain, Alex. A. Inglis, James R. Roddick, Alex. Ayton, William Brown, Thomas A. Croal, James Patrick.—*Curator:* Mr. Hugh Brebner.—*Treasurer:* Mr. James M'Glashan.—*Secretary:* Mr. Thomas Barclay.

The following new members were admitted:—Messrs. W. Barclay, A. D. Buchanan, J. G. Wandesford Butler, Walter Clark, James Gibson, Alfred H. Gracie, James M'Craw, J. G. S. Mackenzie, Andrew Melvin.

The PRESIDENT, in closing the proceedings, stated that the medal awards to the most successful exhibitors at the outdoor Saturday rambles had not yet been made, they being entirely in the hands of the members of the Society, who, in fact, occupied the position of a jury, and as their decisions were final, they could not be known till after Saturday evening next, when their written opinions would decide whose works stood highest in the estimation of the Society.

The Council had arranged that in the proceedings of the next session there would be a regular succession of business, which would be so arranged that anything of new or immediate interest would have precedence, so that each evening would have something of interest to the already large and increasing membership of the Society.

Appended are the conditions for the competition, which may be taken as a sound method of judging without judges specially appointed. The exhibits for competition are divided into classes as follows:—Class A, President's medal, for best picture taken at any of the Saturday rambles; Class B, Society's medal, for best picture from negative taken since January 1, 1801; Class C, Society's medal, for best figure study (not being a portrait) from negative taken since January 1, 1891.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 6,—Mr. William Lang, jun., F.C.S., President, in the chair.

Mr. H. M. SMITH, of the Eastman Company, gave a lecture on the Kodak camera, and, by means of the Society's lantern, showed a large series of views taken with the Kodak.

At the close of Mr. Smith's lecture a business meeting was held, when four new members were elected—viz., Messrs. John Westall King, James Colville, M.A., B.Sc., James H. Whiteford, and G. R. Amy.

The following gentlemen were appointed office-bearers for the ensuing year:—*President:* Mr. William Lang, jun., F.C.S.—*Vice-Presidents:* Messrs. J. Craig Annan and Archibald Watson.—*Council:* Messrs. W. J. McIlwrick, A. Mactear, George Mason, John Annan, James Gardner, and William Brown. —*Treasurer:* Mr. George Bell.—*Secretary:* Mr. Frederick Mackenzie.

A new collodion-ferrotype plate of Nievsky's was shown to members.

Correspondence.

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

PERSPECTIVE AND THE PHOTOGRAPH.

To the EDITOR.

SIR,—There is some inconvenience in having to deal with criticisms upon my lecture from a correspondent who was not present thereat. Lucidly though the main points were put in your article, it could not be expected that sufficient space could be spared to set forth all the arguments, and especially to give all the illustrations by which my propositions were supported. Had Mr. Henry Flather, who has now written two letters on the subject, been present to witness these illustrations, he might have been convinced of the accuracy of my propositions, and saved from committing himself to the criticisms he has written.

In his first letter, Mr. Flather says that he "was struck by the technical errors" displayed, whether in your article or my lecture is not clear, but as he has not been able to show one such error, it is not of much consequence. He further presumes that I have either forgotten perspective, or never thoroughly mastered it. Such a personal question can have no interest for your readers. What I do maintain is the truth of the propositions with respect to perspective and the photograph that I have put forward, and these, I believe, will withstand any attack in the same way, and for the same reason, that a mathematical proposition is unassailable. In putting it that the consequences of my proposition will appear absurd to the merest tyro, Mr. Flather may be right. I have no authority to speak for the person adduced, but, after all, the opinion of such a one is not important. If opinion is of any importance in what Mr. Flather speaks of as an exact science, I would rather take that of experts and disregard the tyro.

The grammatical obscurity, to say the least of it, which characterises the first and principal paragraph of Mr. Flather's letter, would render a reply on each possible intention of the words too long and tedious; one or two remarks must suffice. He says, "A circle in perspective, whether it be parallel to the picture plane, to the right or left of the spectator, above or below the eye, in an ascending or descending, or an oblique plane, is *never* an ellipse, it is simply a circle in perspective; its form may, and does, frequently approach the curve of an ellipse, but that is all."

As some readers unversed in the subject might take it for granted that such statements would not be made in the authoritative manner assumed by Mr. Flather in criticising my lecture unless they were recognised facts, it may be well to quote from an acknowledged authority. Mr. H. S. Dennis, in *Third Grade Perspective, approved by the Science and Art Department, South Kensington*, Part I., page 16, in directing the drawing of a circle in perspective, after giving the means for finding points and position, concludes the section with, "draw the ellipse." Again, in Part II., page 111, "The perspective representation of a sphere can only appear as a circle when it has its centre in a direct line with the principal visual ray."

Mr. Flather further says that the deviation from a true circle of a perspective representation of a sphere at A or C in your diagram on page 690 "would be so slight as to be scarcely perceptible without close examination and measurement." This is by no means a fact. In my own diagram and illustrations I confined myself to an angle within 60°, 30° on each side of the line of sight, as that is a conventional limit, and a photograph taken within that limit showed very evident elongation of the spheres at the side, requiring no measuring or close examination to detect. In your diagram, which I find includes an angle of 90°, the elliptical form would be still more striking.

It is strange that Mr. Flather should have been able to draw the diagram figured in his second letter without seeing that, as may be inferred from your editorial note, it only proves my case. When a sphere is intersected by a plane placed as he has put it, a part of the sphere is seen outside the point from which he has drawn his line. If he will draw the lines you suggest, and which are required to complete the diagram, my proposition will be thereby demonstrated.

Mr. Flather desires the establishment of Perspective Classes in connexion with Photographic Societies. Interesting though perspective may be as a recreative study, it is doubtful whether sufficient members of any Photographic Society would care to take it up so as to form a separate class. There would then, too, be the danger of their accepting as a teacher some unsuccessful artist, who might not be specially informed on this subject, but whose connexion with art was supposed to be a guarantee for knowledge. In most towns of importance, however, there are Art schools, supplied with properly qualified teachers, and doubtless such an institution can be found in Scarborough by those who desire instruction n this subject.

I have not posed as a teacher of anything new in perspective. On the contrary, I only want to have the laws of perspective, as expounded by competent teachers, fully recognised. Many artists, however, are either not well grounded in perspective, or violate its laws, as it seems to me, in order not to run counter to the prejudices of the uninstructed. Others, seeing these deviations on the part of artists (not of all) from the representation as accurately given by the photograph, at once assume that the painters are right and photography wrong, and lecture photographers upon their shortcomings. It was in order to reassure photographers as to the correctness of their perspective, and to show how photography is at work in diminishing the proportion of painters who venture to put forth untrue perspective representations, that the subject of my lecture was chosen.—I am, yours, &c., W. E. DEBENHAM.

46, *Haverstock-hill, N.W., November* 16, 1891.

To the EDITOR.

SIR,—Mr. H. Flather is amusing. He seems to think he has "got the right sow by the ear" (and he has, too!), but he cannot take her to market. Even in that diagram you published for him last week, he has missed his own apparent attitude. Had he drawn the circles 2 and 3 in their relative perspective sizes, and the lines from the eye to their individual boundaries, he might have paved the way for a clearer understanding of the subject.

At the present time I cannot go into Mr. Debenham's lecture, only I think a protest is necessary against what you call "Mr. Debenham's central contention," *i.e.*, that photographs taken with a rectilinear lens are in perspective absolutely and invariably correct. Has Mr. Debenham forgotten the *law of diminution in distance*, which is tacitly overridden by optician and draughtsman alike, to meet the pleasing, though illusive, demands of the natural eye?—I am, yours, &c., J. P.

Edinburgh, November 16, 1891.

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the EDITOR.

SIR,—I have carefully read Dr. Miethe's letter in your last issue. Why quarrel? I have no intention of doing so; but a statement of facts is necessary to disprove the assertion which Dr. Miethe repeats, viz., "All I claim is the first publication."

1. Dr. Miethe acknowledges that the "provisional protection" granted to me on October 2 was considerably prior to his application for patent rights in Germany.

2. Dr. Miethe acknowledges that your leading article of October 16, describing my new lens, was prior to his application, and, moreover, *the cause* of his step in that direction.

3. This article describes my lens as follows:—"Simply a double combination, which has the property of producing any size of image from the minimum—when the plate is almost in contact with the back lens—by simply placing the plate at any distance whatever further away. In all constructions for the production of large images hitherto accomplished, the principle involved has been that of the formation first of a primary image, which has been subsequently enlarged, and herein lies the difference between the invention we refer to and former constructions. . . . . The image given is that produced by ordinary photographic lenses, viz., primary and inverted."

4. To an expert, this information is sufficient to explain the principle of the foundation of its construction, as there is only one way of accomplishing the ends recited.

(*a*) It is impossible with two positive elements.

(*b*) If the negative element were longer in focus than the positive, the practical advantage of short extensions for large images would not tell and *great* variations in the separation of the two elements would only cause *slight* variations in the sizes of images possible. Ergo, what is left? A positive element of greater focal length than the negative element!

5. Dr. Miethe was welcomed as an honorary member of the Photographic Society of Great Britain on account of his scientific attainments, and contributions to the subject of photographic optics.

6. It is a pity Dr. Miethe should have added the postscript he did to his letter in your issue of October 30, viz., "If Mr. Dallmeyer's invention is based upon another principle, ..." for he, as an expert, must be aware that the remark is superfluous.

When these points are fully weighed, there can be no doubt of my claims, not only to *priority of application* for patent rights, but also for *priority of publication.* The publication consisted of (*a*) an adequate preliminary description; (*b*) an exhibition of the performance of the instrument itself; and (*c*) the production of photographs taken with it to three editors of leading photographic periodicals, who simultaneously published (in each case as leading articles, on October 16 in their respective journals, more or less the same particulars as recited above (3).

Without the faintest reserve I gladly accept Dr. Miethe's statement that the same subject has occupied his independent attention, but he must allow that his publication as well as his "application" is subsequent to mine.

The main feature of the invention lies not in the *forms* that may be ascribed to either element, but in the introduction of a scientific principle in

lens and telescope construction for the formation of large primary images in a short compass, that has hitherto only existed by the accidents of individual constructions, but never hitherto permitting the wide, regulatable limits now rendered possible.

While speaking of "forms," when Dr. Miethe wrote on October 30, and furnished a drawing of positive and negative elements feasible for accomplishing the end in view, you, Mr. Editor, made a comment about the engraver's execution of the same. It struck me as curious you did not add, or consult me as to the advisability of adding, another referring to the rough sectional drawing I made for you at your request on October 13 of the very instrument you had seen some weeks previously at my office. Your discretion was doubtless well meant, but it may interest the photographic world, and particularly Dr. Miethe, if you will add an editorial comment to say what that drawing was, although it does not affect the matter of publication in the press, which I have succinctly established above.—I am, yours, &c., THOMAS R. DALLMEYER.

25, *Newman-street, W., November* 16, 1891.

[The drawing referred to by Mr. Dallmeyer was a positive lens (achromatised on the Gauss principle), with a negative lens placed in the same position as that shown in Dr. Miethe's drawing. Our reticence in speaking of it arose from a request made by Mr. Dallmeyer, at the time, that we would allow its construction to remain *sub silentio* for a brief period until he brought it before the public through the Camera Club.—ED.]

THE NEW CURE FOR BLISTERING.

To the EDITOR.

SIR,—I have to thank you for calling attention to Mr. A. W. Clark's prior discovery of the use of boiling water in preventing blistering of albumenised paper. As you kindly suggest, I certainly was in entire ignorance of his communication, an ignorance certainly shared by many others on this side of the water, as your columns abundantly testify. I am glad, however, to have had the privilege of independently calling attention to the remedy and confirming Mr. Clark's experiments, and I hope that the taking the matter up now will prove of real value to troubled workers, and perhaps set at rest some of the extraordinary views which are so constantly being put forth both as to the cause of blisters and their cure.—I am, yours, &c., WILLIAM BISHOP.

November 14, 1891.

CONTROLLING DEVELOPMENT.

To the EDITOR.

SIR,—Mr. Alexander Ayton, of Londonderry, has carried my recommendation as to the use of the odorator a little further by pointing out its suitability for flooding *wet plates* with developer. The action of the instrument is so gentle as to preclude the possibility of washing away the film of silver, a too common result of throwing on the developer by hand.—I am, yours, &c., W. E. CROWTHER.

Londonderry, November 15, 1891.

ON SOME CONDITIONS AFFECTING REVERSAL OF THE PHOTOGRAPHIC IMAGE.

To the EDITOR.

SIR,—Kindly allow me space to say that in your reprint of my paper on the above subject, a typographical error appears. The magnesium ribbon I used was the ordinary commercial article, weighing about four *grains* to the foot, and not "four *grammes* to the foot," as printed in your issue of the 6th inst. All the operations of placing the sensitive plate in frame, exposing and developing may be carried out in the full light of an ordinary room. My last paper read at the Camera Club, on the 22nd ult., offers an explanation of this.—I am, yours, &c., HENRY SUTTON.

Clapton, N.E., November 7, 1891.

THE LANTERN MICROSCOPE.

To the EDITOR.

SIR,—Kindly permit me to say a few words in correction of Mr. Chadwick's paper on Leach's Lantern Microscope, reported in the JOURNAL of October 30th. That Mr. Chadwick is considered a great authority on photography and the management of the lantern every one fully admits; but, judging from his remarks on the lantern microscope, he has not ventured very far in the microscopic world. As one who constructed and worked the lantern microscope several years before even Mr. Leach, I think I am able to judge what such an instrument will do.

In the first place, Mr. Chadwick is dead against every authority regarding magnification. Extreme magnification, such as Mr. Chadwick suggests, is condemned by every authority of note, both for the microscope and the lantern microscope. That the magnification which enables the observer to see *all* the details of an object, is the largest to which it should be subjected, anything beyond this defeating the purpose. Mr. Chadwick says, that with his arrangement, high powers can be used for class and other demonstrations, although he has previously stated that the arrangement of condensers is only adapted for objectives of $\frac{1}{10}$ of an inch, which is by no means a high power. Mr. Chadwick cannot surely be ignorant of the fact, that lantern microscopes, of whatever make, have long been discarded by the college authorities where high powers are required. I see, too, that he has come round to my views, and does not recommend the use of special objectives.

His last paragraph but two is a contradiction of the previous portion of his paper, where he leads us to suppose that he can use high powers, that is, of course, $\frac{1}{5}$ or $\frac{1}{10}$ of an inch objective with his arrangement simply because he uses an alum trough. What he says is simply this: in order to use a high power requiring a large amount of light, interpose an alum trough which stops 50 per cent of the light. Mr. Chadwick does not seem to be aware of the fact that it is possible to focus the heat rays at a point beyond the luminous rays, and thus avoid all heating of the slide. I should just like to inform Mr. Chadwick that the substage condenser, of which he speaks, and the novel way of interchanging the objectives, was used by me more than sixteen years ago, and shown to Mr. Leach in 1876. In conclusion, Mr. Chadwick says that lantern microscopes, which have no alum trough are self-condemned; this I deny, as I do not use an alum trough, and never will, and I may say that I have never melted a slide.—I am, yours, &c., J. A. FURNIVEL.

MR. RALPH ROBINSON'S PHOTOGRAPHS.

To the EDITOR.

SIR,—Will you kindly allow me to state that the exhibition of Mr. Ralph Robinson's photographs, now at the Camera Club, will close on Friday, November 27?—I am, yours, &c., G. DAVISON,

Hon. Secretary.

Camera Club, Charing-cross-road, W.C., November 14, 1891.

Exchange Column.

Wanted, a hand camera, Kodak preferred, in exchange for a new whole-plate camera, never used, worth 7*l.*—Address, S. BRADY, Portsmouth-road, Long Ditton, Surrey.

Exchange rustic armchair and exterior background (slightly soiled) for grass mat.—Address, W., 10 Grundy-street, Radcliffe, near Manchester.

Will exchange half-plate rapid rectilinear, by Stereoscopic Company, for quarter-plate portrait lens.—Address, A. H., 31, Lynton-road, Crouch-end, N.

Exchange safety bicycle, "Juno," in first-class condition, for large-size photo-auto-copyist apparatus and press.—Address, H. W., 134, Graham-street, Penrith.

Wanted, photographic apparatus, studio furniture, &c., in exchange for a gentleman's single-stone diamond ring.—Address, H. GRAYSON, 1, Inkerman-street, Blackburn.

Will exchange half-plate square studio camera, by George Hare, sixteen-inch pull, leather bellows, single slide, cost 4*l.* second hand; wanted, whole-plate portrait lens or euryscope.—Address, C. W. CLARKE, Market-place, Devizes.

Will exchange Bigelow's *Album of Lighting and Posing*, with key, in good preservation, for Hardwich's *Chemistry*, latest edition, and other photographic literature.—Address, F. DAWKES, Wells, Somersetshire.

Will give, in exchange for 12 × 10 portable camera, with three slides, mahogany portable developing tent, cost 9*l.*, and half-plate camera, with three slides, by Rouch, or would exchange for good backgrounds, &c.—Address, J. ASTON BRIGGS, Whitby.

Answers to Correspondents.

HENRY FLATHER.—Thanks; probably in our next.

RECEIVED:—C. Brangwin Barnes; J. Brown; D. D.; and others.

R. ROBINSON.—We will add the name of H. H. to the Black List.

BABY LENS.—Such lenses as you allude to are supplied by most, if not all, opticians.

D. J. O'NEILL.—Received. We, of course, had no means of telling that the report was unauthorised.

J. P.—We have received several copies of the circular. We referred to the matter in a sub-leader last week.

J. C.—It is a collodion transparency laid down on a coloured surface. The "process" is as old as the hills, and will probably outlive them.

BEDS.—The subject you name has been treated of in our pages on many occasions; but we will, nevertheless, keep your suggestion in view.

W. A. C.—We imagine it is merely a bit of "bluff" on the part of the firm to intimidate you in your business. Consult a respectable solicitor, and act upon his advice.

CASPER HOLDING.—1. It is an Austrian publication, and printed in that language. 2. A drysalter might help you, but we do not think the substance is yet obtainable in commerce.

CONSTANT READER.—1. The work in question is printed in German, and is published at the address given. 2. Very doubtful. Try the effect of a weak solution of cyanide of potassium.

J. A. S.—If the case be as stated, nothing but a wide-angle lens will do the work required. You must be prepared for violent perspective, as, under the circumstances, it cannot be avoided.

OWEN WILLIAMS.—Thin sheets of talc may be used instead of glass for negatives, but there is a difficulty in getting them perfect, except in small sizes. Xylenite of celluloid is as transparent and answers quite as well, with the additional advantage that it may be had in large sizes and at a moderate price, which is not the case with talc beyond a few inches square.

W. (Oxon).—"Canary medium" is certainly not a safe light with plates orthochromatised by Drs. Mallman and Scolik's method; or, indeed, for any plates sensitised for yellow rays, such as those by eosine.

"PLATINUM" wishes to know the uranium toning bath (for bromide and platinum prints, mentioned in last week's issue). "Platinum" will find the formula and full information in Mr. J. Weir Brown's paper, printed on page 109 of our present volume.

ENLARGEMENT.—1. Just far enough to allow of the whole of the negative being illuminated. 2 and 4. Gas is not suitable for the purpose. 3. A few inches—but it will depend entirely upon the kind of light employed. A simple experiment will determine the point for you.

J. A. HANSON.—1. We have no "competition pictures" to loan out to societies. 2. Probably Messrs. Waterlow, Mr. J. R. Götz, and the Meisenbach Company would be willing to let you have specimens of photo-mechanical processes. Their addresses appear in our ALMANAC.

W. S.—The mounts forwarded are unquestionably printed with bronze powder, and are, therefore, quite unsuitable for mounting silver prints upon, though they would be right enough for carbon. For this they may be reserved, or, if *gold* was guaranteed, they should at once be returned to the maker.

A. STEVENS.—It is not at all impossible to photograph actors on the stage. It has been done many times, even with the ordinary lights of the theatre, and by the aid of the arc light. The magnesium flashlight can be utilised, either by itself, or as an auxiliary to the ordinary source of illumination.

A. W. S.—If the result of the late gales has been such as to cause leakage "all over the roof" of the studio, a builder should be called in without delay. As the structure is old, and in a very exposed position, it, no doubt, requires strengthening in a substantial manner. Very old studios are often a source of danger to life and limb.

BETA.—The cause of the spots on the picture is not far to seek. It is that something has been splashed upon it, and that something is, unquestionably, a solution of silver, as proved by its metallic appearance when viewed sideways. The spots also appear on the mount, which shows the evil occurred after the print was mounted.

SETH WALKER.—About the quickest lens you can use for enlarging from quarter-plate detective camera negatives is a half-plate Petzval combination. It may be worked at full aperture, and, with a good paraffin lamp, will entail but a brief exposure. A quarter-plate lens of the same construction may be used, but it will probably require stopping down, in order to secure good marginal definition, hence it would necessarily entail a longer exposure.

EAST ANGLIA writes: "Having made several plain enlargements on bromide paper, I will be very thankful if you will say in your next issue of JOURNAL what material I shall require to work them up, and if there are any publications I can obtain on finishing in black and white."—Ordinary water colours are all that is necessary for finishing bromide enlargements. Or they may be worked up in chalks. The best work on the subject is Wake's book on the subject. It is now out of print, but possibly a copy might be obtained through the medium of an advertisement.

PROVINCIAL.—In this column we cannot afford space—indeed, it would occupy the whole of several JOURNALS—to give full working details of the collotype process. In the abstract, the process consists of coating a glass plate with bichromated gelatine, and exposing it to light behind a reversed negative until sufficiently printed. The unaltered bichromate is then washed out, and the plate dried. It is then fixed on the bed of a printing-press; moistened with water, and is ready for inking up with fatty ink. In fact, the plate is treated in printing precisely as if it were a lithographic stone.

E. RENNELL says he "wishes to take a photograph of a pet cat of the family. He (the cat) usually sits, the greater portion of his time, on the scroll of a couch; but on placing the couch in the open air, the brute no longer likes his favourite location, and cannot be persuaded to remain on it long enough to secure a picture. To take it in the room is out of the question. Can you suggest how I can get a picture of the animal?"—We see no difficulty in the way. If the opportunity be taken, when pussy is "at home" in his favourite seat, to use the flashlight, there is little doubt that an excellent negative may be obtained. Every precaution should be taken to secure a good picture at the first exposure, as puss may be too much scared to allow of a second chance for some hours.

M. C. writes: "I have a solution of paper residues, together with some silver coin dissolved in nitric acid, which I find has copper in it. How can I precipitate the copper, yet leave the silver in solution for crystallising? I have tried Captain Abney's formula with oxide of silver; it does not precipitate the copper. Are there any instruction books on the subject?"—We scarcely know what is meant by a "solution of paper residues." But if a solution of nitrate of silver contains nitrate of copper, the best method for a novice to get rid of it is to precipitate the silver in the metallic form either by placing in it strips of copper or zinc, and when the whole of the silver is thrown down to thoroughly wash the precipitate and redissolve it in nitric acid. Then crystallise. No works are published on such a simple subject.

W. H. asks: "Will you kindly say the cause of markings on the enclosed prints? The paper is my own sensitising. The strength of bath was about fifty-five grains to the ounce, and was floated about three minutes. Is this the strength and time you recommend? I presume the bath should be acid. Mine turns the blue litmus paper slightly red. The paper is rather old—say nine months—and has been stored in a cool cellar. Would damp account for red spots?"—The paper having been placed in a damp place may possibly account for the marking, particularly if the paper were unevenly dry at the time of floating. Examine the paper, and see if there is any sign of mildew; if not, try the effect of hanging the sheets in a dry room a few hours before sensitising. The bath would appear to be about the right strength and in the proper condition.

THE PHOTOGRAPHIC CLUB.—Wednesday, November 25, Monthly Lantern Meeting.—December 2, *Ferrous-oxalate Developer.*

DERBY PHOTOGRAPHIC SOCIETY.—The Hon. Secretary's address is, Thomas A. Scotton, 9, Church-street, Derby.

LEEDS PHOTOGRAPHIC EXHIBITION.—The Committee, in response to the application of a number of exhibitors, has extended the time for receiving entries and exhibits till Thursday, November 26.

THE AUTOCRAT LANTERN TRANSPARENCY PRINTING FRAME.—Under this name Mr. G. S. Martin, Bream's-buildings, Chancery-lane, has brought out a frame that is at once cheap and effective. The negative is adjusted over a shallow cell, into which is dropped the sensitive plate. It is well made.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—At the technical meeting, to be held on November 24, at the Society's rooms, 50, Great Russell-street, at eight p.m., the subject for discussion will be. *The Negative, and How to make the Best of it.* An example of photography in colours, by Becquerel's process, will be shown.

FRY MANUFACTURING COMPANY'S DEMONSTRATIONS.—The next lecture and demonstration is fixed for November 27, upon the subject of *Bromide Enlarging.* Syllabus:—Methods of Working by Daylight and Artificial Light; Griffith's Enlarging Cameras; Exposure and Development; Vignetting; Printing in Skies; the Acid Fixing Bath; Practical Demonstration.

ON Wednesday evening, Councillor Scattergood was giving a magic lantern entertainment in the Methodist New Connexion Chapel at Ilkeston, when the gas he was using exploded with an alarming report. The chapel was considerably damaged, and a panic amongst the audience ensued. Several persons were seriously injured, and had to be taken to the Cottage Hospital. A young man named Bremer has succumbed to his injuries, and several other persons are in a critical condition.

HULL AMATEUR PHOTOGRAPHIC SOCIETY....Winter Syllabus.—1891: November 26, *Demonstration of Printing and Developing Bromide Paper*, Mr. J. S. Green. December 3, Lantern Exhibition, *Slides from Kodak Films*, Mr. H. M. Smith. 10, *Toning.* 17, *The Hand Camera*, Mr. A. H. White. 1892: January 7, Lantern Entertainment. 14, *Tips.* 21, *Flash light Experiments.* 28, Lantern Entertainment. February 11, *Difficulties*, Rev. G. A. Coleman. 18, Lantern Entertainment. 25, *Ferrotype Dry Plates*, Mr. B. M. Stokes. March 3, *Lantern Slides*, Mr. J. Walker. 10, *Mounting and Surfacing.* 17, Lantern Entertainment. members' slides. 24, *Early Photographic Processes*, Mr. C. F. Amos. 31, *Shutter Work.* April 7, Lantern Entertainment.

THE annual dinner of the Photographic Club was held at Anderton's Hotel on Wednesday, November 18, Mr. William Bedford in the chair. The toast of the "Photographic Club" was given by Mr. H. E. Davies, and acknowledged by the Hon. Secretary, Mr. F. A. Bridge, who briefly dwelt upon the flourishing position in which the Club now stood. "Kindred Institutions," given by Mr. Edgar Clifton, was acknowledged by Mr. F. Hollyer (on behalf of the Photographic Society of Great Britain); Mr. R. P. Drage (London and Provincial Association); and Mr. S. T. Chang (Holborn Camera Club). "The Press" was spoken to by Mr. Thomas Bedding, and Mr. E. W. Foxlee responded for "The Pioneers of Photography." The "Health of the Chairman" was then cordially honoured, and concluded a most enjoyable festivity, in which music and song played an important part.

PHOTOGRAPHIC SURVEY OF STAFFORDSHIRE.—A meeting was recently held at the Stoke Free Library to discuss the desirableness of forming a society for the purpose of making a photographic survey of the county of Stafford. Mr. A. Scrivener was voted to the chair, and said the proposed Society would be very largely a friend to the archæologists, and would take up the work of giving illustrations to works of archæological interest. This being so, he was rather in favour, if the matter could be arranged, of the Society being established in connexion with the North Staffordshire Naturalists' Field Club, which already had a camera section in existence. Mr. A. J. Caddie read a paper on the subject, prepared by Mr. John Ballinger, librarian at Cardiff, and read at the recent meeting of the Library Association at Nottingham. Mr. Ballinger, in the course of his suggestions, said the idea was to secure photographs of all prehistoric, early British, and Roman remains, of all places of interest likely to be removed or altered, the interior and exterior of ecclesiastical buildings, family portraits, portraits of celebrities, old furniture, carving, documents, and any other objects typical of county or associated with local history. The reference department of a Free Library was suggested as the most suitable place wherein to deposit the work of the various members of the Society undertaking such a labour. The Chairman said that already, in North Staffordshire at any rate, a great deal of archæological work had been done by the Naturalists' Field Club which it would not be worth while to do again. As an archæologist, however, he should be glad to give what help he could, because he believed the object to be a good one. Eventually, it was agreed that before any further action was taken in the matter the Naturalists' Field Club should be approached, with a view of ascertaining whether they were willing to undertake a survey of the county, and to deposit a record of such work in the free libraries of North Staffordshire.

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THE FATAL LANTERN EXPLOSION.

ERRIBLE lantern explosion, as we stated very briefly last week, occurred at Ilkeston, Derbyshire. This is a town of over 14,000 ıbitants, and, like all towns in this progressive and recreative it is favoured by the presence of those who are able and ing to minister to the social and intellectual requirements he population. As we have already stated, a lantern enter- ment, before it even began, had a sad and fatal termination. 'rom such sources of information as we have had access to, ppears that the entertainment in question was to have been ın in the Methodist New Connexion Church by Councillor ttergood, who is an experienced worker of the lantern. A ilar exhibition had been given by the same exhibitor on the vious evening in connexion with foreign missionary services, he had used the same apparatus, which consisted of a ıial lantern with mixed gas jets. He had the hydrogen in bag and the oxygen in another, one bag being on top of other, and two fifty-six pound weights supplying the ıisite pressure to both. Mr. Scattergood was in the act of ıing on the light to commence proceedings when a snap as pistol cap was heard, followed within a few seconds there- r by an explosion of an appalling character—so great, indeed, t the windows of the edifice were blown out, and everything)wn into a state of wreck.

'he damage done to the building was severe, but this is ning to that which was sustained by many of those present. poor lad—Hubert Brewer, aged sixteen—succumbed to injuries while he was being carried away; he had been ıck across the base of the skull, and a portion of his coat had n driven into his breast down to the heart. Mrs. Summerfield Mrs. Slack had each an eye torn out, with their faces cut n to a dreadful extent. Many others sustained injuries.

Now that the lantern is so universally used, it is necessary should inquire into the cause of the explosion. That it se from an admixture of the gases we have no doubt what- r, for neither oxygen nor carburetted hydrogen (the kind l) are explosive in themselves, but only so when mixed. l now we are brought face to face with a difficulty. Mr. ttergood at the inquest says that at the termination of the vious evening's entertainment some gas had been left in both bags, that he brought away the oxygen one and filled it up ıome, employing the usual well-known means for making oxygen; and that the other, the hydrogen one, was left on premises and filled with carburetted hydrogen from the ns. Now, might it not be possible that, especially as both s were black, he brought away to his home by mistake the that already contained some hydrogen, and filled it up ı oxygen? If so, then the gas bag that remained, and was sequently filled up in the chapel, had its oxygen supple- ıted by carburetted hydrogen. If this surmise be correct, whole matter is at once explained.

But we are here met by the further evidence of Mr. Scatter- good, given at the Coroner's inquest. Having stated that his experience in the management of the lantern was of twenty years' standing, he says that there is no doubt of his having taken home the right bag, as it was marked with a large O. When he arrived at the chapel the first thing he did was to make contact between the hydrogen bag and a bracket on the wall, in order to the filling of the bag, he in the interim fixing up the screen and erecting the lantern on the stand. When everything was ready, and the hydrogen bag filled, he placed both bags under the pressure boards with a piece of canvas between them. Two fifty-six-pound weights were then placed on the top of the pressure boards, and he went to the lantern and lit the hydrogen in order to heat the limes. This was done in both top and bottom lanterns, and the hydrogen thus played on the limes for four or five minutes. He then turned on the oxygen, first at the bag and then at the burner. The upper lantern proving to be satisfactory, he then did the same for the lower one. It was then that the explosion occurred.

Now, so far as we can see, nothing whatever was done by the lanternist that is not done by every one to whom is en- trusted the giving of a lantern entertainment; and it is im- portant that, although the jury returned a verdict of "Accidental death," photographers and lantern exhibitors know something more than is here given. Something was hinted at the inquest as to a possible interference with the burners by two gentlemen who were allowed access to the chapel; but, so far as we can see, if they interfered at all during the absence of the exhibitor, it could only have been to the extent of displacing from the burner a piece of wire gauze, which is mistakenly thought to prevent the back-flow of the oxyhydrogen flames. A more mistaken notion never prevailed. We have sent this flame through a tube over two inches long packed with a charge of the smallest gun-shot procurable, it has even been sent through porous wood; and how, then, should a piece of even the finest wire gauze prevent its transmission? We must know more than we do at present. It goes almost without saying that, if gas bottles had been employed, the mixing of the gases would have been impossible; but no safety jet or blow-through burner would have prevented an explosion if the gases were mixed in the bag, although in this case the introduction of hydrogen would be so improbable as to amount to a practical impossibility. Meantime we must wait further developments, for at present the accident is surrounded with mystery.

SOLVENT ACTION OF BROMIDES IN DEVELOPMENT.

Mr. A. Haddon is reported to have said, at a recent meeting of the London and Provincial Photographic Association, that developers ought to be divided into two classes, one in which the formation of the image was due to the reducing action of the

developer itself, and the other in which certain chemicals in solution dissolved portions of the silver bromide, which was then deposited to help form the image. Ammonia and bromide, he remarked, were both solvents of silver bromide. In reply to a question, he appeared to think that there might be sufficient bromide in a developing solution to dissolve enough bromide of silver to seriously affect the deposit.

If the latter view is correct, however, we must agree with a succeeding speaker that pyro and soda would give less intensity than pyro and ammonia, which would be in defiance of what is actually found to be the case. The same gentleman, however, goes on to remark that these dilute solutions would dissolve very little, the inference being that the amount would be so small as to be practically inappreciable. But do they dissolve any at all? If not, then Mr. Haddon's highly novel theory falls to the ground; if they do, the action of the developing solution, containing a bromide or ammonia, or both, upon a sensitive film, receives an explanation which throws a new and not uninteresting light upon development.

The dissolution of the altered or unaltered bromide of silver, which, according to Mr. Haddon, may take place during development, proceeds from the known solubility of that haloid of silver in a large excess of an alkaline bromide or of ammonia. Hence the presence of bromide in the developer, in such an exceedingly small quantity as it usually is, reduces its solvent powers to the minimum activity. Ammonia, again, only dissolves silver bromide very sparingly when used relatively strong, its solvent action upon this salt being considerably less than it is upon silver chloride. We may thus take it that, if silver bromide has any solubility at all in these extremely dilute solutions of the bromides and ammonia, the latter have a degree of solvent energy which has not hitherto been suspected.

A study of a large number of developing formulæ points to the conclusion that bromide of ammonium is seldom present in a developing solution to a larger extent than three grains per ounce, while, on the other hand, it is generally smaller; that the average quantity of potassium bromide does not often exceed two grains; and that liquor ammoniæ is not often employed at a higher strength than about four minims per ounce.

To ascertain whether the two bromides and the ammonia really do exert a solvent action on the silver bromide when in the developer would be a very difficult task; but, if such an action really does take place, it is possible to confirm it without resorting to development. If a substance possesses certain properties when intimately (but not chemically) combined with other bodies, then it is fair to reason that those properties are not destroyed if the other bodies are removed. In other words, the solvent powers of the two bromides and ammonia can be ascertained by employing them in plain solutions without the presence of the reducing agent or the other accelerators besides ammonia.

It was in order, if possible, to test Mr. Haddon's theory that we accordingly made up plain solutions of potassium bromide, ammonium bromide, and liquor ammoniæ of the strengths above referred to, using distilled water for the purpose. We then took six quarter-plates of pure bromide of silver, and exposed three of them to light in the camera. Unexposed and exposed plates were next placed in six dishes containing respectively three ounces of the ammonium, potassium, and liquor ammoniæ solution in duplicate, the idea being to submit both unexposed and exposed plates to the action of the "solvent," lest there should be any possibility that only on the latter plates (the exposed) the solvent powers would take place.

The solutions were allowed to act for a quarter of an hour, and were then returned to their respective measures, each pl being washed in distilled water, and this wash water being a placed in its proper measure. The solutions were all perfec colourless. To test for the presence of silver bromide in t solution, we proceeded as follows :—

It is well known that a strong solution of an alkaline bromi if applied to a solution containing bromide of silver dissol in ammonia, will reprecipitate it. We therefore added a sa rated solution of bromide of potassium to portions of each the two ammonia solutions; but the latter remained perfec clear, and, upon increasing the quantity of bromide soluti their appearance was still unchanged, and no precipitate bromide of silver was obtained. Then to the whole of the solutions we applied a solution of alkaline pyrogallol, but precipitate of metallic silver was thrown down, thus complet disproving the presence of any silver salt in solution.

The issue of these experiments (which our readers will s are of the simplest possible nature), therefore, negatives M. Haddon's theory so far as the implied solubility of bromide silver in dilute solutions of the alkaline bromides and ammoni concerned. It will be observed that we selected plates of p bromide for the purposes of our experiments, which wo have been vitiated had the films contained iodide or chlori But it is well known that a great many modern plates do c tain iodide as well as bromide of silver, and hence, were M. Haddon's theory feasible, this fact would tend to prevent a great loss of density of deposit, inasmuch as iodide of silv is insoluble in either of the alkaline bromides, or in ammon.

Mr. Haddon's remarks, as given in our report of the meeti at which he spoke, are necessarily brief, and therefore have no means of knowing whether he included among t solvents to which he referred one which fills a large pl in modern developing formulæ, and which has considera solvent powers on silver bromide. We allude to sulph of sodium. We should ourselves, however, be inclined to su pose that, if Mr. Haddon omitted to notice this, it would simply from an oversight, as he is one whose full and accur chemical learning has before this elicited our acknowledgmen Sulphite of sodium is generally present in the developer relatively large quantities, and it is possible that it then ex cises a decided solvent power upon the deposit. Upon chlor of silver this power is so considerable that sulphite has b proposed by Captain Abney as a fixing agent for silver print

We may consequently take an early opportunity of exp menting upon the possible solvent action of sulphite of soda the developer, and will record the results if they are import enough in connexion with the very interesting point raised Mr. Haddon.

COLLODION EMULSION WITH CHLORIDE OF SILV FOR TRANSPARENCIES.—III.

Before passing on to a consideration of developers we may j remark that we have made no allusion to the employment organifiers or preservatives in the preparation of the emulsi This omission is intentional, as, although in the case of pl bromide emulsions it is often useful to apply a solution of so organic substance to the film before drying, in order to alter modify the colour of the resulting image, the practice does n appear to have the same value when chloride of silver is question, nor does it seem to be necessary. If, therefore, t pyroxyline be suitable for the purpose, *i.e.*, not too "horny," impervious, the plate may be dried straight away after washi

In all cases, however, it must be borne in mind that, before proceeding to develop, the film must be first moistened with dilute alcohol—equal parts of methylated spirits and water, or, if the film possess a tendency to hardness, the proportion of alcohol may be increased. This is poured over the dry film, and, after soaking for a few seconds, is thoroughly washed out, in order that the aqueous developer may flow smoothly over the film; this is of special importance, for the reason that, unlike gelatine films, the development often commences instantaneously or nearly so on the solution touching the film, and any irregularity in the flow is therefore to be avoided.

The application of alcohol must be made before wetting the film, otherwise a prolonged soaking will be necessary to enable it to displace the water and thoroughly open up the pores of the collodion. The value of the application of alcohol is clearly shown by flooding a portion only of a plate and, after washing, proceeding to develop in the ordinary way, when one portion of the plate will show not only far greater vigour, but also more detail than the other.

The development of these plates, it should be noticed, is far more conveniently performed without the aid of a dish, the glass being held in the fingers, and the developing solution poured on to it from a lipped measure glass. The solution runs with perfect freedom, and so small a quantity as half an ounce is ample for a plate $8\frac{1}{2} \times 6\frac{1}{2}$, while a lantern plate in skilful hands may be manipulated with a single drachm, though double the quantity will be preferable.

With gelatino-chloride plate the favourite, and no doubt the most suitable developer, is the ferrous-oxalate or its modification the citro-ferrous-oxalate, as the warm tones are obtained with greater certainty, and, perhaps, in greater beauty by its means than with either pyro or hydroquinone. Such is not the case, however, with the collodion films, and the iron developer possesses no advantages over pyro at any rate to compensate for the greater trouble and expense of its preparation and preservation. There are many amateurs, however, who, being familiar with the working of the ferrous-oxalate developer for enlarging and similar purposes, will prefer to use it for transparencies, and where it is so employed for other purposes it comes in very conveniently for the purpose, as the old and spent solutions are actually better in their action than when freshly prepared.

There is no necessity to give any special formula for the ferrous-oxalate developer for chloride transparency plates. Any of the published formulæ will answer if it be only borne in mind that the solution must be sufficiently diluted and restrained to suit the exposure and the tone required. The old and oxidised solution answers far better as a restrainer than any fresh addition of bromide or free acid, and should therefore be kept for that purpose; but it will not do to use alone, as it possesses little active power. If freshened up with a little newly made solution, however, it behaves in altogether a better fashion than the new solution alone, however much diluted or charged with bromide.

We may mention here a modification of the iron developer that will be found exceedingly useful where very warm tones are desired, and especially for the production of "Bartolozzi" or red-chalk effects on opal or in transparencies. It is equally available for chloride, bromide, or chloro-bromide plates. It consists in the substitution, total or partial, of ferrous sulphite for the corresponding oxalate. Ferrous sulphite is not an easily obtainable salt, but is readily prepared by dissolving freshly precipitated ferrous carbonate in aqueous sulphurous acid. The salt itself is but little soluble in pure water, but readily dissolves in excess of sulphurous acid, so that, when a clear solution of any strength is obtained, it is sure to contain a large proportion of free acid, which, though militating against its use for negative or rapid work, is rather in its favour for our present purpose.

The method we ourselves usually adopt in its preparation is as follows:—Ferrous carbonate is precipitated by mixing solutions of ferrous sulphate and carbonate of soda, and the somewhat pasty mass is drained on cambric, and lightly washed, to free it from the decomposition salts. If, however, the iron salt be kept slightly in excess, these, consisting of sulphate of soda and the excess of sulphate of iron, do not greatly matter if traces of them are left; indeed, there is little necessity for a careful washing. The carbonate of iron may then be dissolved in the aqueous sulphurous acid of commerce, sufficient of the latter being used to form a *nearly* clear solution, which, when filtered, may be taken to represent a saturated solution; or the preferable, though more troublesome, method is to transfer the carbonate to a suitable apparatus, and to pass a stream of sulphurous acid gas through it until a nearly clear solution results, and then to filter. The product obtained in either case is a bright yellowish-green solution, which smells strongly of sulphurous acid, and, in our experience, appears to keep well.

Employed by itself, the acid solution of sulphite of iron is naturally very slow in action; but, if the solution obtained as described above be mixed in suitable proportions with the oxalate developer, the advantages of its colour-giving powers are still obtained. The proportions will depend upon the tone required, the exposure, and also upon the age of the oxalate developer used. Old developer alone may be used for this mixture, as the ferrous sulphite solution acts as a reducer of the ferric salts it contains, and which are the chief destroyers of its energy.

Another modification of this developer consists in dissolving the ferrous sulphite in potassic oxalate; this produces similar tones, and is more energetic, requiring, therefore, more care in use as well as the addition of restrainers. Or the ferrous sulphite may be added to old and oxidised developers, which will be by its means reduced and revivified, and at the same time charged with ferrous sulphite to the extent of the solvent power of the oxalate of potash it contains.

The colour produced by this combination is entirely unlike the "warm" tones usually obtained, being, as already stated, precisely that of red chalk or terra cotta. It is perhaps scarcely suited for lantern slides, owing to its want of transparency, but it is admirably adapted for opal or window transparency work, as, where the red-chalk effect is not required, it tones perfectly with gold through all the usual grades of purple to pure black. It is, in fact, more easily toned than any other form of developed image we know.

In the course of his lecture on the measurement of lenses, given at the Society of Arts on Wednesday evening, Professor Sylvanus P. Thompson directed attention to a topic which is but little understood, and about which little has been written, viz., the relative position of the Gauss or nodal points of a lens when such a change as the hypothetic division of a biconvex lens and the separation of its halves takes place. It is well known that the focus of a single lens is measured from the posterior nodal point of such a lens, but Professor Thompson showed how, by separating the lenses, the anterior and posterior points approached each other until with increased separation they not only came together but crossed each other. We bespeak for the paper (a portion of which we give in the present number) an attentive reading

and careful study. The London manufacturing opticians were in great force at the meeting.

When will it be clearly understood by amateurs that the tone of a print is not dependent upon the composition of the toning bath, but upon the character of the negative? A very large proportion of the queries addressed to us by amateur workers, with reference to silver printing, is something like the following: "Can you give me a good formula for a toning bath to yield purple or black tones? I have been using," &c. We have pointed out for years and years past that purple and black tones can be obtained with any of the recognised toning baths, provided the negatives are such as have sufficient vigour to protect the high lights and delicate half-tints while the shadows are being deeply printed. This class of negative has clear glass for the deepest shadows, and great opacity for the highest lights. Without a negative of this character it is quite useless, no matter what toning bath be employed, expecting to obtain black tones. This fact is again emphasised, because the question is being so continually repeated with regard to the toning solution.

A secondary point in connexion with obtaining purple and black tones is the paper. This should be somewhat heavily salted and sensitised on a strong bath—conditions that seldom exist in the commercial ready-sensitised papers now in the market. To use a vigorous negative to advantage a strongly sensitised paper is a necessity. In olden times, when purple and black tones were the order of the day, the negatives possessed a wide range of tones from black to white, while the paper then in vogue contained a larger proportion of chloride, and was sensitised on baths of double the strength of many now employed.

Photography and things photographic are frequently met with in strange associations. The following lot appears in the catalogue of a recent auction sale: "*Abney's Photography*, the *Newgate Calendar*, and fourteen other books." It may be gratifying to some to learn that on this occasion photography was accorded the premier position.

Some time ago the authorities at the Royal Observatory, Kew, inaugurated a department for testing photographic lenses, and giving certificates as to their merits, the same as is done with meteorological instruments, watches, chronometers, and the like. It will be interesting to know the number of lenses that have been sent for examination, and the result. This will, doubtless, appear in the next annual report. Up to the present we have seen no announcements by opticians that so many of their instruments have passed the Kew examination, as is often the case with watchmakers and manufacturers of certain scientific instruments. Neither have we, as yet, seen any advertisement of lenses for sale with the qualification that they possess a Kew certificate. However, we presume the department is in existence, and that lenses will be examined if sent. Of course, if the instruments are not forwarded, it is not the fault of the authorities.

It always has been a matter of surprise that professional portraitists do so little with winter portraits—that is, portraits in winter attire with wintry surroundings. In Canada, America, Russia, and other countries, winter portraits are made a special feature of, and some artists are almost as busy during the inclement season as they are in summer. In this country, we suspect that, not one photographer in fifty possesses a snow-clad landscape background that could be used for an outdoor winter portrait. Should the forthcoming prove as long a winter as the last, photographers might materially increase their returns by making a speciality of this class of portraits.

With a little ingenuity a winter scene can easily be extemporised, and without any considerable outlay, a little whitewash, or white paint, judiciously applied to any old landscape background, a few pounds of cotton-wool for the accessories, and some sheets of white wadding for the floor, being all that is required.

A question was recently put as to whether wet-collodion negatives became denser by keeping. Since the meeting we have had the opportunity of examining a number of *carte-de-visite* negatives, taken by M. Camille Silvy thirty years ago. We were perfectly familiar with M. Silvy's work at that time, and we can safely say that these negatives are in the same condition as regards density as they were at the time they were taken. They are very much more intense than any now made. We have also examined a number of other old negatives, taken about the same time by different professional photographers; and, although they are what would now be considered very intense, they have not increased in density by the keeping.

It is difficult to conceive how a silver intensified negative can spontaneously become more intense; but, when other materials are employed, the case may be different. Selle's method, to wit. We can quite imagine that some photographers, looking at the negatives they took thirty years back, might surmise that they could not possibly have made them so dense as they now appear, and they are undoubtedly dense as compared with the present gelatine ones—that is, they have greater contrasts. Printing from these negatives cannot be taken as any criterion as to change, because it is well known that the present make of albumen paper, particularly the ready sensitised, yields more vigorous prints from soft negatives than was the case with that of a score and half years ago. Furthermore, the standard of prints is changed. Softness without much vigour is now the order of the day. Formerly, force and vigour were in favour; the shadows were deep purple or black, while the extreme high lights were pure white, as in an engraving. At that period the present prints would be considered poor and flat; now the old style of print might by some be classed as hard, though they were full of gradation. The beauty of a good engraving consists in the depth of its shadows and the purity of the whites, with perfect gradation between them.

In the *Bulletin* of the French Chemical Society M. G. Denigès gives a new and simple reaction for discovering the presence of chlorides in presence of bromides and iodides. A solution of forty grains of phenol and five c.c. of aniline yields a beautiful blue colouration in presence of traces of hypochlorite, the reaction not being affected by traces of the other haloids.

AMERICAN NOTES AND NEWS.

The Free Crayon swindle in America has, we are pleased to observe, recently been crippled, if not disabled, by the post-office authorities in New York. The *New York Herald* has been interesting itself in the matter, and now, by order of the Postmaster-General of the United States, the registered mail addressed to the swindling concern is officially stamped "Fraudulent," and returned to the senders. The payment of money orders sent has also been stopped. The Tanquery Portrait Company, the concern in question, is worked on lines very similar to those English undertakings which we have been denouncing in our pages for some time past; and it has prospered so well that its promoter owns a yacht, a house on the Hudson, fast horses, &c. "Our English contemporaries," remarks the *St. Louis and Canadian Photographer*, "are constantly bringing to the light the doings of some new firm of these swindlers, and the people of merry England get after the managers with a determination we would like to see imitated in our own broad land."

Several of our American contemporaries appeared to have arranged for cable despatches of the awards at the late Photographic Society's Exhibition, and surprise, if not disappointment, was freely expressed that no American exhibitor was fortunate enough in securing one of the "much-coveted" medals, as they are termed. We heartily share our contemporaries' sense of disappointment, which, however, we cannot but take as a compliment to the "poor old" parent Society and its Exhibition. Despite all the lugubrious prognostications as to the future of that Society, we make bold to prophesy that ten years hence our American brethren will be just as eager to secure its "much-coveted" medals as they are now, if not more so.

Portable Photographic Camera, according to Mr. J. F. Sachse he *American Journal of Photography*, must not in future be ed among the productions of the nineteenth century. Recently Sachse disinterred from his library an old book, in which he dis-ered particulars of "an instrument of use to take the draught or ure of any thing. Communicated by Dr. Hook to the Royal ety, December 19, 1694." By the use of this instrument, says Hook, any person that can use his pen and trace the profile of t he sees ready drawn for him shall be able to give us the true ght of whatever he sees before him. The instrument referred to nothing else but a small picture box, much like that which he . Hook) long previously showed the Society for drawing the ure of a man or the like. Mr. Sachse remarks that this is, with-doubt, the first description and illustration of what was virtually nd camera, minus dry plate, film-roller holder, or button arrange-it. But Mr. Sachse will kindly pardon us for saying that he will over, by turning to our volume for 1889, that Mr. Wm. Lang edated him by giving the very drawing and description which he v reproduces.

. JOHN VANSANT advocates the use of lead acetate in the hypo ng bath to prevent the negative frilling and becoming crapy in m weather. About two and a half grains to each fluid ounce of :4 hypo solution are the proportions. The lead hyposulphite first med is immediately redissolved by the sodium hyposulphite. The ght black flocculent precipitate formed after a time appears, says Vansant, to be only the organic matter in the water combined h a minute portion of the lead. Dr. Vansant's communication on this ject appears in the *St. Louis and Canadian Photographer*, one of most sprightly and practical of our Transatlantic contemporaries.

is said that Mr. C. Gentile, the editor of the *Photographic Eye*, will bably fill the office of Superintendent of the Photographic Depart-nt of the Chicago Exhibition. Mr. Gentile, we know, has had a g experience in practical photography, a highly desirable acquisition anybody selected for the office.

E Society of Amateur Photographers of New York at one of their ent meetings had an instructive discussion on the properties of the w reducing agent, para-amidophenol. The experiences of Dr. arles Ehrmann with it appear to have been of an extremely favour-le character. For lantern-slide work it proved, in his hands, very ective, being both superior to hydroquinone and eikonogen for pidity and quality of picture. He also said that he had denied the ssibility of gelatine making a process plate equal to a wet plate; t he believed that in para-amidophenol photographers had a veloper with which it might be possible to attain such density and ch transparency as to equal a wet plate. With regard to the half-nes, he passed round prints which showed conclusively that no fault uld be found with the new developer on that score.

MONG those Americans who have been residing in Europe for some ne, and have made for themselves a good and widespread reputation, Mr. Muybridge, whose speciality of late years has been animal comotion. This gentleman left England for the United States on Wednesday last, his ultimate destination being Philadelphia. Con-rsing with Mr. Muybridge just previous to his departure, and in-uiring what class felt the greatest interest in his work, he said that inters and sculptors far outnumbered all others; physiologists came xt, then anthropologists, biologists, palæontologists, zoologists, natomists, and physicists. Photographers, as such, seemed to take mparatively little interest in the subject, although, as every one nows, it is to photography alone that our present state of know-dge of animal locomotion is due. It is interesting to know that nong those who exhibited the deepest curiosity in the subject as the late Field Marshal Count Von Moltke, who attended veral of Mr. Muybridge's lectures and demonstrations, and became subscriber to his large work.

N an article on "Realistic Photography" in the *American Journal f Photography*, Mr. Xanthus Smith acknowledges the receipt, from Dr. P. H. Emerson, of a folio containing ten of his East Anglican pictures, and expresses the pleasure they have afforded to himself and other painters to whom he has shown them. Mr. Smith, and his friends, while recognising that there are certain shortcomings, chiefly in the composition, says, "There is so much art and truth in the pictures that, to a true lover of nature, there is a vast deal to gratify in them. We see in every one that the utmost has been done that could, to lift the work out of mere commonplace photography. Selection of subject, with a view to sentiment, grouping, action, and general harmony of purpose have been well attained indeed for photography. The absence of accentuation of focus gives an effect of mystery in some, and an effect of breadth of touch in others, that is pleasing to an artist." Mr. Smith says that, opposed as he is to the attempting to lift photography into the realms of fine art, he regrets that Dr. Emerson should have been led to renounce his good work; "for, if it does not meet the expectations or requirements of many learned artists, it is surely very instructing and encouraging for a large number who have not been favoured with a sufficient share of the divine afflatus to be great painters, to be able to gratify themselves in this humbler walk of art."

IN the course of an article on "The Importance of Knowing how to Develop a Negative," in *Wilson's Photographic Magazine*, Mr. B. F. McManus gives one piece of advice which may be the acme of wisdom in its way, but for which, nevertheless, we ourselves are at a loss to discover the necessity. It is, when old developer is used, to filter whenever a plate is developed, otherwise the negatives will be full of spots and holes. But will they? We have never hitherto heard that such effects are likely to proceed—or, indeed, have proceeded—from the cause here assigned. If an old developer is ever allowed to get into such a state that its filtration is necessary, it ceases to have any but the most feeble developing powers, and is, therefore, practically worthless.

PREVENTION OF LIMELIGHT EXPLOSIONS.

COMPARATIVELY few accidents of a serious nature occur nowadays during limelight exhibitions. A gas bag may by accident become charged with a mixture of two gases, and burst with a loud report, wrecking the pressure board and knocking down persons near it; but compressed gas cylinders are growing in favour, and these appear to be quite safe after leaving the works where they are filled, the only exception being the bursting of a pressure gauge attached to a cylinder. Saturators also rarely burst, now the plan of stuffing them with a porous material, such as flannel or wool, has been adopted.

Explosions of a minor nature, being perfectly harmless, if somewhat startling, are called "pops" and "snaps." They are due to the explosion of the gas contained in the jet tubes and the rubber pipe connecting the saturator with the jet. Such pops chiefly occur during frosty weather, and the severe cold of last winter caused much trouble to owners of saturators not artificially warmed.

The warm-air saturator, when charged with *ether* and sufficiently warmed, possesses a practical immunity from pops, owing to a high degree of saturation, the gas which has passed through it being charged with so great a quantity of vapour that it is rendered non-explosive. But with *benzoline*, which gives a whiter and more brilliant limelight than ether, the only way of avoiding pops was to keep up an uninterrupted current of gas issuing from the jet all the time the light was burning. Any check to the current would involve the risk of a pop, in precisely the same manner as withether in a cold saturator.

The only safeguard that could be employed was a jet with a special mixing chamber packed with pumice grains. This, if in perfect order, was fairly proof against the penetrating limelight flame; but, unfortunately, it was liable to deteriorate in use, and when out of order could not readily be corrected by the lanternist away from home. Hence there has been a felt want of an efficient flame-check which was simple and not liable to get out of order.

So far as benzoline is concerned, the writer believes he has discovered such a flame-extinguisher. About eight months ago he prepared a jet thus: the mixing chamber was bored out and enlarged, then packed with cotton wick shredded and separated into threads. This stuffing was enclosed within discs of wire gauze placed above and below, the gas traversing it in an upward direction. A few drops of glycerine were put on the wick, and the excess liquid blown out

with the breath. The nipple and curved tube were also altered to give the best results with saturators. This jet was used by him many times for experimental purposes, and occasionally tested to see if it was flameproof, and not a single pop occurred. The flame could not pass through the damp packing. The writer cannot guarantee at present that this device will answer for ether, as the ethoxo flame is more penetrating than the oxybenzoline or oxygasoline flame, and it is possible that the glycerine might be removed by absorbing the ether and eventually being blown out of the cotton; but with coal gas and benzoline he believes it to be a reliable protection against explosion.

This device is not patented, as it was thought that so simple an expedient, which might contribute to the safety and popularity of the limelight, should not be hampered by any restrictions as to use.

ALBERT W. SCOTT.

NOTES FROM SCOTLAND.

(By a Special Correspondent.)

THERE would seem to be, if judgment is to be formed upon the occasional, if not continuous, wails from southern headquarters, a decided decay of business photographic. Is this so? Looking at the advertising sheets of all the journals, at the continued increase of societies, at the ever extending recognitions of the youthful giantesque art science by the elderly fathers of the press, at the increasing bulk of our annual ALMANAC, the yearly records of various denominations of others, and even now within quite a short time tradesmen's catalogues extending from the modest eight pages into bulky volumes, with quarterly or monthly supplements, does this look like diminishing business, or collapsing trade, or falling off of artistic aspirations, or even reduced or diminished professional work and emoluments? It seemeth not. Closer inquiry into areas more within careful supervision leads rather to an opposite opinion. True it is that some business places decay, and some artistic fires burn out, as they do in all things human; but is that consequent upon a general falling off of public demands, or, indeed, public need for photographic work?

Whatever may be ruling in the "hub of creation," with its "*Bassano Limiteds*," on offer, its "penny in the slot," pushed by the sons of Mammon *collapses*, the business promoters of which latter class always seem to manage to come out smiling and victorious financially, the general round of business and demand for photographic help by, in, and to all, other classes of business seems to be steadily increasing.

In this limited hyperborean little world, it seems to be especially the case. It cannot be because we are gifted with longer summer days, and more brilliant evening twilights; those are compensated for by the shorter and more blustering winter ones, although these are not all so snowy and frosty as some poor benighted southerns, breathing on their frozen fingers—or, as in France, carrying their lighted chauferettes to market, kirk, and table—imagine. Is it not rather that those here engaged in photography as a profession, and others engaged in supplying the multifarious wants thereof, observe, as their neighbours do, which way the public taste is tending, or otherwise strike out into new courses, showing the public—the fickle public—new, improved, or better things, which if, and of, and like beauty itself, are only for a time, are yet a joy for the time, and thus they manage to catch the passing fancy and create an imitative desire in the minds of those who are the great supporters of all who live by supplying articles of taste, of luxury, and of fashion, among which photographic portraits assuredly, for the greater part, are. To being articles of actual necessity, very few can make claim.

In this direction the older and oldest practioners and firms are here still keeping steadily in front, and giving employment as widely as ever; while, as will ever be the case, new men—geniuses in their special aptitudes and ways—arise among us, and seeing, say, the artistic department from a new or different standpoint, display this, and so are commending themselves to what in the end is the most perfect judge for the time being—the public taste.

Whether this is to be attributed to the really excellent exhibitions we have had recently in Edinburgh and Glasgow, or whether these again may not be an outcome of the desires of all who produce efforts of special excellence to let such be seen—this being more especially the case in works which appeal to the eye and to the cultivated taste for recognition—may be a doubtful issue; but the fact remains that, instead of a decadence as groaned over, there has been rather a rejuvenescence, which has produced effects in even unexpected quarters. The most striking, perhaps, of these being the alteration by the artists of the Royal Scottish Academy of the opening of their time-honoured exhibition from the month of February to that of December, thus enabling it to get, as the two previous Edinburgh Photographic ones did, the advantage of the Christmas and New Year holiday visitors, both exhibitions being held in the same m nificent suite of public galleries, and thus the older body shuts younger out from the time which chance, or the exigencies of the serv allowed it. It is not too much to hope for, nor is it too sanguine an look to dream of, the day when every great centre of population shall h its annual photographic exhibition under such rules, or under a body more drastic in the exclusion of rubbish than the Royal Scottish Acade itself is with its shoals of proffered *art—painted art*—examples. Wh we have *that*, the artistic side of photography will take its due pl among the methods by which human skill has striven to perpetuate impressions of the universe, by which it is surrounded.

PHOTOGRAPHIC CHEMISTRY.*

WE are thus brought face to face with the remarkable fact that a f of pure dry haloid gives no product which is more easily reducible t the original haloid by any reasonable amount of exposure to light. the same haloid be diffused in fine particles throughout a sensitis vehicle such as collodion (with the necessary preservative) or gelati and an exposure for a few seconds or a minute fraction of a second gi a product which is far more readily reducible than the unexposed hal It may be pointed out that it is extremely difficult to see where necessity for invoking the physical theory of the photographic im comes in when these facts are fairly weighed.† The facts themsel can be easily demonstrated without any appeal to a photographic plate. is only necessary to take one of the brominated silver mirrors and str it with a dilute solution of gelatine, allowing the solution to remain ten or fifteen minutes in contact with the film. The gelatine stripes c if necessary, be kept moist by adding water from time to time. T plate is then exposed to strong light for a few seconds, washed with wa water to remove the excess of gelatine, and then developed with a we ferrous oxalate solution containing plenty of potassium bromide. If experiment has been properly made, the stripe under the gelatine velops before the remainder of the film is attacked.

From this and many analogous experiments which might be made quoted,‡ it will be made clear to the student that the function of sensitising vehicle is of a very high order of importance. It will be se also that the particular vehicle now in vogue, gelatine, is a particula good sensitiser, and it is legitimate to connect its sensitising action w its well-known power of taking up bromine. It may be asked whethe is more probable that mere contact with a solution of gelatine should alter the physical condition of the haloid (as in the last experiment) as convert it from a comparatively insensitive to a highly sensitive physi modification, or whether it is more probable that the gelatine should act the same way as the reducing agents used as sensitisers in the form experiments with the coated papers. It may, I think, be fairly taug that the balance of probability is in favour of the purely chemical acti of the gelatine. In accordance with this view is the fact that no collodi emulsion, however the haloid may be modified in physical condition "ripening," can be made as rapid as a modern dry plate. On the oth hand, in favour of the view that some weight must be given to the st of aggregation, it may be pointed out that the silver bromide on gla although considerably increased in sensitiveness by contact with a gelati solution, is still much less sensitive than the emulsion.

If, therefore, it is regarded as improbable that mere contact with gelatine solution can alter the physical condition of the haloid, it may asked what happens during the ripening of an emulsion. The stude will have learnt that, when silver bromide is first precipitated in gelati the emulsion is comparatively insensitive. It is only by long cont with the gelatine solution at the ordinary temperature, or by the acti of heat for a shorter period, that the emulsion acquires its maximu sensitiveness. It is believed by the majority of photographic chemi that the change which occurs during this process is a purely physical o —that there is a growth in size of the particles, accompanied by cor sponding changes in optical properties.§ As already stated, it is possib

* Continued from page 682.

† In his inaugural address to the Photographic Section of the Liverpool Physi Society (January 19, 1891, "Photography;" February 19 and 29, 1891), Dr. F. Hurt states that it has always appeared impossible to him "to reconcile the short exposu necessary for the production of photographic images with any theory which manded the absolute separation of the halogen, or part of it, from the silver." bases his objections to this (chemical) theory on quantitative experiments, which to prove that the energy supplied by the initial source of light is totally inadequa to account for the decomposition of the haloid, or the quantity of silver produced the film by subsequent development. It does not appear to me, however, that the experiments or calculations in any way affect the chemical theory of the phot graphic image. The actual amount of photo-chemical decomposition, as measur by the quantity of silver produced on reduction, may be, as the author states, co nected with the initial source of energy by a logarithmic law. But this does n prove that no separation of halogen takes place; the energy is not to be regarded acting upon AgBr alone, but upon a most intimate mixture, or possibly even upon compound, of AgBr and gelatine. The latter substance is well known to combi with bromine to a very considerable extent (20·5—22·9 per cent.; see Weyl in *Che Centralbl.*, 1878, p. 198, and Knop, *ibid.*, 1879). The action of light on the phot graphic film is rather comparable with the action of heat on an explosive mixture compound; the total energy evolved on the explosion of gunpowder is not depende on the amount of energy supplied by the spark which determines the explosion.

‡ See section iii. of chap. x. of Eder's *Ausführl. Handb.*, part iii.

§ For further particulars, see *Chemistry of Photography*, pp. 120, 132.

nat some such physical change of condition may occur, and that the ncrease of sensitiveness may be partly attributable thereto. The con-ition of the bromide particles in an emulsion is, from the beginning, ery different from the condition of the bromide on a film prepared by rominating a silver mirror on glass. Nevertheless, I do not believe that ve are at present justified in teaching dogmatically that the whole in-rease in sensitiveness is due to physical modification only. I must confess that, from experiments which I have been making, and which I ope at some future time to continue, I am gradually coming round o the view that more and more weight must be given to the probability of combination between the silver haloid and the gelatine, and less weight to the state of molecular aggregation than has hitherto been conceded. If analogy is wanted in support of this view, it is only necessary to remind you of the existence of the "gelatino-nitrate" of silver prepared in a former experiment. If gelatine can combine with silver nitrate to form a compound capable of photo-chemical decomposition, it is not unreasonable to suppose that a similar kind of compound might be formed from a silver haloid and gelatine, or some constituent of the gelatine, under the conditions essential for ripening an emulsion. It is desirable that the photographic chemist should be prepared for the proof, which may be at any time forthcoming, that the marvellous sensitiveness of the modern dry plate is not altogether due to the particular state of aggregation of the silver haloid, but that the substance which is so sensitive to light is an organic silver haloid compound belonging to that indefinite "molecular" group so frequently met with in this branch of chemistry.

From this stage onward the practical study of photographic processes may be carried on hand in hand with the demonstration of the chemical principles concerned. The photographic image will be regarded as being most probably composed of a product of true photo-chemical decomposition. This product may, or may not, be identified with the "photo-salts," but it is not improbable that its composition may vary according to the nature of the vehicle with which the silver haloid is associated. The sensitive film which is now in general use will be regarded as a "gelatino-bromide," in the same sense that the term "gelatino-nitrate" has been employed. The photographic image will be looked upon as a design on the surface of the gelatino-bromide, composed of a chemical product more easily reducible than the gelatino-bromide, and invisible simply because of the extreme tenuity of the deposit. When a reducing agent is applied, the material composing the invisible image is alone reduced to metallic silver,* and the picture is said to be "developed." The subject of development may now be dealt with, and the chemical principles of the process demonstrated. It is necessary to commence by pointing out that a photographic developer may act in two distinct distinct ways. In development by vapour, as in the Daguerreotype, and in the so-called acid developers, there is an accumulation of finely divided metal (resulting from condensation in the case of mercury vapour, and from chemical reduction in the case of acid developers) on the material of the invisible image only. If, for example, silver nitrate is reduced by ferrous sulphate or pyrogallol, the pulverulent deposit of metal accumulates by preference on the product of photo-chemical action, and continues to be deposited thereon as long as there is silver being deposited from the developing solution. Where the silver deposit has once formed, there it continues to grow by accretion, and the developed picture is built up of metallic silver. The action is, doubtless, of an electrolytic character, the material of the invisible image and the unaltered haloid forming the two elements of a galvanic couple, and the developing solution playing the part of the electrolyte. To illustrate the mode of action of developers of this class, it is only necessary to use one of the silver on paper designs produced as in the first lecture. An extremely faint design in reduced silver, on being immersed in a solution depositing the metal by reduction, becomes darker and darker by the process of accretion. In order to broaden the student's notions, it must be pointed out, and illustrated experimentally, that this process is not peculiar to silver. A design in any freely divided metal, such as mercury, gold, or platinum, produced by reduction, chemical or photo-chemical, on a paper surface can be "developed" in the same metal, by immersing it in the solution from which the metal is being deposited by chemical reduction.

The other kind of development effected by such reagents as ferrous oxalate, alkaline pyrogallol, eikonogen, and hydroquinone, must be regarded as also due to reduction; but, in these cases, it is the material composing the invisible image which is directly reduced. This constitutes the so-called alkaline development. It must be taught, in connexion with this subject, that the silver deposit which results from the reduction of the invisible image is not the exact equivalent of the quantity of material composing that image, but that the reduction commenced on the portions exposed to light extends downwards through the film as long as the developer is acting. In fact, it must be made clear that the silver deposit *grows* by continued reduction, the action in this case also being most probably electrolytic, the elements being the first film of reduced silver, the unchanged haloid with which it is in contact, and the developing solution as the conducting medium.

The final result of both kinds of development is the production of a silver picture, composed of far more silver than can be accounted for by the actual quantity of the material composing the invisible image. The two kinds of development may be classified as "accretional" and "reductional" (chemical and physical, according to the Continental photographers). The broad principles of the process having been elucidated, the student may proceed to the study of the individual developers, their mode of preparation, and the probable chemical changes which they undergo when acting upon an exposed plate. In dealing with the latter point, it is not essential that the actual composition of the material composing the invisible image should be known; it is only necessary to regard the action as occurring between free halogen and the reducing agent in the presence of water. In the case of such a developer as ferrous oxalate the chemical change is sufficiently obvious, but the action of halogens and water upon organic reducers is far less definite, and it will be safer to abandon all attempts to represent the changes by equations in the present state of knowledge. It may be less satisfactory, but it is a more truly scientific attitude to confess imperfect knowledge than to invent nicely balanced equations which may be quite remote from the truth.

Having mastered the principles of development, it is important that the student should have his attention directed to certain phenomena which connect this subject with the initial action of light on the photographic film. He will have learnt from the previous demonstrations that the photographic image with which he is practically familiar is most probably a product of photo-chemical decomposition. He will thus be prepared for the proof that chemical reducing agents may act in the same way as light; that is to say, that by employing a very slow reducer, and allowing it to act on the silver bromide for a short time, the reduction is carried to the same stage as that which results from the initial action of light. The process of reduction can be arrested at the invisible stage—at a stage intermediate between the haloid and the free metal. The product thus formed, whatever its composition may be, is more easily reducible than the original haloid, and can therefore be "developed" by ferrous oxalate, &c., in just the same way as the invisible image. The simplest way of showing this is to stripe a sheet of paper, coated with the haloid, with an alkaline solution of glucose, allow the latter to act for a few minutes, wash thoroughly, and then develop with weak ferrous oxalate containing plenty of soluble bromide. It may be pointed out that such a result as this, for the experimental demonstration of which we are indebted to Carey Lea, is opposed to the physical theory of the photographic image, since it is difficult to see how the mere contact of a silver haloid with a feeble reducing agent can modify the physical stability of the haloid so as to transform it into a chemically unstable modification.

Another fact bearing on the present subject which must not be overlocked is that mechanical force of the nature of a shearing stress also produces a developable impression on a silver haloid film. So far as my experiments have gone, this result cannot be produced except in the presence of a sensitiser; any of the ordinary photographic films will show it, but I have thus far been unsuccessful with the halogenised mirrors on glass. Although negative evidence does not count for much, it appears thus far that the effect is only producible under the same conditions that an invisible image is produced by light. If this be so, then we have an additional argument in favour of the chemical theory of the photographic image, for the researches of Professor Spring, of Liège, have shown that a mixture of compounds can be made to undergo chemical interaction by mechanical pressure alone. The silver haloid and its associated or combined sensitiser provides such a mixture or compound.

In connexion with the necessarily related subjects of exposure and development, the phenomenon of reversal must be dealt with. I regret exceedingly that time is pressing me towards a conclusion, and that I can do no more than hint at the mode of treatment of this important subject. I have already expressed the view* that this phenomenon is best regarded as reversed chemical action between the halogenised sensitiser and the material of the invisible image. Since that view was put forward three years ago, no new facts have been adduced which are in opposition to it, and I am therefore bold enough to think that it is, at any rate, worthy of being taken into consideration by the teacher of photographic chemistry. In the broadest possible terms, all that we have to consider is that the "photo-salt," in contact with a sensitiser containing more than a certain quantity of halogenising or oxidising material, has the tables turned upon it, to speak metaphorically, and then acts as a sensitiser towards the film which at first acted as a sensitiser towards it. The principle can be demonstrated by utilising a very old experiment. It is known that potassium iodide is capable of undergoing photo-chemical oxidation in the presence of moisture and air; iodine and potassium hydroxide are formed, and, of course, interact in the absence of some other iodine absorbent. A photo-salt is an iodine absorbent, and therefore, if a sheet of paper be coated with a silver haloid, and then exposed to light till it darkens, we have a surface capable of sensitising a solution of potassium iodide, so that the latter undergoes photo-chemical oxidation with extreme rapidity, the liberated iodine being absorbed by the photo-salt,

* It is well known that a reducing agent of sufficient strength to reduce silver bromide directly, such as the ordinary ferrous oxalate developer, may be applied with a gelatino-bromide dry plate. It is generally taught that the haloid is protected in such an emulsion by virtue of the particles being imbedded in the gelatine. I am disposed to believe, however, that the protection is not merely physical, but that the weak chemical combination between the halcid and the gelatine (or one of its constituents) results in the formation of a compound less reducible than the haloid itself. I may point out, incidentally, that the change in size of the particles, and the modification in optical properties undergone by the emulsion during the process of ripening, as well as the increase in sensitiveness, are all in accordance with he chemical theory of the gelatino-bromide film.

* *Chemistry of Photography*, pp. 209-230.

which thereby becomes bleached, *i.e.*, converted into the ordinary haloid.

Having brought the student up to this stage of knowledge, we must leave him in possession of a silver picture produced by development, and the chemistry of the subsequent operations of fixing, clearing, intensifying or reducing, printing, toning, and so forth, will be comparatively simple, after the course through which he is supposed to have been conducted. With regard to these subsequent operations, all that has to be borne in mind is that, after fixing and washing, the image is composed of a graduated deposit of metallic silver, and that all the changes that are wrought upon it by intensifiers or reducers are simply the result of ordinary chemical transformations. Thus the principle of intensification may be demonstrated in the usual way, viz., by producing a design in silver on paper, as in the first lecture, then bleaching it by immersion in a solution of mercuric chloride, and, after washing, converting the mercurous chloride formed into the dark dimercurous ammonium chloride. The final result is a more opaque image—the latter has become intensified.

I have, perforce, been obliged to keep rigidly to my programme in this course of lectures; there has been no time for straying into by-paths, and I have confined myself strictly to the chemical aspect of the subject. I said, at starting, that it has also its physical side, and the special action of the spectrum colours on the different photo-sensitive compounds, the electrical phenomena accompanying development, the action of special sensitisers in connexion with orthochromatic photography, the subject of heliochromy, &c., must be included in every complete course of instruction in photographic technology. It has been my object to indicate the general lines on which this branch of technical training should be conducted; the teacher will, no doubt, discount the personal element from these lectures as far as he may think desirable; and, after he has done this, if he will conduct the student along the broad track, towards which I have acted the part of a finger-post, we may call into existence a race of technologists who will raise the subject of photography to that high position as a science which it has already taken as an art.

—*Journal of the Society of Arts.* R. Meldola, F.R.S.

THE MEASUREMENT OF LENSES.

Often have I regretted that the resources at the disposal of the Technical College, Finsbury, did not enable its staff to organize and equip a proper laboratory for optical measurements, and for the standardising of optical instruments, in the same thorough and practical way in which they have now for more than ten years organized laboratories for electrical measurements. What Professor Ayrton did ten years back for the City and Guilds Institute, in organizing a laboratory for electrical measurements, I have desired to do for optical measurement, believing that, when the opportunity should come, the work would be of as much benefit to the optical industries of London as the electrical laboratories of the City and Guilds Institute have been.

The exact measurement of optical quantities is no novelty, for in this branch of science precision has long reigned, if not in the lower branches of the industry, at least in the higher. And the laboratory methods of optical measurement are for the most part thoroughly worked out and known, though many of them unfortunately involve the use of expensive instruments and appliances.

An optical laboratory should possess the means of testing rapidly, accurately, and without too expensive appliances, such matters as the truth of plane surfaces, the curvature of curved ones, the focal powers of lenses, their aberrations, and their aperture. It should have means of testing mirrors and prisms, as well as actual entire instruments. It should be able to state the results in terms available for future years by the employment of accurate fundamental standards.

With but one very small part of the subject of the work of the optical laboratory do I propose to deal to-night, namely, with the measurement of lenses. Lenses are used for many different purposes, and in varied functions and combinations. Measurements that would be important for some of these are utterly unimportant for others. For example, the condenser lenses used for magic lanterns are not wanted to be either aplanatic, achromatic, or rectilinear; their function being merely to collect the light which emanates from a certain luminous patch, and spread it as nearly equally as possible over the area covered by the transparent slide, so that the whole is equally illuminated, and so that the light so transmitted shall be on the whole slightly convergent. To measure the aberrations or exact focal powers of such lenses would be a useless work.

However, it will be convenient at the outset to enumerate all the things which might be made the subject of measurement with respect to a lens or combination of lenses. These are no fewer than eighteen in number:—

1. Diameter, or linear aperture.
2. Thickness, or length from pole to pole.
3. Focal power, or its reciprocal the focal length.
4. Position of principal focal planes.
5. Position of optical centres ("principal points" of Gauss).
6. Angular aperture.
7. Chromatic aberration.
8. Spherical aberration, lateral and longitudinal.
9. Chromatic difference of the spherical aberration.
10. Loss of light by reflection from surfaces.
11. Absorption of light in transmission.
12. Illumination of field, central and marginal.
13. Complaneity of focus (included in 7 and 8).
14. Degree of distortion of image (rectilinearity).
15. Cylindricity, or degree of astigmatism, including angle of axis of cylindricity.
16. Accuracy of centering.
17. Definition in margin of field (involved in 7, 8, and 16).
18. Refractive indices of materials.

Now, of all these varied matters, there are but three with which the present paper will deal, namely, the focal power of lenses, and the position of their focal planes and principal points.

By focal power I mean, of course, that property on which their convergivity (positive or negative) depends, and on which, in turn, their magnifying action (positive or negative) is dependent. It must be borne in mind, as a fundamental principal of elementary optics, that all that any lens or mirror (or combination of mirrors or lenses) can effect is to imprint a curvature on the wave-front of the light that enters it. If the wave is plane—*i.e.*, consists of parallel rays, to use the old language—then the lens prints a curvature, positive or negative, upon it, by virtue of which its march is changed, and made convergent or divergent. If the wave, before impinging on the lens, is initially non-plane, but either convergent or divergent, then the lens will alter the curvature of the surface, the resultant curvature on emerging being simply the algebraic sum of the initial curvature and the impressed curvature.*

The focal power is the curvature imprinted by the lens on a plane wave, and is the reciprocal of the true focal length. It is appropriately expressed in terms of the proper unit of focal curvature, the *dioptric*.† The proper numbering of lenses in dioptrics has been an enormous gain in one branch of the optical industries—that of the ophthalmists—and it is much to be wished that other lenses than those of spectacles should also be henceforth described in the same way.

Silvanus P. Thompson, D.Sc., F.R.S.

—*Journal of the Society of Arts.*

(To be continued.)

Our Editorial Table.

The *Photographic Quarterly* (Hazell, Watson, & Viney) for last month contains several articles which we have read with interest. It opens with a paper by Mr. H. P. Robinson on "The Transition Period," in which he concludes that everything connected with the art has almost come to a standstill; there is a dead level of "half-plate-itude," tempered with snap-shotism, and among a thousand amateurs photographers there is scarcely a pin to choose. He is of opinion that the standard of excellence for admission to the exhibition of the Photographic Society of Great Britain should be raised, and that good work should not be strangled, because it is good, soon after its birth. "Photography and Research," by J. Hall-Edwards; "A Ramble in Spireland," by Rev. T. Perkins; "In the Ardennes," by Bernard Alfieri, and other good articles go to form a very readable number.

* All the ordinary formulæ of the text-books for lenses are more or less particular statements in symbols of this general rule; for example, the well-known formula—

$$\frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$

in which f is the focal length, and u and v the respective distances of two conjugate points serving as object and image. The reciprocal of a length is a curvature; so that this formula merely states that one curvature is the result of adding two other curvatures together. I have pointed this out in a paper in the *Philosophical Magazine* in October, 1889.

† The *dioptric*, originally proposed by Monoyer as the unit of focal power of a lens, is now in international use, having been formally adopted by the International Medical Congress at Brussels. It is a unit of curvature, and, as such, may be used for other purposes than focal powers—for example, to express the curvature of surfaces. Unit curvature is taken as the curvature of a circle of one metre radius. Or a lens, having a focal length, is described in modern language as having a power of one dioptric. A lens having half a metre as focal length has a power of two dioptrics.

Photographs of the Year.

This work (by the same publishers and arranged by Mr. C. W. Hastings) recognises that the photographs of the year are to be found among those exhibited at the annual show of the Photographic Society of Great Britain. There are twelve photogravures of the pictures selected, and they are well interpreted by the Woodbury Company. The descriptive notes and critical review of the exhibition are by Mr. H. P. Robinson. The *Sea Dream*, by Mr. Clement Williams, is printed in a dark-blue ink, unlike the others, which are black and white. We think it is an error of judgment in printing to give marine subjects of this class in deep green or blue, especially as the sea forms only a portion (less than half in this case) of the picture, which is, nevertheless, a grand one. Van der Weyde's group of *The Misses Dene* and H. Stevens's *Old-fashioned Winter* are admirable. Mr. Ralph Robinson's *Peep-Bo* and A. R. Dresser's *The Caskets* are also as well interpreted as these artists could desire them to be. *The Lesson in Spinning*, by Joseph Gale, is a perfect picture, while the *Manchester Ship Canal* of T. Birtles, despite what at first sight might be deemed its diagonal composition (the foreground and the steamers' smoke lying in parallel diagonal lines), is a truly admirable picture. Mr. Robinson is his descriptive essay cannot congratulate the exhibition upon being better than its predecessors. A feature this year is the number of prints on extra rough paper, which he designates as the charity which covers many photographic sins. These twelve *Photographs of the Year* sell at half a guinea.

Lantern Slides of the Western Riviera.

By F. York.

To those who cannot afford to visit this attractive portion of Europe the next best thing is to see Mr. York's large and fine series of pictures on the screen, and listen to the concise description given by Berita Barnett, in the descriptive "Reading," as an accompaniment to each. There are three sets, these embracing Nice, Monaco, and Mentone, with San Remo and Genoa. Mr. York's skill as a photographic artist is too well known to render it necessary for us to say a word as to the quality, artistic or technical, of these slides. It is enough to say that they look exceeedingly well when examined in the hand, and they project admirably on the screen.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,842.—"Improvements relating to the Adjustment of Photographic Lenses." G. Rodenstock.—*Dated November* 16, 1891.

No. 19,911.—"Photograph Exhibitors." Complete specification. C. G. Soderstrom.—*Dated November* 17, 1891.

No. 19,922.—"Improvements in or connected with Automatic Photograph Machines." D. T. Miller and A. A. Lateulère.—*Dated November* 17, 1891.

No. 19,935.—"Improvements in Photographic Apparatus." Communicated by A. Farinetti and the firm of Clement & Gilmer. E. G. Brewer.—*Dated November* 17, 1891.

No. 19,978.—"A Negative Cleaning Brush for Cleaning the Backs of Negatives or other Plates or Materials used in Photographic or other processes." J. McNeil.—*Dated November* 18, 1891.

No. 20,007.—"Improvements in or relating to Photographic Cameras." G. E. de Faucompré.—*Dated November* 18, 1891.

PATENTS COMPLETED.

Improvements in and Relating to Photo-chromographs.

No. 14,943. Ludwig Meyer, 3, Cornelius-strasse, Berlin, Prussia.—*October* 31, 1891.

The object of the present invention is the reproduction of oil paintings and coloured pictures by the aid of photo-lithography in such a manner that, whilst the result is more true to the original, the reproduction is effected at a less cost than by existing known processes, and is, further, from an artistic view, very much in advance of pictures produced by those processes and of photographs. This invention will also enable less gifted artists to produce pictures which cannot be easily detected as different from real paintings.

According to this invention, the picture to be reproduced—for example, an oil painting from a public gallery—is first enlarged, reduced, or reproduced by ordinary photography, and any desired number of photo-lithographs are then produced therefrom. Each of these photo-lithographs is then illuminated in oil colours, the outlines and the chiaroscuro being produced by the photograph. The picture thus illuminated, when thoroughly dry, is securely transferred or fixed upon an artist's canvas, or other suitable foundation, with the oil colours next to the foundation, and the paper on which the photograph was printed is then removed as in the case of ordinary transfer pictures.

If a picture with very high artistic finish is desired, it is, after having been illuminated, retouched with oil colours by an efficient artist, so as to obtain a more harmonious blending of the various colours and shades.

It will be evident from this description that the illuminating colours lie between the canvas or other foundation and the shading of the photo-lithograph, which circumstance shows at once that the difference between my new process and result and those obtained by the ordinary methods of procedure. According to these methods, the print or photograph forms the ground upon which the colours are distributed, and a natural effect equal to a real painting is not produced because the shading and outlines of the ground picture vanish and are lost through the use of opaque colours. By my method, on the contrary, every object bears its peculiar colour upon which the shadows rest as in nature, and in a picture, which is supposed to represent nature, these conditions should not be reversed.

I am aware that a method is already known in which photography, illumination, and photographic printing are employed, but in this process each individual picture is reproduced direct from a negative by a photo-printing process, no photo-lithographic prints being employed. I desire it to be understood, therefore, that I do not claim the process hereinbefore described with reference to photographic prints, but only with reference to mechanically printed photographs, such as photo-lithographs.

What is claimed is:—The method or process for the reproduction of oil paintings and coloured pictures substantially as hereinbefore described.

Improvements in Photographic Backgrounds.

No. 18,410. William Watson, 37, Naburn-street, Glasgow.—*October* 31, 1891.

My improvements in photographic backgrounds consist in representing, by a background having, preferably, interchangeable parts, interior or exterior views of a railway carriage, "Pullman car," tramway car, or omnibus. The background can be made with a framework of wood covered with cloth and painted. There may also be used a background behind representing a view of a station, landscape, or street, &c. Interchangeable letters may be slid or fitted into the frame so as to represent the name of any place, or of the car or carriage belonging to any company or person.

The interchangeable letters may, if desired, be fitted or slid into a grooved or equivalent frame, which may be fitted on or to the background instead of the letters being fitted into or on the background itself. The interchangeable letters may be made of metal, wood, paper, or other suitable material having a piece projecting from the edge of that part which is in the groove to keep them, when in place, at equal distances apart.

With this invention parties or individuals may be photographed as just going to, or stepping into, a train or car, or as looking out of the window, or sitting in a seat, &c.

The claims are:—1. One or more photographic backgrounds, made or arranged so as to give interior or exterior views of a railway carriage or other vehicle, substantially as hereinbefore set forth. 2. The combination with photographic backgrounds. representing interior or exterior views of vehicles, of interchangeable lettering arranged so as to give the names of places on the photograph, substantially as hereinbefore set forth.

Improvements in Optical Lantern Stages, Slide Carriers, and Slides for Registration.

No. 20,633. David Lionel Salomons, Bart., Broomhill, Tunbridge Wells, Kent.—*October* 31, 1891.

Firstly, in respect to the adjustment of the stage runners or slide carriers of the optical (or magic) lantern:—

Since slides which require registration by means of stops fixed to their edges abut against the end of the runner of the stage, it becomes necessary to fix the said stops most accurately, and the abutment stops which are attached to the end of the stage for use with those slides, which are pushed through the stage until they reach such stop, to ensure their correct position for registration, must have a definite position, or the slides which have stops affixed to them will not register correctly. The necessity of working to two fixed points (viz., the end of the runner and the non-adjusting side stop) is found to be most inconvenient, and often detrimental to an exhibition upon a screen.

At the present time it is usual to make the side stops just referred to adjustable and capable of being clamped, and I now propose to make the end of the runner or end of any form of carrier adjustable.

This part of my invention I achieve by moving the runner bodily to or fro by means of screw, and locking it with a lock nut, or by moving to and fro by means of wedges, screws, racks, or any of the well-known mechanical methods any portion of the runner or the whole runner, as before named, so as to lengthen and shorten at pleasure, within the required limits, the distance between the end of the stage runner against which the stopped slides abut and the stop or point of registration for ordinary slides. The same treatment can be applied to carriers.

This improvement enables the discs to be registered in the best way by means of standard registering slides, when all pictures and other slides which have been set or cut to register will register correctly on the screen.

As it does not follow that slides which have affixed to them abutment stops will afterwards register correctly (even though they have been registered in the first instance), since, when registering anew with the standard registering slides, the optic axis of the system of lenses may not pass through the same part of such slides which abut against the stop fixed to the stage as when these slides were first registered, and consequently also not through the same part of those slides to which stops were attached when registered with them, or in the lantern stages set truly in register by their aid in the first instance.

With the improvement here proposed it will only be necessary to alter the length of the stage runner or carrier to a slight extent or move it bodily, for the original distance to be re-established at any time, after the frames may have altered through expansion or contraction, and once more obtain the register without any further trouble.

In order to facilitate the correct registration of slides, and to throw the discs from two or more lanterns coincidently and to the best advantage upon a screen, I propose the use of a number of standard slides, one to be placed in each lantern; and since these are all mathematically alike, or so far as present means exist for making them so, it is evident that to all intents and purposes the figures upon two or three of such slides may be made to superimpose upon the screen so as to appear to the eye as if only one slide of the figure had been

projected. To bring the coincidence about, well-made optical lanterns should have suitable adjustments, and some have, but till now there have been no standard registering slides made which can be depended upon for truth and accuracy; and, since this class of slides is used not only for adjusting the lantern before an exhibition, but to set and cut the ordinary slides, the importance of having such standard slides of a character to be depended on for accuracy at all times and in all climates is clear.

The second part of my invention consists of improvements in such standard registering slides. In describing them, let it be understoood that, in every form to be hereafter described, the part of the slide which rests upon the runner must be true, so also is the end which abuts against the stop fixed to the end of the stage, and these two true edges or surfaces must be at right angles to one another. The word "true" is used in the usual engineering sense as applied to flat surfaces in rectangular forms. In all cases it is proposed to make the working part of the slide of glass, and it is also proposed to make the slides about the usual size of frame slides in England, although they can be made in any size, if desired. It is further intended that the figures on the slides should be as follows :—

A horizontal line so placed that, when projected, the disc shall be approximately divided into an upper and lower half, a vertical line so placed that, when projected, the disc shall be divided into a right and left-handed half, the combined effect of these two lines being a projected disc divided into quadrants. Besides these lines, there are to be four more, symmetrically placed above those just mentioned, forming a square, with its sides parallel with one or other of the lines dividing the disc into a quadrant, but not so large as to occupy the whole disc. Each angle of the said square might occupy the centre of each quadrant.

Other figures would answer the purpose, but the figure referred to is the best for the purpose.

Having so far described the slides generally in respect to their common properties, I will proceed to describe in detail some of the most suitable forms when ready for use.

The simplest form would be a slab of glass trued on two edges as mentioned, with the figure described upon it at the proper place. Three such glasses would be required for a triple lantern, two for a biunial lantern. All slides that are used as a set, or to form sets of identical make, must by preference have the lines put on them at the same time, in any suitable dividing engine, or with any machine capable of doing dividing and such a class of work—for instance, a milling machine, lathe, planing machine — since many such machines can be arranged to accomplish dividing work. The lines are preferably etched on the glass, or the lines may be engraved on the glass by any other suitable means.

In the place of glass, metal plates may be used with figures or lines perforated in them. In the case of lines when their position would cause a part of the plate to fall out, small portions of the plate could be left here and there, as is done with stencil plates. Glass slides as described could have the sides protected with wood or other suitable material, a hole being cut at suitable places for the light to pass through.

Another form of slide is to have a metal frame trued as mentioned, with the etched glass mounted within it, and, if desired, glasses placed over each side of the etched or engraved glass to act as a protection.

In this form of frame it is necessary to etch or engrave the glass after mounting in the frame, from which it must not be removed after the operation. The best method of fixing the glass in the metal frame is to press it against the two sides which have been trued on the outside edges.

This may be done by means of screws pressing upon the opposite edges of the glass, these screws passing through the frame. Also these screws should not press upon the glass direct, or it may be broken when the glass or metal becomes expanded by heat, or if the slide is jarred. A piece of ivory or well-seasoned wood should be inserted between these holding screws and the glass.

The ivory or wood may also be shaped in a way to act spring fashion.

Another and probably better way of holding the glass in place is to cut a corner off the glass opposite to the side of the frame which has been made a right angle, and here to place a small ivory ring pressed against the glass by means of a screw passing through the corner of the metal frame.

The glass must be kept from falling out by means of any of the usual methods, so as to be equivalent to having placed it in a groove, either such a groove from the first or one built up.

The protecting glasses if used should not be in contact with the one which is engraved or etched. There are an unlimited number of ways in which the metal frames may be made, such as cast solid, built up, built up to have half the groove in each half, or half a V groove in one half, and no part of a groove in the other half. In the last case the glass will rest in the half V groove; or the glass may be mounted as previously described, and protecting glasses resting on or in a metal cell that shall prevent the etched glass being in contact with the protecting ones, and hence not possible to be shifted on being touched or the outside glasses being wiped.

The metal-frame mounted slides have the advantage that another very important registering piece can be added with great facility. To the end opposite the one trued, which abuts against the stage stop, a bracket can and should be attached by being screwed on, and this bracket must project below the lower and trued edge of the slide, say to the extent of $\frac{3}{4}$ of an inch. This projecting part of the bracket may be recessed, if need be, so as not to prevent the slide being pushed into the stage a little beyond its end. This bracket to have a screw and lock nut at the part which projects, so that this screw may abut against the end of the stage runner, and the point of abutment can be varied by means of the screw, and which may be fixed with the lock nut. Thus registration can be effected by means of the slide-adjusting stop pieces, as well as by means of the stage stops, giving in this way two methods of registration as well as the combined methods which would be used when registering slides requiring stops to be affixed to them, with slides which register by abutment against the stage stops.

The claims are :—1. An adjustment to lantern stage runner or slide carriers for the magic lantern, for ensuring superposition of similar views or designs when projected from two or more lanterns or optical systems, attached to one or more bodies containing an illuminant or illuminants such as generally known as optical lanterns, and constructed substantially as described. 2. The movement attached to the standard registering slide by means of screw and lock nut, fastened to the bracket substantially as described. 3. The etched or engraved standard slides or designs, on glass only, or on glass mounted in metal, and trued substantially as described. 4. The combination of adjustable stage runners or slide carriers and etched or divided standard slides, by which perfect registration or coincidence of designs or similar views can be made at any time, substantially as described.

Improvements in Carriers for Lantern Slides.

No. 20,972. Reginald William James, 75, Tyrwhitt-road, Brockley, and Malcolm Stodart, 35, Tyrwhitt-road, Brockley.—*October* 31, 1891.

Our invention relates to improvements in lantern slide carriers, such as those used with optical or magic lanterns, and consists in the provision of means whereby the lantern slides may be partly or wholly ejected from the carrier, thus greatly facilitating the manipulation of the said slides when changing, and obviating the necessity of handling the slides so that the fingers come in contact with the faces of the slide, thus soiling them, the said soil marks appearing magnified on the screen, and giving the picture a very foggy and unsatisfactory appearance.

We carry out our invention by arranging upon the ordinary sliding frame, which carries the lantern slide, an ejecting mechanism, which may consist of a lever with unequal arms, pivoted preferably in the lower part of the frame, the long arm of the said lever reaching to about the centre of the space occupied by the lantern slide, and the short arm being adapted to be operated by hand direct from the exterior, or by means of a pusher extending from the top of the slide frame.

When it is desired to withdraw a slide from the frame, a small amount of finger pressure on the pusher or on the small end of the lever direct causes the slide to be raised by the long end of the lever a considerable distance out of the top of the frame, and enables the operator to grip the said lantern slide on its edges and wholly extract it from the carrier, thus obviating the necessity of bringing the fingers in contact with the faces of the slide.

It is obvious that the same result may be effected by means of a sliding lifter having a hooked end, which shall engage under the lower edge of the lantern slide in such a manner as to lift the slide with it.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 1	North London	Wellington Hall, Islington, N.
,, 1	Holmfirth	
,, 1	Sutton	Sutton Scientific Society's Rooms.
,, 1	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
,, 2	Coventry and Midland	The Dispensary, Coventry.
,, 2	Edinburgh Photo. Society	Professional Hall, 20, George-street
,, 2	Photographic Club	Anderton's Hotel, Fleet-street, E.C
,, 3	Bolton Photographic Society ...	The Baths, Bridgman-street.
,, 3	Leeds	Leeds Mechanics' Institute.
,, 3	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
,, 3	Glasgow Photo. Association.....	Philosophical Rooms, 207, Bath-s
,, 3	London and Provincial	Champion Hotel, 15, Aldersgate-s
,, 4	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Clu
,, 4	CroydonMicro.Club(Photo.Sec.)	OldSchool of Art, George-st., Croyd

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

November 24.—Technical Meeting.—Mr. William England in the chair.

Two specimens of colour photography on silver plates, done according to tl late E. Becquerel's method, and sent by Mr. Doré, were exhibited. The blu and greens were faithfully reproduced, but the red and yellow were wea which Mr. Doré attributed to under-exposure, while the white came out as dirty brown.

Mr. Chapman Jones suggested that in these experiments the use of squa patches of different colours would be a better test than the colours of t subjects from which these pictures were made, which were not true colou

Mr. Jones produced two negatives developed with para-amidophenol. T formula he used was as follows :—

Para-amidophenol chlorhydrate	5 grammes.
Crystallised carbonate of sodium	50 ,,
Crystallised sulphite of sodium.....	50 ,,
Water	1000 ,,

The developer worked quicker than eikonogen, and was very clean, and, dilut with an equal bulk of water, seemed to be just as rapid. It brought out qu as much detail as he expected. The colour of the negatives by daylight wa steel blue.

The subject for discussion was *The Negative, and How to Make the I of It*, and Mr. Jones showed a negative to prove that a thin image could worked up to any density. It had been intensified in sections with mercu chloride and ferrous oxalate. To increase the shadow details, he thought uranium intensifier, used strong, with rapid application, very suitable. should have an addition of a little acetic acid. It intensified the half-to and scarcely affected the high lights. He said he thought the idea that urani makes the negative slow in printing was a mistake.

Mr. W. Bedford asked if the results were permanent? He said t uranium was being employed for toning bromide prints.

Mr. Jones had not noticed any change, and did not think there was parallel between the two cases. Prints toned with mercury were, howe likely to undergo a change.

Mr. BEDFORD said that, with regard to intensification, he preferred the silver and pyro method, especially now that we are always careful to eliminate the hypo. In this we succeeded better now perhaps because less gelatine is used in plate-making, and thus it was much easier to get rid of the hypo. He would not intensify Mr. Jones's negative with silver, as, in actual work, one never had a negative so thin as that. As to reduction general and local, he used ferricyanide of potassium and hypo, taking care to have an excess of hypo to finish with, and well washing afterwards. Perhaps, however, with regard to local reduction, there was no more useful method than friction with methylated spirit. There were few negatives that could not be improved with that. As to clouds, these were now generally done by printing from separate negatives; there was not much printing-in of clouds done now.

Mr. J. SPILLER said that, if we had recourse to Mr. Bedford's recommendation to go back to pyro and silver for intensification, one ought to return to the cyanide method of fixing, as it was so difficult to wash out hypo. Silver was one of the most delicate tests for hypo in a film or paper. Cyanide would be good as a local reducer, and would give a method of grappling with the defect of halation. He had seen some good examples of working with it on church windows, where the light had spread, and cyanide had removed the spreading so well that one would never dream halation had occurred. He thought that the uranium intensification method should be looked upon with caution, because under some circumstances it might change in the light, and produce hardness of the negative. He was also unable to realise that the method of iodine intensification was what was claimed for it. He had never succeeded in strengthening a negative by it, and had once cut a negative in two and treated one half with iodine dissolved in iodide of potassium, and could not observe any difference in the results.

Mr. A. MACKIE observed that, if cyanide was such a good reducer of a negative as Mr. Spiller said, would it not be dangerous to employ it in fixation?

Mr. SPILLER said he would only use it of such a strength as would remove the yellow film.

Mr. BEDFORD remarked that a two per cent. solution had a considerable effect in reducing a negative.

Mr. JONES asked if it was possible to fix with cyanide without losing vigour in the shadows.

Mr. MACKIE also inquired if cyanide did not conduce to frilling.

Mr. BEDFORD said that modern plates would stand pure cyanide, but would frill in the common kind adulterated with carbonate of potassium. He thought local reduction was better done by friction, as you could see what you were doing. Unless the cyanide was allowed to spread, it formed lines.

Mr. MACKIE remarked upon the tendency of a reducer to attack the edges of a plate more than the centre. Bichromate of potash, and sulphuric acid in particular, was liable to attack the part of the plate it was not wanted to.

Mr. JONES said, in reducing a negative, it attacked the shadows in greater proportion than the high lights. This was a strong argument against reducing or getting too much density, and in favour of getting little density and intensifying.

The CHAIRMAN said that negatives might be very much improved by placing a thin sheet of paper on the back with some very thin gum-water and allowed to get dry. They could then be worked upon in various ways. If some parts were too dense, a little petroleum, or a little wax dissolved in ether, applied to the back, would make them fairly transparent. The distances could be softened off with a little plumbago. If some parts were very dense, like water sometimes is, with a fine-pointed penknife the paper could be cut away in a jagged form; the thickness of the glass in printing prevented sharp lines. He had found this necessary with many of his Swiss views, because the mountains in the distance, without very great care, came out much stronger than the foreground. Most excellent results could be got with very little practice. He said that in connexion with one of his Swiss views there was a prominent mountain thirty miles off which it was necessary should appear clear and distinct, but it was very difficult to get it so, on account of the hazy weather. He laid paper over the negative in the way he spoke of, and worked round it with a black-lead pencil to mark out the mountain distinctly, then painted the back of the negative with Indian ink, and ground it off, and so improved the picture that an expert could never tell the negative was doctored. People would not look at the picture if they could not see the mountain. He had sold thousands of it. In some pictures he had seen, Mont Blanc, sixty miles off, had been painted in by the local photographers.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 19,—Mr. A. Cowan in the chair. There was a large attendance.

Mr. George Pendry, of Nottingham, passed round some examples of burnt-in pictures on porcelain, which were much admired. It was understood that the process was a secret one.

Mr. W. LOW SARJEANT having experimented with the new developing agent, para-amidophenol, for transparency work, showed a number of lantern slides developed therewith. He said that he found it between hydroquinone and eikonogen in the character of the results, giving the density of the one and a fine black deposit. He employed Dr. Andresen's formula, which was as follows:—

Para-amidophenol chlorhydrate	8 parts.
Sodium sulphite	80 ,,
Sodium carbonate	40 ,,
Water	1000 ,,

It was very rapid in work, and bromide might be used with it. Mr. Sarjeant had also brought six bottles of the developer with him, which he presented to the Association. These were balloted for by the members present. The lantern slides were much admired on account of their fine tones, beautiful gradation, and general "wet-plate" character. They were made on Thomas's plates.

Mr. A. HADDON observed that, on a former occasion, a sample of a salt had been handed to him by a member, who desired to know what it was. Before saying, Mr. Haddon said he would like to be informed the use for it.

Mr. H. B. SMITH said it was used in photo-lithographic work, and it appeared in the sensitising bath, and was supposed to assist the ink in leaving the paper. The bath was composed of—

Water	1000 parts.
Potassium bichromate	50 ,,
"The mysterious salt"	5 ,,

Mr. HADDON then stated that the mysterious salt was sulphate of manganese.

Mr. SMITH inquired whether any communication had recently been received from the Photographic Society of Great Britain as to the affiliation scheme.

Mr. R. P. DRAGE (Hon. Secretary) said that no communication had been received, but he was hoping to hear from the Society shortly.

Mr. J. BARKER produced a gelatino-chloride print, toned in the ordinary acetate toning bath used for albumen prints, to support a remark he had previously made as to there being no necessity to use a special bath for toning gelatino-chloride prints.

Mr. DEBENHAM said that greater permanence would result from using the sulpho-cyanide bath, as it contains more gold.

Mr. BARKER thought that the sulpho-cyanide helped to remove the silver from the print.

This being a lantern night, the slide competition, which had been in progress for some time, was brought to a decision. Four negatives had been placed at the disposal of competitors, from which the competing slides were to be made. These were now compared one with another on the screen, and a vote of the members taken as to which were the best. The competition resulted as follows:—First negative, Portrait of the Chairman: first, Mr. E. W. Parfitt; second, Mr. Kellow. Second negative, View at Ickenham: first, Mr. J. S. Teape; second, Mr. Kellow. Third negative, View at Shere: first, Mr. T. E. Freshwater; second, Mr. H. D. Atkinson. Fourth negative, Richmond Bridge: first, Mr. T. E. Freshwater; second, Mr. G. W. Atkins. Mr. Freshwater's slides were made by the collodio-albumen process, the other winners, on gelatine lantern plates.

At the conclusion of the competition, a miscellaneous collection of slides by Messrs. L. Medland (horses trotting, jumping, &c.; exposures, one-five-hundredth and one-three-hundred-and-fiftieth part of a second), H. E. Davis, Debenham, W. Low Sarjeant, Freshwater, and A. L. Henderson (wet-plate slides, by Wilson, of Aberdeen, from Mr. Henderson's own negatives of views of Cannes; Villefranche; Grasse, showing the hotel where the Queen sojourned last spring, as also several of Her Majesty's apartments).

The meeting concluded at a late hour.

CAMERA CLUB.

NOVEMBER 19.—Mr. G. L. Addenbrooke read a paper on *Aluminium and its Application to Photography*. Mr. W. England occupied the chair.

Mr. ADDENBROOKE briefly described the method of production of the metal, dwelling upon the circumstances which have led to the cheapening of its price. The qualities and characteristics of aluminium for casting, soldering, rolling, and for working generally were given, and the lecturer concluded by describing the utility of the metal for photographic purposes. Some examples by the Phœnix Engineering Company, who appear to be chiefly responsible for the development of the metal for practical purposes, were on exhibition in the room.

In the discussion, remarks were made and questions put by Dr. Massey, Messrs. Andrée, Cunningham, Howlett, Seyd, W. H. Harrison, and the Chairman.

At the lantern evening, Monday, November 30th, Mr. Frank Haes will exhibit his slides, showing what was done in *The Early Days of Animal Photography*. On Thursday, December 3, Mr. A. R. Dresser will treat the subject *Toning Bromide Paper and Transparencies*, with demonstration and illustration.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

NOVEMBER 23,—Mr. J. Saville in the chair.

Mr. F. E. JONES read a paper on *The Working of Black and Sepia Platinotype Paper*, demonstrating his points as he went along. Mr. Jones said that many who had not tried the process were under the impression that it was difficult to work. This would be shown to be erroneous. It was at once the simplest, quickest, and cleanest of all photographic processes of printing. The most suitable negative was one full of gradation, obtained by a full exposure aud a rather slow development, but not necessarily dense. The paper had been greatly improved during the last eighteen months, and would yield good prints from any ordinary negative. The lecturer, having given the instructions and formulæ, which are to be found in each packet of paper, said that prints made from a negative with moderate contrasts showed the shadows of a dull orange tint, lighter and different in tone from the other parts. The parts were solarised, and the prints would develop correctly. Thin negatives would not produce this effect. Hard negatives would when developed show heavy blacks in the shadows. Such prints required hot and prolonged development. It was difficult to say what amount of detail should be visible in the print before development, but usually all parts of the picture, except the detail in the highest lights, should be visible. Paper which had been kept some time under proper conditions would yield best prints from a hard negative. 130° Fahr. might be considered the standard temperature. Over-exposed prints might be saved by cool, and under-exposed prints by hot development. The lecturer here developed several black prints he had made from members' negatives, showing the method of working, avoiding air bubbles, &c., and said the developer when stored away for future use should be kept from the action of a strong light, and it was a good plan to add a little fresh developer to the working solution on each occasion of using it. It was advisable to give three clearing baths, for five, ten, and fifteen minutes respectively, to the prints after development. With few exceptions, the sepia process was similar to the black. It was more easily affected by light, therefore increased care must be taken in handling. The special solution must be used in the developer, and the same dishes must on no account be used for both processes. The temperature must be from 150° to 160°. Discolouration of the whites

would be due to want of sufficient special solution in the developer, exposure of the developer to light, the use of dish with cracked enamel exposing the iron, paper kept too long, or exposure of the prints to light while clearing. Porcelain dishes, carefully heated, were best for the sepia process. The faults usually found in beginners' work were as follows :—1. Prints grey and wanting in vigour, probably due to (*a*) under-printing, (*b*) a weak negative, (*c*) cool or too short development, or (*d*) a weak developer. 2. Black spots, or black or grey smears, caused by tearing the paper, allowing particles of the sensitive salt to be sprinkled over the print, and redueed there on development. 3. Rusty prints ; the paper was stale or damp, or the developer was at fault. 4. The whites were degraded. If grey, the paper or the developer had been exposed to too much light; if drab, the paper was stale or damp. To prove if the paper were at fault, develop a piece which had not been exposed to light ; after clearing, if not white, it had deteriorated. 5. The shadows were soaked out, resembling brown paper. Cause, solarisation ; cure, give a longer and hotter development, on no account removing till the salts had been thoroughly reduced in the shadows.

PEOPLE'S PALACE PHOTOGRAPHIC CLUB.

NOVEMBER 20,—Mr. R. Beckett in the chair.

Mr. HELLARY asked the best way to block out a portion of a negative.

The CHAIRMAN thought that Brunswick black, as bought at the oil shops, would answer his purpose. He (the Chairman) had used it for years. It was cheap and easily procured. He said the quickest way was to roughly block out on the glass side of the negative, and to carefully finish up to the fine details on the film side, then varnish to protect the printing paper from sticking.

Mr. S. BECKETT then gave a demonstration of the gelatino-bromide printing process. He said its advantages over other printing processes were, first, its rapidity of production ; and, secondly, the uniform results. A number of prints could be got off quickly, and of one colour throughout. He recommended the ferrous-oxalate developer for black and white prints ; but, when toning with uranium was to follow, the hydroquinone developer should be used. After demonstrating exposure, development, &c., Mr. Beckett toned several prints in the uranium bath, as recommended by Mr. Weir Brown. The colours ranged from warm black and sepia to red. The prints, he said, should be well washed from hypo, and, if the ferrous-oxalate developer was used, no iron should be present in the paper, as it showed itself by blue markings, owing to the presence of the ferricyande. It was, therefore, better to use quinol when toning was to follow. Several prints illustrating his remarks were handed round.

HOLBORN CAMERA CLUB.

NOVEMBER 20,—Mr. Fred. Brocas in the chair.

Mr. J. G. Hudson demonstrated the "Kolm," a light for taking portraits at night. It is an arrangement whereby magnesium is blown into a spirit flame, giving a steady light for any length of time necessary to take a portrait. The light is shown behind ground glass, and the smoke is carried away by a curved funnel. It burns very little magnesium, and gives an excellent light. It is a simple, though ingenious, contrivance, and serves its purpose admirably. Mr. Hudson exposed half a dozen plates in the room on single portraits and a group. These were afterwards developed, and turned out exceedingly well.

BRIXTON AND CLAPHAM CAMERA CLUB.

NOVEMBER 19,—Dr. Reynolds (Vice-President) in the chair.

A letter was read from the President, Mr. A. R. Dresser, regretting his inability to be present, owing to indisposition.

The Committee reported that, in accordance with the wish expressed by the members at the last meeting, they had inspected some rooms that they thought would be more suitable than the Gresham Hall, their present quarters, as they were much larger and more convenient, as they also had the advantage of having a room adjoining, with a sink with hot and cold water laid on, which could be used as a dark room and for demonstration purposes. A long discussion followed, and finally it was unanimously resolved that the Club take up its abode at the Clarence Rooms, 376, Coldharbour-lane, Brixton, without delay, and that a reception be held on December 10 to inaugurate the opening. ....

CROYDON CAMERA CLUB.

NOVEMBER 9,—The President in the chair.

Mr. C. F. OAKLEY gave a demonstration on the making of window transparencies to a well-filled room.

In the discussion which ensued, Mr. Sargeant advocated the erythrosine bath, where the transparency is enlarged from a smaller-sized negative, and Mr. Weir Brown advised that, where thin negatives had to be printed from, the positive be over-exposed and subsequently reduced. Mr. J. Pinkham showed photomicrographs, and Mr. E. C. Whitaker gelatino-chloride prints, besides examples of work passed round by other members.

NOVEMBER 23.—The President in the chair.—Members' Lantern Night.

Mr. D. E. Goddard, of Wallington, was elected a member ; and Mr. Artherton nominated to a seat on the Council, *vice* Mr. Maxey, who has left Croydon.

A lengthy report of the Council was brought up, embodying schemes of an exhibition, with open classes, proposed to be held in 1892. After discussion the members approved of the proposals, and a guarantee fund was immediately opened. All members who have not already done so are asked to guarantee 5*s.* towards the deficit, if any. Local residents who are not connected with the Club are also invited ; but the Council have considerable reasons for thinking the exhibition will pay its way, as the last one, although on a smaller scale, was so greatly appreciated.

The following fixtures were announced :—November 30, Special lantern show, by Mr. Charles W. Heastings. December 7, *The Open Sesame of Successful Photography*, by Mr. H. Maclean ; 21, Lantern night. January 4, a Paper by Mr. Charles Hussey.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

NOVEMBER 20,—Mr. Edward Lovett (President) in the chair.

Mr. J. A. CARTER, B.A., gave a lecture of *A Tour Through the Norwegian Fjords*, illustrated by a series of photographs which he had taken during his travels. Starting from Gravesend, Mr. Carter ably described the lovely country and the strange and beautiful scenery. The kind and obliging manners of the people so impress and interest one, and the bracing, health-giving atmosphere so rejuvenates one, that one longs to go again.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

NOVEMBER 20,—The President (Mr. Andrew Pringle) in the chair.

The proposed testimonial to Dr. Maddox was brought before the meeting, and several donations were given by members.

The PRESIDENT then gave an address on *The Principles Involved in Enlarging on Bromide Paper*. Condensers were first treated, their size, focal length, construction, and functions. The projection lens was then discussed, and its relations to the condenser. The lecturer decribed apparatus for enlarging by daylight and artificial light, and used drawings in illustration of his remarks. A few words were said about the relative merits of daylight and artificial light, and hints were thrown out on the weak points of enlargements, and on the best way to overcome the difficulties.

Lively discussions and questions to the lecturer followed, and fresh points were elicited thereby.

Mr. CLARE described his method of using an Argand gas-burner and a reflector, and other members joined in the discussion.

RICHMOND CAMERA CLUB.

NOVEMBER 20,—Mr. Cembrano in the chair.

Mr. HERBERT FRY grave a demonstration of *The Development of Opals and Ivorytypes*. After some remarks on the relative merits of the ferrous-oxalate and hydroquinone developers and the advantages of an acid fixing bath (hypo and acid bisulphite of soda) in substitution for the usual acid-clearing bath before fixing, Mr. Fry proceeded to expose and develop with hydroquinone an opal and a celluloid (or so-called ivory) film, very beautiful results being obtained. He clearly explained the processes, and gave formulæ as he went along, and afterwards replied to various inquiries of members, of whom there was a strong muster. In the report of last week's meeting, caramel with *glycerine* was inadvertently written for caramel with *gelatine*. If any one has tried the former backing, the reporter sincerely hopes he may live till it is dry.

MIDLAND CAMERA CLUB.

NOVEMBER 20,—Dr. Hall Edwards (President) in the chair.

Fifteen new members were elected, making a total of sixty-three at the second meeting of the Club.

Dr. Leech offered a prize of a hand camera, if the Club intended to hold any competitions at the end of the winter season.

The lantern was then brought into requisition by Messrs. Warren and Welford, and the slides were described by each member. Professor Allen showed several of Somerset churches ; the President, a few home portraits and some old sketches made in lead pencil upon ground glass, afterwards made transparent by varnishing. These latter, he said, were extremely easy to do, and the surface admitted of the most delicate shading. The Hon. Secretary showed hand-camera shots, flashlight work, and isochromatic results against ordinary plates. Mrs. Welford showed hand-camera work, and the following exhibited various sets :—Rev. J. Henry, Messrs. T. J. Perry, Frederick Iles, W. W. J. Nicol, R. J. Bailey, and William Bentley. Dr. Maberley showed a series of Norway slides.

Next meeting, December 4, *The Keeping Qualities of Gelatine Dry Plates*, by Dr. Leech.

DERBY PHOTOGRAPHIC SOCIETY.

NOVEMBER 19.—The "New Hampshire" Lantern Slides (seventy), kindly lent by the Liverpool Amateur Photographic Association, were exhibited by the oxyhydrogen lantern. Mr. Bendle W. Moore was unanimously elected a member of the Society.

OXFORD PHOTOGRAPHIC SOCIETY.

NOVEMBER 17.—Mr. H. Minn (Hon. Secretary) gave a demonstration on *Collodio-bromide Emulsion Making for Transparencies*. The whole process, from the making of the pyroxyline to the varnished transparency was clearly explained. A half-plate transparency was then made and handed round to the members.

Mr. W. W. Fisher, M.A., Corpus Christi College, public analyst, The Museum, was elected a member.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 13.—Annual Meeting.—The following gentlemen were elected officers for the ensuing year :—*President :* Mr. G. A. Carruthers.—*Vice-President :* Dr. W. H. Hunt.—*Council :* Messrs. Paul Lange, A. F, Stanistreet, G. Latimer, C. B. Reader, G. E. Thompson, H. B. Millar, W. T. Briggs, and A. F. Edwards.—*Lanternist :* Mr. W. A. Norrish.—*Librarian :* Mr. J. A. Forrest,—*Auditors :* Messrs. A. Bradbury and H. S. Nicklin—*Hon. Treasurer :* Mr. W. A Brown.—*Hon. Secretary :* F. Hope Jones, Prenton, Birkenhead.

The Secretary's and Treasurer's reports having been submitted to the eting, the PRESIDENT (Mr. G. E. Thompson) gave a demonstration *Finishing of Transparencies*, an exhibition of slides by various members minating the proceedings. It was decided to extend the time for sending nts in for competition until the date of next meeting.

EDINBURGH PHOTOGRAPHIC SOCIETY.

E competitive exhibition, restricted to members of this Society, took place the Architectural Hall, 42, George-street, on the three days following the nual meeting of November 4, being freely open to the public as well as mbers. The number of works sent in were under 130, divided into three sses. Class A.—The President's silver medal for the best picture taken at y of the Saturday rambles. These were landscapes only, and of all sizes, m quarter-plates to 10×8. The names of the competitors were hidden der *noms de plume* and numbers only, and there being no catalogue rendered difficult to individualise the pictures. The views were all in the vicinities of verkeithing, Balerno, on the Water of Leith, and Dalkeith, the scenes of the turday rambles. The titles of many of the pictures being very similar made scrimination no easy matter, and criticism impossible to be understood with- t having sight of the pictures themselves. The method for selection—that of allot by members of the Society—is the one probably least open to objection here high-class professional judges are not called upon to exercise their skill d acumen. The form was exceedingly simple :—

In my opinion the best pictures are as under :—

Class A.	*Class B.*	*Class C.*
No.	*No.*	*No.* .....

Member's Name .....
Address .....
Date .....

d may asisst either for comparison or example by other bodies. The slip as folded up, and dropped into a locked box, which was opened after the ose of the Exhibition by the officials of the Society, the papers examined and unted, with the result that the President's silver medal, Class A, has been varded to Mr. Patrick, one of the lately elected members of the Council, for mount containing five views taken at the Dalkeith meeting. They were inted in platinum, the finest of the series being two upright views on the k, excellently chosen, and rendered with all the delicacy and charm which a ie picture should have. In this group there were many very good—indeed, ie photographs ; such as No. 36, *A Shady Pool on the Water of Leith ;* No. *A Bridge over the Water of Leith ;* No. 6, *Rosyth Castle ;* No. 4, *Inver- ithing :* No. 36, *Malling House,* and many others. In Class B, for the best cture from negative taken since January 1, 1891, the Society's medal has ne to Mr. L. G. Paterson for his picture, *Fast falls the Eventide.* This is a e bit of landscape, with dark clump on right and a river running to fore- ound, and is printed on rough drawing-paper, perhaps slightly over-sized ; e one artistic defect being that the rolling and somewhat too parallel masses cloud fail to have their effects of shadow on the watery foreground. Still, owing for the difficulty of photography being "merely mechanical art," it is ine bit of work, and well deserves the honour. No. 63, *A Harvest Field,* other reddish print on plain paper ; No. 66, *Winter,* three views on the Tay ove Dunkeld ; No. 43, *Elgin,* and *A Smith's Shop,* with figures well dis- ed, but indifferently printed—the latter said to be a flashlight picture—all serve notice. In Class C, in which the Society's medal was offered for the t figure study, not being a portrait from negative taken since January 1, l, the award has been given to Mr. J. Stewart Smith for his *Yum-Yum at* , a Japanese interior, which is excellently well managed, although not en in "Far Japan." In this class there were a number of good artistic dies. Nos. 7 and 8, single figures, entitled *Reverie* and *Meditation,* well in natural landscapes ; No. 6, *The Evening of Life,* an old woman in a ly carrotish landscape, and a group (No. 5) of three, with a swing, were all iceable, as were two views at Dordrecht.

considerable number of pictures sent "not for competition" helped to fill large hall. One set of small landscapes in vignette, developed on bromide er with a camel's-hair pencil, looked exceedingly well. A number of trans- ncies by the President showed his characteristic taste and style.

he number of visitors during the three days took great interest in the ibition. Their comments were free, and guesses as to the artists' personali- were many.

he awards will be publicly announced at the next meeting of the Society.

ASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

EMBER 20,—Mr. John Morison, jun. (President) in the chair.

ter the usual business, a paper was delivered by Professor A. Humboldt on, of the Technical College, on *Kallitype and Kindred Printing Processes,* uich he gave a very able demonstration. There was exhibited a very large ine collection of lantern slides.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

EMBER 20.—The chief business of the evening was a demonstration by H. M. Smith, of the Eastman Company, who brought under the notice of iembers a new rapid bromide paper, which could be toned to a sepia tint olour preferred by many to the cold steel-blue tone of ordinary bromide . Referring to the Kodak camera, he recommended the larger sizes, quarter-plate and upwards. From twenty to twenty-five feet was about est distance for a hand camera from the nearest object. Mr. Smith ited a series of lantern slides, comprising views in England, Wales, and several Continental countries, all taken with a Kodak camera on quarter-plates and 5×4.

In the competition for enlargements, the prizes were awarded as follows :—First, Mr. D. Ireland, two views of a Norwegian fjord ; second, Mr. J. Munro, St. Monans and Perth Bridge.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 19,—Mr. Mackie (Vice-President) in the chair.

The subject for the evening was the Chairman's paper on *Hand-camera Work.* After speaking on the various points of what he considered a good hand camera, Mr. MACKIE took up the development of instantaneous exposures, recommending dry pyro, with ammonia and bromide of potash. He afterwards showed a selection of lantern slides to illustrate his paper.

The lantern lamp used was Stocks's patent, kindly sent down by Mr. Stocks for exhibition. The general opinion was that the lamp was a considerable improvement on the ordinary form of paraffin lamp—the chief points of improvement in it being an adjustable chimney, and the reflector outside the combustion chamber.

VIENNA PHOTOGRAPHIC SOCIETY.

AT the last meetiug of the Society, Professor EDER gave an account of the application of photography to decorating the surface of thin metal sheets, invented by Mr. Brandweiner. The patented invention is this :—A polished sheet of metal is etched by means of a relief of gelatine photographically produced, serving as a matrix for a silver skin one-twentieth millimetre thick or less. Copper is then, by means of electricity, precipitated just as thin, and, finally, paper is pasted on it, and the whole removed from the original. The polished parts are now dark, the etched ones snow-white. Designs of these two colours look very nice indeed. Dr. Eder spoke further of the sensitising of asphalt by sulphuration, and gave the proportions found by Valenta.

Mr. E. HAAKH, of Stuttgart, described an apparatus invented by him to produce life-size pictures by magnesium flashlight and daylight. The pictures are taken by means of a long tunnel and movable screens keeping all reflected light from the lens. The light enters from the side of the apparatus ; the sitter is enclosed in a pear-shaped tent that can be turned round, surrounded by transparent curtains. The apparatus can be worked also in a room, but the camera requires a space of fifteen metres. The price of the whole from Steinheil, in Munich, is 2500 marks.

Colour prints by Meisner & Buch, of Leipzig, on a peculiar paper were universally admired by those engaged in Farbenlichtdruck, colour prints made by Lichtdruck or collotype.

A tableau of heliochromien, by Dr. Raphael Kopp, of Münster (Switzerland), was another item of interest. It seems that he goes to work differently from the old Poitevin process. Sulphur yellow, brownish yellow, chocolate, and light rose, olive green, but not blue, were the colours represented in his pictures. The author says that the colours can by his method be entirely fixed.

Lastly, Mr. Muller (Lechner's manufacture in Vienna) showed an instrument to be fixed on a hunting gun, by which the mark is automatically photographed.

THE PHOTOGRAPHIC SOCIETY OF JAPAN.

A MEETING of the above-mentioned Society was held at No. 9, Kaga-Yashiki, Tokyo, on the 4th instant. The object of the meeting was to give members an opportunity of testing the rapidity of their instantaneous shutters. A fly-wheel, rotated by a crank, and having a silvered glass ball attached to the periphery was fixed up, with a seconds pendulum along side of it. By watching the seconds pendulum, it was very easy, after a little time, to make the wheel revolve at a uniform rate of sixty revolutions a minute, or one a second. Immediately that a uniform speed of sixty revolutions a minute had been attained, an exposure was made with the shutter to be tested. On development of the plate, the angular motion of the wheel was indicated by the length of line traced out by the silvered ball, and it was a very simple problem to work out the exposure in the form of the fraction of a second. The shutter that worked the most quickly was the "Caldwell." This, at its highest speed, gave an exposure estimated at only the one-hundred-and-twenty-fifth of a second. Of the most rapid of the other shutters tried, none gave as little as twice this length of exposure. The longest exposure that was "Instantaneous" (not "time") was one-thirteenth of a second. Photographers who do "instantaneous work" have generally notions, vague to say the least of it, about the exposures they are giving. The tests made by the Photographic Society of Japan go to prove that by far the greater number of "instantaneous exposures" are somewhere between one-twentieth and one-fiftieth of a second. An interesting feature of the meeting was a trial of speed, by several of the members, in hand exposures "cap off and on." It was shown that more than one member could give an exposure as short as one-fifth of a second by hand, and that without shaking the camera at all. It was found advisable to use a very loose cap. The following gentlemen were elected members of the Society :—Mr. E. Beitter, Mr. J. Rickett, and Mr. S. Suzuki.

Correspondence.

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

BLISTERS ON ALBUMENISED PAPER.

To the EDITOR.

SIR,—I hardly ever take up a photographic publication without seeing something on the subject of the blistering of albumenised prints—loud and bitter complaints of their troublesomeness, elaborate theories as to

their origin and cause, and long and complicated methods for curing them. In your own valuable JOURNAL two or three articles on this subject have lately been given a prominent place, you, sir, saying in one that blisters are "the *bête noir* of the photographer, whether professional or amateur." All this I read with unfeigned astonishment, for I have now been an enthusiastic amateur for eight or nine years, doing all my own printing, toning, and mounting, and never once have I met with a blister of any shape or size. To what am I to attribute this complete and extraordinary immunity from a pest that plagues all my brother photographers? Am I the favoured of Heaven, and is it due to a special interposition of Providence on my behalf?—I am, yours, &c.,

C. BURTON BARBER.

1, *Titchfield-road, Regent's-park, November* 21, 1891.

[Mr. Burton Barber's experiences have been of a very favourable, not to say unique, nature.—ED.]

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the EDITOR.

SIR,—Permit me once more to speak on the question of priority with Mr. Dallmeyer.

Mr. Dallmeyer says that from his description of October 16th it must be evident to every one having the necessary knowledge *which* construction was meant, as *only one construction* had the described properties.

This is, as Mr. Dallmeyer must well know, not correct, because any system of a long-focus object lens or a short-focus positive lens have this property, with the exception that they will produce upright images.

I chose the combination of positive and negative lenses because, from my preliminary calculations, I had convinced myself that it was the way to obtain the desired result with the least number of elements.

Finally, my letter says that it was through Mr. Dallmeyer's description that I took out my German patent then and there. I would otherwise have waited until my final calculations had been completed. I would anyhow have taken out a patent, not only in Germany but also in England, had not Mr. Dallmeyer's prevented me from it; but I did not say that his publication was the cause of my taking a patent. I must also take exception to Mr. Dallmeyer's remark when he credits me with the power of completing my calculations for such a lens in one day and a half. His description was published (in London) on October 16, while my patent was applied for on October 18. I must say that I do not calculate with such rapidity, and I do not believe that Mr. Dallmeyer completed his calculations in so short a period as two days.

Point 4 (*a*) of Mr. Dallmeyer's letter is to me an enigma. How can an optician, who must know the astronomical telescope, make such an assertion? Also, I do not know what is meant by paragraph 6 of his letter.

I would have been gratified if Mr. Dallmeyer had more frankly acknowledged the *independence* of my idea; there is absolutely no reason why he should doubt it.—I am, yours, &c.,

DR. A. MIETHE.

Potsdam, November 23, 1891.

LEACH'S LANTERN MICROSCOPE.

To the EDITOR.

SIR,—My name having been so prominently used by Mr. J. A. Furnivel in his ill-advised letter of last week, I suppose the most I can do is to condescend to meet him on ground chosen by himself. I shall take up his remarks *seriatim* so far as they apply to me or to my lantern microscope, leaving Mr. Chadwick, of course, as he is so well known to your readers, to take care of himself; and first, "As one who constructed and worked the lantern microscope several years before even Mr. Leach, I think I am able to judge what such an instrument will do." Seeing my connexion with the lantern microscope began in the year 1850, I have asked him more than once what age he was at that time, and as a straightforward answer to this question, which he has not yet attempted to give, would settle his pretensions on this point, I need not say another word in regard to it. Second, "The magnification which enables the observer to see *all* the details of an object is the largest to which it should be subjected, anything beyond this defeating the purpose." Who, does Mr. Furnivel say, contradicts this? It is the very thing we have always argued for and mentioned. Does he pretend to say that his microscope does this? Does he show *all* the details of an object on the screen with the magnifying powers he uses, or with the (no alum trough) light which he brings to bear upon it? A few facts bearing upon this point are worth thousands of words. Well, he gave an exhibition here at the beginnin of this month. He used first a two-inch objective, and showed with it lot of objects which could have been shown with an optical lantern havir a four-inch focus objective just as well without any lantern microscope all; showing large vegetable organs such as calix, petals, stamens, pistil anthers, ovaries, &c., in section, is not showing vegetable structur When he made an attempt with the one-inch objective to show structur the exhibition was a failure. The light was *non est*, and no one at sixte feet from the screen could see what the lecturer was talking about. I tried to show cellular structure, vascular structure, spiral structur fibrous structure, and the various structures of bark all in vain. Stomat starch, *in situ*, raphides, stellate hairs, &c., were said to be upon the scree but the lecturer was so certain that no one but himself could see ther that he suggested that the audience in some cases should go up to t screen and look at them. Here the *object of the exhibition* was inde "defeated;" but, contrary to what he says, it was for want of magnificatio and for want of the light which makes magnification possible.

Now, I am in a position to say that the objects which so signally fail "to come out" were well and properly mounted. Some of them I ha since purchased for screen work, and have gone through the whole c lection upon the screen with my microscope, to the satisfaction of t mounter and of every one present, who were requested not to go nea than sixteen feet to the screen, so as to give each object a fair tri Vascular, fibrous, cellular, vesicular, spiral, Cambrian, and all kir of structure might have been seen very well by many hundreds people in any size of lecture-room; and as to starch, raphid stellate hairs, stomata (even to their little open mouths), were exce ingly well seen. The starch granules glittered like diamonds on screen; the stellate hairs, with three, four, and up to seven rays, w conspicuous as the rungs of a ladder.

To do this I had abundance of light at command, and my powers were inch and half an inch, these being supplemented with the amplifier, wh about doubled the powers. Of course, no ordinary eyepiece can be u in these demonstrations, but the magnification of the objects, on acco of distance, is much greater than that usually attempted with eyepie and these powers combined.

Here, then, we have had two exhibitions with the same objects, same lecturer, and, to some extent, the same persons saw both—the creating disgust and contempt, the other unbounded enjoyment. yet this man talks about professors and college authorities having deci against high powers. I say, Yes, with such an instrument as tha which he claims the paternity, where nothing higher than one and a inch is possible. He talks about $\frac{1}{16}$ and $\frac{1}{20}$, and knows all the time tha one ever pretended to use such powers. The half-inch, with ampl equivalent to a quarter of an inch, is a very high power indeed compa with a one and a half inch, this latter, [redacted]wenty feet, magnifying 0 diameters, while the other, at the same distance, magnifies, with ampli over 1000 diameters.

But, third, "I see, too, that he has come round to my views, and not recommend the use of special objectives." The man who wrote knows that the statement is positively untrue. Many objectives, w purchasers of a lantern microscope may happen to have in use with ordinary microscope do well also for the lantern microscope, but n well, as a rule, as those specially adapted to, or specially selected for latter instrument, and therefore he knows "that special objectives ar a rule, recommended for obtaining the best results." Why, then, do go out of his way to put into any one's mouth words which the pe never used?

Fourth. What he says is simply this: "In order to use a power requiring a large amount o light, interpose an alum trough w stops fifty per cent. of the light."

This kind of writing may suit Mr. Furnivel's intellect, but will it impose upon? In the first place, the alum trough doe intercept any perceptible amount of light. I defy him to tell durin exhibition when the alum trough is in use or not in use, if he doe see it taken out of or put into the lantern. He "does not seem aware of the fact that it is possible to focus the heat rays at a beyond the luminous rays, and thus avoid all heating of the slide."

Certainly not, no one is aware of this, not "fact," but fiction, so f the lantern microscope is concerned. In this instrument the su densers must work co-optically with the objectives. The focus o determines within narrow limits the focus of the other, and any lens separates the luminous focus so far from the heat, forms that th can be utilised without dangerous results from the other, would be use whatever, in this instrument, except with such low powers as he and which are more fit to be called *lantern* objectives than to be microscope objeetives. The novel way of interchanging the objec was used by me more than sixteen years ago, and shown to Mr. in 1876.

What a ridiculous statement this is to make. These objective ad were in use before Mr. Furnivel was born. I have seen them fo parts of the accessories of lantern microscopes with instruments t of which no one could tell, and yet he talks about 1876. I know was the date when he took up this subject; but he was so unacquainte the literature treating upon it, that he supposed everything he di original. For a long time he held himself forth as being the first a subcondenser in the lantern microscope. How is it he has n

forth that claim in his letter? Does he now acknowledge that Kingsley used subcondensers before himself? that Lardner, in the 1856 edition of his "Optics," pictured a subcondenser with rack and pinion, as used then in the solar microscope, and as used by my friends in Ashton-under-Lyne, with some assistance from myself, in the year 1850? That old microscope is still in my possession; I have years since offered to show it to Mr. Furnivel in order to dissipate the notions which he entertains in regard to his own discoveries in this line; and, if he will pay me a visit here, I will guarantee to do as well, and show as much microscopic structure with that old instrument used in its primitive condition as he did and showed on the evening described in this letter. I do not use an alum trough, and never will, and I may say that I have never melted a slide.

Is this to be wondered at, considering what has before been said in regard to his performances? But there is one other thing I would like to name before ending this long letter. I went to one of his exhibitions some years since. The president for the evening was instructed to tell the meeting that the microscope to be used that evening was a "*perfect*" instrument, and not like some of those with which some of them were acquainted. Well, with this perfect miscroscope every object was shown without any pretension to microscopic detail. The compounds, eyes of an insect were said to be "well shown," and not a facet was visible in the cornea. A section of liver was said to be frog's skin, and the ends of the large blood-vessels, where the injecting fluid had collected and dried up in patches of colour, were said to be pigment cells of the skin. Well, the next slide was the frog's skin, pigment cells and all! The man giving the lecture was a science teacher. What is the moral to be drawn from all this? Simply, that the light was so bad that even a teacher of physiology could not tell the difference between a section of liver and a piece of frog's skin. Is it surprising, under such circumstances, that he does not need an alum trough and never melted a slide? W. Leach.

36, *Melbourne-street, Broughton, Manchester.*

PERSPECTIVE AND THE PHOTOGRAPH.

To the Editor.

Sir,—Your note at the foot of my last week's letter calls for a reply, if you will kindly pardon my troubling you again.

At your suggestion I have drawn the rays from "eye" tangential to the solids 1, 2, and 3, and, in so doing, we find three *right* cones; but, as the vertical sections forming the bases of 2 and 3 are not parallel to the picture plane, the horizontal diameters cannot be represented their exact lengths.

Further, there is this simple fact. Seeing that the rays drawn from "eye" to solids 2 and 3 become proportionately longer as the distances of the solids from the centre of vision increase, so the angles subtended at "eye" become smaller, the solids are more distant from spectator, and so appear to diminish perceptibly, and must be so represented, whether in a true photograph or perspective drawing.

In conclusion, Mr. Editor, I would mention that this view should have been put forward last week, which I fully intended doing, but thought it would make the letter too long, and sketch somewhat confused; as it is, trust I am not trespassing too far on your kindness and valuable space.—I am, yours, &c., H. Flather.

Scarborough, November 16, 1891.

[In an article on "Wide-angle Lenses," in May last year, we showed that a row of statues of similar dimensions would, in the photograph, have increased thickness as they approached the margin. The Apollo Belvidere in the centre would be expanded to Falstaff at the sides of the picture.—Ed.]

MR. HEYWOOD'S PAPER.

To the Editor.

Sir,—In Mr. Heywood's very interesting paper read before the Manchester Society I notice a mistake into which he has, no doubt, inadvertently fallen, respecting the first Photographic Society. The honour of being the first to establish a Society, given by him to London, should be given to Leeds, a Photographic Society having been formed in this town by Mr. J. W. Ramsden in 1852. A short time ago Mr. Ramsden handed over to me a number of the *Journals*, containing the productions of the members of the Society, and which were circulated monthly; and on the covers of the *Journal* is lithographed "Productions of the Leeds Photographic Society," and they bear the imprint of the lithographer, "T. A. Hope, 1852." I have also in my possession an old account-book belonging to Mr. Ramsden, and among a number of entries under the date 1852, such as "Cartridge paper for *Journals* for Leeds Photographic Society, Mounting prints for Leeds Photographic Society, Stitching *Journals*," &c., I find the following:—"1852. Leeds Photographic Society. Rent of room from March 1 to September 1, 1852," and also the receipt for the same. If any further proof be needed, on p. 121 of the *Journal of the Photographic Society*, 1853, is an extract of a paper read before the Leeds Photographic Society by Mr. J. W. Ramsden. I have also the names and addresses of the twelve members who were enrolled in March, 1852, and the photographs of several of them. Letters are also in existence from the late Mr. Roger Fenton, written on the formation of the Photographic Society of London, in 1853, to Mr. W. Teasdale, the Secretary for that year of the Leeds Society, having reference to a question of right to title and of precedence raised by the Leeds Society.

A number of the productions of the Leeds Photographic Society, bearing date, with the Society's *Journal*, will be exhibited at the International Photographic Exhibition, which opens at the Leeds Municipal Art Gallery on Tuesday, December 8. Apologising for the length of this letter,—I am, yours, &c., Thomas W. Thornton.

22, *Carr-road, Leeds, November* 23, 1891.

To the Editor.

Sir,—The President of the Manchester Photographic Society, Abel Heywood, jun., Esq., in his presidential address reported in your columns in last week's issue, states that the Manchester Society, which began in 1855, "is the second on the list of the photographic societies of the world." The reading is a little ambiguous; but, if it be meant that the Manchester Society was the second society to be formed in the world, or in the United Kingdom, then, I think, exception must be taken to the statement. The exact date of the formation of the London Photographic Society was January 20, 1853. As a matter of fact, the second photographic society in the country was the Liverpool Photographic Society, founded in March of the same year. Our own Association, the Glasgow Photographic, which still pursues the even tenor of its way, came into existence the following year, its first meeting being held on March 8, 1854. Mr. Jabez Hughes, at that time practising photography professionally in Glasgow, was mainly instrumental in founding the society. At the meeting in question, Hughes read a paper on *The Prospects and Progress of Photography*, and I think it may also be sufficiently interesting to refer to the fact that Robert Hunt was present, and gave a short address.—I am, yours, &c., William Lang.

Cross Park, Partick, November 22, 1891.

To the Editor.

Sir,—There is an article in the last number of the Journal on bygone advertisements. In it the writer says that the firm of "Squires," lens makers, is "not known now," or words to that effect. Many studios have that maker's lenses in use now. I have one in my studio. I possess a c-d-v lens by "Squire"—diameter of glasses, $2\frac{1}{4}$ inches; back focus (strict solar), $4\frac{3}{4}$ inches; fixed stop, $1\frac{3}{4}$ inches. Now, this lens will absolutely take a full-length standing figure of three inches of a person five feet seven or eight, or less, inches, with full opening, and quite sharp, not smudgy in any way. Will any modern maker's lens of same diameter and focus beat that, or even come up to it? Please understand, sir, a full-length standing figure. Would not a lens of that focus and diameter be classed an extra rapid, or should it not be classed so?—I am, yours, &c., J. Horton.

26, *Caroline-street, Cardiff, November* 24, 1891.

MAGNESIUM IN OXYGEN.

To the Editor.

Sir,—Will you kindly allow me a small space in your next issue to point out an error in your report of a meeting of the West London Photographic Society, which is somewhat misleading?

I am made to cast a doubt, in a rather uncourteous way, upon the originality of Mr. Humphrey's idea of printing platinotypes by means of magnesium burned in oxygen.

My statement at the meeting in question was to the effect that the idea of burning magnesium in oxygen for photographic purposes was not new, as many years ago an apparatus for the purpose was brought out, I believe, by Mr. Moule.—I am, yours, &c., J. Désiré England.

21, *Charles-street, Royal Crescent, Notting-hill, W.*

Exchange Column.

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

Will exchange the *London Dispensatory*, also twenty 1s. numbers of *Temple Bar*, for half-plate camera stand and three dishes.—Address, T. Key, 23, George-street, Grantham.

Wanted, photographic accessories, in exchange for excellent pair of field glasses, cost 1l. 17s. 6d., box of water colours (not used), cost 16s., box of mathematical instruments, cost 1l. 12s., eighteen numbers *Countries of the World, Chemist and Druggist Directory, Paper Makers' Directory of all Nations.*—Address, R. Smalley, 12, Park-road, Blackburn.

Wanted, whole-plate 10×8 or 12×10 camera, suitable for in and outdoor work, in exchange for Ideal hand camera, new last year.—Address, SEAVY, 164, Camberwell New-road, London, S.E.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR, 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

SPOTS.—See reply to "Midget."

NOVICE (Scarborough).—Consult our advertising columns.

C. F. ROBINSON.—One of the formulæ is clearly useless, if not both.

H. C. STANDAGE.—It was returned to you in due course last August.

J. H.—All the makers named are good. Our own supply consists mainly of No. 2 on your list.

G. P.—Had you read the JOURNAL for November 13, you would have seen that your discovery had already been referred to.

C. W.—It would be impossible to give you full working details in this column. The subject will be dealt with shortly, probably next week.

W. B.—We should say that you would find a good field for collotype work in America. It is, if possible, more practised there than here.

R. E. COLLINGS.—See answer to E. H. D. and others. The paper is sold in America, but has not yet been placed on the English market.

E. H. D., C. F. R., and many others will find Mr. J. Weir Brown's uranium toning formula in our number for May 15 of the present year.

C.—You will find a formula for para-amidophenol in our report of the London and Provincial Photographic Association in the present number of this JOURNAL.

HOLBORN.—The plates have evidently deteriorated with keeping. You must complain to those who supplied them, and not to the maker. The former is the one with whom you had dealings.

STUDIO.—Refer to page 613 of our volume for 1888, where you will find a description of the system of glazing adopted in Mr. John Stuart's studio. This is probably what you require to know.

QUI PALMAM MERUIT, FERAT.—Let us have the "fuller history" you speak of, and append your name to the communication. It would be unfair to publish anonymous letters on the subject you refer to.

H. B. J.—A four-and-a-half-inch condenser will be most advantageous. The distance of the light from the condenser will depend upon its focus. The best distance is easily determined by experiment.

G. MANSFIELD.—We should say from your formulæ that you have added too much citric acid. Silver citrate is soluble in warm water, but probably not to the extent of such a strong solution as you appear to have. Try the effect of adding more solution of silver nitrate.

PERPLEXED.—We exposed and developed one of the plates you sent us, and it "puckered" up under the action of the solution. Probably, if you employ a substratum with the emulsion, the trouble will cease. We are unable to say definitively what the cause of the defect is.

THOS EDGE.—Several of the photo-mechanical processes are capable of yielding results such as you are seeking for. Surface blocks may be had of the Meisenbach Company, Waterlow & Sons, and others. The Autotype Company, we believe, make a speciality of the collotypes of the kind referred to.

T. W. KIRBY.—We believe that you will find little or no difficulty with the French and Italian custom-house officials. As to the permits for photographing in those countries, probably the consuls in Liverpool will give you the best information on the subject. We do not know how long ships stop at Gibraltar and Genoa.

CURATE.—As the screen you intend to use will only be eight feet square, by all means, as you are a novice, begin with the blow-through jet. That will give very satisfactory illumination on such a size screen. When you have gained some experience, you might go in for the mixed jet, though it is not at all necessary for so small a screen.

MUGWUMP.—1. So far as we know, there is no provision in the Employers' Liability Act excluding photographic workers, whether operators or printers. 2. We are not aware of any legal decisions on the subject one way or the other. Purely legal questions are scarcely within our province. Any solicitor will give you the desired information.

E. ELVEY.—We do not agree with you that it would pay manufacturers of dry plates to supply emulsion to those who would care to coat their own plates. We are by no means surprised that the firms named declined to supply it. Some years ago Mr. Kennett supplied a "dried emulsion" to be dissolved for coating plates, but it was not commercially successful. Then dry plates, as now, were not articles of commerce.

PROCESS.—To give full working details of processes within the space devoted to this column is quite out of the question. All that has been published on "process" work has appeared in back volumes. Photo-zincography is not adapted to half-tone subjects from nature. We imagine, for your limited requirements, it would be more profitable for you to get the blocks made by firms that work for the trade rather than to attempt to work out the method yourself.

AN INTENDING PATENTEE.—It has been held by the Solicitor-General, when recently stating a case, that there is no authority, to his knowledge, which lays down that the invention of a servant, even made in the employer's time, and with the use of the employer's materials, and at the expense of the employer, thereby becomes the property of the employer, so as to prevent the person employed from taking out a patent for it.

MIDGET.—We cannot account for the spots. They may be due to the manipulation, the material used for mounting, or the mounts upon which they are placed. It is impossible for any one, by merely looking at a print, without knowing anything whatever of its production or the conditions under which it has been kept, to say the cause of its deterioration. Any opinion on such data would be nothing more than wild speculation.

J. J. J.—The composition of "gloy" is kept a trade secret, therefore we cannot say of what it consists, nor can we say if it would act deleteriously on photographs. Dextrine is a very convenient material for mounting purposes; but, unfortunately, it is one that cannot be recommended, inasmuch as all commercial samples are acid, and, therefore, may act injuriously on photographs. Starch is about the best mountant next to gelatine, and the inconvenience of making it each time it is required is not great.

H. G. YATMAN, of Fernden, Haslemere, Surrey, writes: "Could you not give us some idea of Mr. Dresser's paper on *Toning Lantern Slides*—the methods of toning, clearing, and retoning? I am sure they would be acceptable to those of your readers who, like myself, saw his slides exhibited one evening at the Photographic Society in Pall Mall."—Doubtless Mr. A. R. Dresser, with his customary willingness to help a brother-worker, will give our correspondent the particulars asked for, either through our pages or by letter.

A. WALLACE says: "In trying to make some gelatine reliefs, similar to those used in the Woodbury process and manipulated in the same way, I quite failed to develop the pictures, even though I used nearly boiling water. The gelatine was the best—Coignet's gold medal. The tissue was thick, and it dried very slowly, taking nearly two days. Can you help me?"—Our correspondent's trouble is not far to seek. In the first place, the gelatine used is about the worst that could be selected for the purpose, as it is far too insoluble. For relief a soluble gelatine is required. That generally used it Nelson's "amber," or the No. 1 soluble. Secondly, unless the film is dried more quickly—say, within twenty-four hours—even when the proper kind is used, it will be next to useless. These thick tissues are always dried over chloride of calcium, so as to secure quick drying without the aid of heat. Heat would increase their insolubility.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, December 8. Discussion on Mr. Warnerke's paper, and paper by Mr. A. Pringle on *Photo-Micrography.*

NORTH LONDON PHOTOGRAPHIC SOCIETY.—Tuesday, December 1, 1891, Wellington Hall, Islington, at quarter past eight p.m., optical lantern night. Visitors are invited.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—December 3, *The Exaggerated Perspective of Wide-angle Lenses.* December 10, *Warm Tones in Lantern Slides.* December 17, Monthly Lantern Night.

CLEVELAND CAMERA CLUB.—A lantern evening will be held on Thursday, December 3, 1891, in the Literary and Philosophical Hall, Corporation-road, Middlesbrough, when Dr. Stainthorpe will exhibit over 120 slides, illustrating *A Holiday in Holland.*

MRS. R. L. KIDD, on November 14, laid the foundation stone of some important additions to the works of Messrs. Morgan & Kidd at Richmond. We are happy to hear that the firm's business has outgrown their already large premises at all points.

THE *Gentlewoman* Christmas number is full of illustrations and reading of peculiar interest to the fair sex. Dr. Conan Doyle, at one time an esteemed contributor to our pages, and now one of the leading novelists of the day, is among those who supply the fiction to our contemporary.

ROCHDALE AND DISTRICT PHOTOGRAPHIC SOCIETY.—Winter Session 1891–92.—1891: November 30, *Lantern Slide-making,* Mr. Ingham. December 7, Exhibition of Prize Slides. 28, *Art and Photography,* B. C. Brierley. 1892.: January 25, *A Tour in Wales,* C. R. Beaumont. February 29, *The Optical Lantern, Its History and Mission,* Rev. T. P. Spedding. March 28, *Carbon Printing,* J. H. Hoyle; *A Day at Ingleton,* T. Leach. April 25, *Picture-making by Photography,* R. M. Jones. Time of meetings, 7.30 p.m.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The Third Annual Exhibition was held on Monday and Tuesday, November 16 and 17. The judges were Messrs. Cembrano, Pringle, and Warnerke, and the awards were as follows:—Silver medal, Mr. C. H. Oakden, for best general exhibit. Bronze medal, Mr. Esler (special), for general exhibit. Silver medal, Mr. Kirby, portraiture. Silver medal, Mr. E. A. Whitty, best picture, half-plate and under. Silver medal, Mr. T. S. Bailey, best picture over half-plate. Bronze medal, Mr. W. Howell, for best local views. Bronze medal, Mr. W. Rice, for lantern slides. The President's work was not for competition. There was a large attendance, while the work showed a great improvement on last year.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1648. Vol. XXXVIII.—DECEMBER 4, 1891.

ANOTHER GAS EXPLOSION.

this occasion we have to record another explosion, not urring, as in that described last week, in a provincial chapel, t in the centre of London, on the premises and in the midst the Photographic Club, there being present at the time eral of the ablest lantern experts with whom we are ac- ainted.

It was after the close of a lantern entertainment on Wednes- y, last week, when, the oxygen having been found to be ex- usted, the Hon. Secretary disconnected the gauge and gulator from the empty bottle, and attached them to another ntaining twenty feet of gas. Holding the cylinder in his nds, he slowly turned the tap to permit the gas to enter the uge in order to determine with certainty that the cylinder s full, or to what extent it was so. It immediately re- tered a very high degree of pressure, which, when noted, led the Secretary endeavouring to turn off the gas at the linder. But the tap now refused to act, and before any ther steps could be taken the pressure-gauge burst with a ud noise, part of the regulator was buried in the ceiling, and me was seen to issue with great force from the cylinder. rtunately no one was hurt.

This matter is, for the moment, involved in much mystery ; t, from a careful examination of the gauge, we firmly believe at the origin of the explosion lay there. We may here plain that a Bourdon pressure gauge, either for steam, gas, anything under tension, consists of a flat, thin tube, bent in circular shape, closed at one end, the other end, which is ed to the plate, being open for the purpose of permitting the s or steam to enter. It is a principle in physics that when pour of any kind is admitted to a curved tube of this nature e curve has a tendency to open, and this in proportion to the sion of the gas admitted. The free end is geared with a k and pinion through the intervention of a lever, and the sulting movement is indicated by an index finger on a duated dial. In steam gauges the values on the dial press the pounds pressure to the square inch, and in oxygen uges the values are similar.

On examining the curved tube we saw that a piece had been wn out of its outside, as if from the enormous internal pres- e to which it had been subjected, and the casing of the uge, which consists of a circular brass box, was very greatly lged outwards directly opposite to the place from where the ce had been blown off. This leaves us in no doubt as to e precise part which first gave way. It is only reasonable to ieve that the thinnest metal should be the first to yield to e immense pressure bearing on it, and the gauge tube was doubtedly the thinnest.

But what caused the flame—a flame which, although of brief ration, was yet sufficiently intense to fuse a portion of the n-metal fittings? Oxygen is a supporter of combustion, but it will not itself burn. Then, what originated the flame, and of what nature was the flame? Pending the investigation which is certain to be made, we can only surmise that the escaping oxygen has exercised a friction so great as to heat to incandescence some small portion of oil, or perhaps leather, in the form of a washer which may have been about the gauge. Oil will, when strongly heated, yield olefiant gas, and this gas, when ignited in presence of oxygen, will give not only flame, but one so intense as to melt platinum.

But, again, and assuming the absence of oil or anything else which by heat would yield hydrogen, and assuming still further that the friction of the compressed gas when escaping was sufficient to raise any thin metal to red heat, we know quite well that metals in this condition will burn in oxygen. It is a well-known lecture-room experiment to heat a piece of iron wire to redness and then plunge it into a jar of oxygen, when it immediately bursts into flame and burns with a certain degree of brilliance. Although we have no experimental knowledge of the behaviour of gun-metal or brass under such conditions, it is fair to infer that they would behave in a similar way. In this way may, perhaps, be accounted for the undoubted burning if not actual fusing of the fittings in the neck of the cylinder.

SILVER PRINTS IN WINTER.

The present season is usually prolific in silver prints far lower in quality than, by the exercise of judgment and care, is at all necessary. True, in many studios there is a rush to get prints ready for Christmas, and, in the endeavour to produce a given number in a limited time, quality is sacrificed for quantity, and by this means alone the general average quality is reduced ; but we refer to prints which, even though hurriedly produced, might be of better character than they are. One prime factor in this degradation of the standard is undoubtedly to be found in the fact that many negatives requiring a considerable time to print are necessarily left in the printing frame two, and sometimes three, days. Now, notwithstanding low temperature, a print on ordinary silvered paper, that has taken three days to produce, never can be equal to one printed, toned, and fixed in one day, and even a two-day print is inferior to a one-day.

Two ways of proceeding are open to the printer. First and simplest, he may use ready-sensitised paper ; second, he may silver his paper before daylight the day it is to be made use of, and he may use, in place of the ordinary felt pad, bibulous paper soaked in carbonate of soda. This latter method is of great value, yet is strangely neglected by a large proportion of printers, at any rate among those with whom we have been brought into contact. Besides its use in the printing frame, it may be employed with advantage to keep the paper

after sensitising and before printing. We have often described the method, and need here say no more than that we find little, if any, difference in action whether pure crystallised carbonate of soda or common washing soda be employed. The strength, too, is immaterial; from half a pound to a pound in a quart of water suffices. It is perhaps well to state that the best value is obtained from the treatment if the pads be periodically dried; they are apt to absorb a little moisture, and the slight dampness thus produced is not beneficial to the negatives if, as is usually the case, it be not removed when there is no silver paper in the frame.

So far as regards modes of treatment of the finished paper. We may now go back to the earlier stages of the work—the sensitising. Here is great room for care. A slight alteration of conditions in one direction may determine the excellence of the prints, while a failure to carry them out may lead to failures of quality. There are, perhaps, not many establishments where the arrangements are so complete that the sensitising room is always maintained at one uniform temperature. Cold weather often means reduced temperature of the silver bath, and it cannot be too strongly impressed upon the printer that reduction in temperature has in practice the same effect as reduction in strength of bath—weak, colourless prints. Therefore, where the conditions are such that the bath temperature is usually low, the silver bath ought to be strengthened, from ten to twenty per cent. beyond the summer strength. It is true that this will entail the use of silver nitrate just in the same proportion; in other words, ten or twenty per cent. more will be employed than the same paper would require in summer. There is, however, or we should rather say there need be, no loss in this, for the surplus silver is not used up; it is all upon the surface of the paper, and, if ordinary care be taken, will all be recovered from the washing waters.

But this extra outlay means so much extra capital employed; and in that sense there is waste, if even there be not inconvenience. Hence, what should be done, if it be desired to avoid the really unnecessary outlay, is to keep the bath at an even temperature. This may be done in many ways, and, of course, will be governed by existing conditions. In the first place, as there are few establishments where there is not at least one fire always going, the simplest plan would appear to be to remove the bath from its dish, filter into a proper receptacle, and keep that in some convenient manner to have its temperature kept up by the fire. Then, again, there is the dish itself, which may very possibly be nearly at freezing point when the silver solution is poured in. We have seen this remedied by the printer, before starting to sensitise, pouring boiling water into the dish, and, after allowing it to impart all the heat possible, pouring in and out again a second quantity, and thus heating the receptacle almost to boiling point. Upon the silver solution being poured in, it becomes heated just sufficiently to bring it up to summer temperature. It occurred to us, when first we saw it, that the plan was an excellent one.

It is well to note, with regard to fixing operations, that "hypo"—never, at its best, a very powerful solvent of chloride of silver—has its solvent powers very considerably reduced by cold. Hence, where it is worked, as is often the case, at a strength approaching what may be deemed a minimum for safety, it is absolutely essential that its temperature be raised. It must, therefore, be made with hotter water than usual, most photographers, we assume, using a certain amount of hot water in making the solution, "hypo" crystals requiring an exceptional amount of heat in assuming the liquid form. In conclusion, we may summarise the means to be adopted to obtai prints in winter uniformly equal to summer work. Heat for th solutions; failing that, increased strength; ready-sensitise paper, or carbonate of soda pads with ordinary paper. The steps taken, there is no reason why any variation in qualit tending to lower the standard should be exhibited at the prese season of the year.

THE problem of the use or otherwise of alum solution, rather tha pure water, for absorbing heat rays in lantern projection—a subject th is much more than a mere theoretical exercise, and which, as described fortnight ago by us, was put before the readers of *Nature*—has at la received a practical solution in the affirmative, at any rate so far the electric arc radiation is concerned. A letter, over the signature T. C. Porter (Eton College), in that journal gives details of obse vations of the heat allowed to pass by various solutions as measur by rotations of the radiometer. The light was kept uniform, a "between each observation in the liquids the radiation from the a was observed unimpeded, save by the glass of the radiometer, recorded below. The time was given by a metronome (previous examined for constancy), bearing half-seconds. No lens was used:

	Number of revolutions of radiometer arms.	Time in half-seconds.
1. Unimpeded radiation	25	160
2. Through empty cell	25	254
3. Unimpeded radiation	25	152
4. Cell + water	25	820
5. Unimpeded radiation	25	164
6. Cell + water (second experiment)	25	832
7. Unimpeded radiation	25	160
8. Cell + potash-alum solution ..	25	43,200
	Time of two revolutions actually taken.	
9. Unimpeded radiation	25	160

. . . . Thickness of each glass plate 1·5 millimetres, thickness of sol tion 50 millimetres, distance of radiometer from arc 1 metre." A cording to these data the value of the alum is unquestionable; however, is to be remarked that the radiometer is sensible to radi tions that would not suffice to heat any slide to a dangerous degre For example, if any one breathes strongly against the instrument, t arms can be made to rotate fairly rapidly.

ACCORDING to the *Electrical World*, New York, Mr. Somoff, of Ne York, has introduced some novelties in minute electric lamps whi we consider should afford scope for photographing pathologic phenomena not yet touched by photography owing to the size of t illuminators, small though they be, hitherto available. The ne lamps are made in various forms. There is a "bull's-eye" lamp, which the bull's-eye conductor forms part of the lamp-globe itse thus considerably reducing the space occupied when two separate i struments were used. Then, again, there is the "grain" lamp, whi is perhaps the smallest lamp that can be made; it is three millimetr in diameter and five long, a one candle-power lamp requiring fro 3·5 to 12 volts pressure.

CONTINUING his experiments upon the action of light upon silv chloride, Mr. R. Hitchcock (see *American Chemical Journal*, p 273–277) gives the results of four months' exposure to direct sunlig of slips of microscopic cover-glass coated with a thin layer of t chloride, and weighed from time to time. The loss of chlorine w greater than in former experiments, and varied from ·0821 to ·09 grain per grain of silver chloride. Probably, even then, he conside the decomposition was not complete. On digestion with dilute nitr acid, the product gave up a quantity of silver equal to the amount chlorine liberated. Hence he draws the inference that the light mere separates the chlorine from the silver.

A SOMEWHAT similar subject has been treated by M. Guntz, and h has communicated his results to the French Academy of Science

He says silver subchloride, or argentous chloride—Ag_2Cl—varies in colour from deep violet-red to violet-black, exposure to sunlight tending to convert it into the latter modification without loss of chlorine. When heated, it splits up into argentic chloride and metallic silver. It is not attacked by dilute nitric acid, but, when warmed with concentrated acid, it is converted into argentic chloride mixed with a varying proportion of argentous chloride, forming the coloured products described by Mr. Carey Lea.

It will be remembered that a few years ago Messrs. Marion & Co. instituted proceedings against the Britannia Works Company to restrain them from issuing plates bearing the name "Britannia," as they had previously registered the word, as applied to photographic dry plates, as a trade mark. The case was duly contested in the High Court of Justice, with the result that the injunction prayed for was granted. Last week a firm of soapmakers, who had registered the word "Britannia," in connexion with soap, as a trade mark, sought an injunction restraining a rival firm from selling a soap under the same name. In this instance, also, the case was contested, and in the end the Court held that the word "Britannia" was one in such common use that it could not be registered as a fancy word under the Trade Marks Act. The two decisions, at least to laymen, seem to prove the glorious uncertainty of English law.

Photography is well represented in the person of Captain Abney on the new Council of the Royal Society, which was elected on Tuesday last. Other newly elected members of the Council who have occasionally made incursions into the domain of scientific photography for special purposes are Professor G. D. Liveing, Professor Crum Brown, Professor Norman Lockyer, and Dr. Hopkinson. To the last-named gentleman, we believe, is due the revival of the oxychloride theory of the latent image, originally put forth many years ago by the late Thomas Sutton.

It has been contended that the baths used for toning albumen prints are unsuitable for the gelatino-chloride papers that are now in vogue, although the objection rests upon little, if any, evidence in their disfavour. At the last meeting of the London and Provincial Photographic Association Mr. J. Barker produced a gelatino-chloride print toned in an acetate bath, which we are informed left little or nothing to be desired as far as beauty of tone could be desired. It is a moot point whether greater permanency is secured to a print toned in a sulpho-cyanide bath; and certainly for toning, *per se*, it is not by any means a *desideratum*.

One of the birthday presents given to the Princess of Wales on Tuesday was one emanating from a nurses' association. It consisted of a large screen of some six or seven hundred photographs of nurses. We should be glad to know that the pictures were not done by any fugitive process, such as albumen silver is now commonly allowed to be. We surmise, however, that most, if not all of the prints are in silver. If there are any in carbon, a year or two will provide a strong contrast between the two styles of picture.

The difficulty of distinguishing by the eye between platinum and developed silver bromide prints is sometimes so great as to baffle even the most expert photographers. A correspondent asks us this week by which process a print he encloses is done, and, for the benefit of others who may be in a similar difficulty, we here repeat the means by which one print may be told from another. It is simply to treat the prints with a solution of mercuric chloride, which, by its well-known bleaching properties, will prove which is the silver print. There is no reaction between platinum and the mercury salt.

The acid clearing bath before fixation, both for negatives and paper, is largely condemned in many quarters on account of the liability of the picture to undergo sulphuration by reason of the presence of a quantity of acid in the film when the latter is placed in the hypo. If there is any acid present, it must be in an extremely small quantity, provided the film be washed. But, in the latter case, is its presence not open to doubt? One would suppose that the soluble chlorides, &c., present in most ordinary waters would neutralise whatever acid might be in the film, and thus, when the latter is placed in the hypo, all chances of sulphuration would be removed. By treating pictures that had been immersed in an acid clearing solution with a solution of an alkaline chloride, any risk of sulphuration which might exist would entirely disappear.

THE NEW METHYLATED SPIRIT IN COLLODION.

When the new Excise order relating to methylated spirit was first published in these columns, collodion-emulsion workers were thrown into a state of alarm; but, possibly, a calmer review of the matter will lead to the conclusion that the circumstances are not really as bad as they at first seemed.

After seven-and-twenty years' experience with collodion emulsion, I have never found the necessity for using pure alcohol, except when a decent sample of methylated spirit was not available; but I have on many occasions come across specimens of the article which were utterly and hopelessly useless, and which in their vileness could only suggest some such admixture as that now proposed by the Excise, namely, a pretty bad sample of mineral naphtha. Consequently, at first sight, it seemed to me that the use of methylated spirit was doomed, and that we should have to go to the extra expense of pure.

But, if we commence to reason the matter out in figures, the proposed addition of mineral naphtha, be it ever so low in quality, does not bear so formidable an appearance. "Three-eighths of one per cent." does not represent a large proportion, it means but three fluid drachms in a large one hundred ounce Winchester; or, roughly, a trifle less than two minims to each ounce of alcohol or spirit. The actual quantity present, therefore, in an ounce of finished emulsion, is less than one minim, or, to be exact, nine-tenths of a minim, a quantity that, from a mechanical point of view, it is scarcely possible to believe capable of exerting any ill effect. It consequently remains only to consider what may be its chemical effect, always supposing, for convenience sake, that the naphtha used is of the worst possible description.

As I have said, it seems scarcely possible to imagine any mechanical injury to arise from the presence of so small a quantity of matter, in other words it is difficult to believe that one minim to the ounce of inert or even injurious material can effect the solubility of either the pyroxyline or the bromides used in making the collodion or influence the texture or transparency of the film. But it is when it comes in contact with the free silver that the trouble may be expected, more especially in dissolving the silver by heat before adding to the emulsion. Here is the opportunity of forming silver compounds that may prove injurious in the form of fog, and the question is, Can they be prevented? All who have used methylated alcohol for the purpose of dissolving the silver in sensitising know how black it becomes on the application of heat, unless it has been previously specially purified; but it is also pretty well known that the presence of a small trace of nitric acid will in most cases prevent all injury to the emulsion from the cause. Will it have the same effect under the new conditions?

To put the matter to a fair test, I obtained a sample of methylated spirit of a quality which I knew to be thoroughly suited to emulsion work—in fact, what I constantly employ. A portion of this was converted into the "new" spirit by the addition to ten ounces of it, of twenty minims of ordinary benzoline, such as is employed in the sponge-lamps. This is going about as low in the scale of "naphthas" as I think the most *exigeant* excise officer will consider necessary; but, to give the benzoline the best chance possible, I shook a quantity of it up, first of all with a little warm water to remove any soluble impurities that might be present.

The addition made no difference to the appearance of the alcohol, and very little to its smell, and, contrary to the statement that the addition of water would render such alcohol milky, it remained perfectly clear when diluted with water, or mixed with ether. As I had anticipated, there was not the slightest difference in its behaviour in dissolving the pyroxyline and bromides, and the collodion was in no way distinguishable—not even by smell—from a corresponding batch made with the unmixed alcohol.

But the crucial test remained to be made, namely, the sensitising

Similar quantities of silver were weighed out to sensitise separate batches, of two ounces each of the two samples of collodion, and dissolved by means of heat in a few minims of water. Separate quantities of the "old" and "new" alcohols, two drachms of each, were also measured, and added gradually to the solution thus formed, and raised to the point of ebullition before pouring into the collodion. I should mention that in the first experiment no addition of nitric acid was made.

Upon mixing the "old" or plain sample of alcohol with the concentrated silver solution, it instantly discoloured slightly, and upon boiling became nearly black, but remained quite clear in a thin layer on the side of the flask. Tho other became very black and dirty, and threw up a soapy scum that adhered partly to the flask, but chiefly remained on the surface of the liquid. The two emulsions were sensitised in the ordinary way, the respective flasks being in each case finally washed out by shaking up the emulsion in them, in order to take up every particle of impurity that might be present. A second pair of emulsions were then sensitised in the same way, but with the addition of one minim of nitric acid to each batch of silver. The only apparent difference was in the case of that which contained no benzoline, which discoloured less than without the acid; the other exhibited no difference whatever.

In due course these emulsions were filtered and put to the test of exposure when, to save trouble and make the story short, it may be stated that there was not the slightest difference between them. They were perfectly free from fog, and, but for the distinguishing marks on the bottles, it would have been impossible to say which was which.

It may be well to remark that these emulsions were ordinary slow ones, made with excess of bromide. Of course, in the case of a rapid emulsion, allowed to ripen for some time in the presence of free silver, a different result might ensue, but I do not think so. The silver seems to combine with the impurities whatever they are and form an insoluble scum, which filters out, the plug of cotton through which the benzoline emulsion was filtered in each of the above instances being perfectly brown after use, while the others were not discoloured.

With regard to the possibility of getting rid of the mineral naphtha by distillation or other means, I am now of opinion that there need be little or no difficulty. For the small quantity required in sensitising, I don't think anything more is necessary than sunning or boiling in the presence of few grains of silver, and then filtering out the precipitate. For those who care to venture on their own rectifying,' I fancy permanganate of potash will answer every requirement, as the following experiment will show.

In a two-ounce bottle take half an ounce of common benzoline and add to it an equal quantity of lukewarm water. Shake up well and then allow to stand for a few seconds, when the two liquids will separate again, and this may be repeated as frequently as you like. Now throw in a few crystals of permanganate of potash, say, five grains, and shake up; a dark crimson frothy solution is at once formed, from which separates a layer of colourless liquid when allowed to rest. But each time the bottle is shaken this layer becomes less, and the contents become thicker, until at last there is no appreciable separation of the liquids.

If the contents of the bottle be now thrown upon a filter, a clear dark crimson solution passes through which has a peculiar pungent and aromatic odour, quite free from benzoline, and measuring little, if any, over half an ounce, or, perhaps, less. The filter retains a thick brown mud smelling strongly of benzoline.

Which looks very much as if permanganate of potash is quite competent *per se* to wrestle with the benzoline. W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

For making glass positives and duplicating negatives Dr. Miethe mentions a plan which he says works well. It consists of taking the print on collodio-chloride paper, and, after toning and fixing, stripping the collodion film from its support and placing it on glass. The transfer may also be effected to sheets of gelatine The advantage of this method is that reversed or non-reversed results may be obtained at pleasure.

We are sorry to learn of the death of Dr. Raymond Kopp, of Müns Luzern, Switzerland, the latest experimentalist in natural-colo photography. The deceased was only thirty years of age, and, so as can be ascertained, there is every probability of the details of researches having been buried with him.

M. Gillon, a Paris camera-maker, taking advantage of the cheapn and low specific gravity of aluminium, is making the bodies of hand cameras in that metal, thus effecting a very material reducti in the weights of these instruments. He proposes, we also gather, make some of the larger or stand cameras of the same material.

The Maddox appeal came before the Société Française de Pho graphie at the meeting of November 6. M. Pector remarked th although the doctor was a foreigner, it was hoped that France wou be worthily represented in the subscription-lists. Science was of country, he said. This recalled to the mind of M. Janssen a saying Pasteur, that "science was of no country, it was true; but men science are themselves a nationality."

There is talk in photographic circles in Paris of the proba creation of a chair of photography in the National Conservatoire Arts and Crafts. A series of conferences on photography are to held at that institution, which gives rise to the rumour quoted. professorial chair, however, involves the outlay of such a lar annual sum that the project may not come to a head. How long, wonder, will it be ere the institution of a professorship of photograp will be canvassed in connexion with an English University or cogn educational centre?

"A simple method of determining the relative rapidity of seve makes of plates," says a writer in the *Bulletin de l'Association Bel* "is to take one plate of each make and expose them to the sky or clear night for about ten minutes. Apply an energetic developer, a then fix the pictures, which, however, will be invisible until af fixation. Then the most sensitive plate or plates will have a numb of stars, more or less, upon them, in proportion to the degree of sen tiveness of the emulsion!" After this, Messrs. Hurter & Driffield w no doubt, in the language of our American friends, take a back seat

Caustic lithia, introduced by MM. Lumière into their para-amic phenol developing formula, is, according to M. E. Sarbe, a ve energetic base. That gentleman also finds, in the course of so experiments, that one part of lithia in accelerating action equals t parts of caustic soda, three of caustic potash, and five of carbonate soda. This substance must not be confused with lithium carbona which has for some time past been occasionally employed as accelerator. Caustic lithia is far preferable to this, as it is conside ably more energetic, while its solubility in water is much superior that of the carbonate.

For relieving the flatness and want of vigour that so often d tinguishes dried matt-surface prints in platinum or silver the *Woche blatt* recommends either of the following baths:—

	Water	1000 c.c.
	Gelatine	90 gramme.
	Alum	90 „
or—		
	Water	30 c.c.
	Citric acid	3 „
	Sugar	3 „

A substitute for glass for lantern slides has been proposed. We not know whether it has been tried; but we should think not. Th paper is placed in oil of creosote, and then squeezed between sheets papier buvard to remove the excess, and is next dipped in an alcoho solution of colophony, dried, and coated with gelatine. Upon this fil which is coated with a suitable emulsion, the transparency is ma and the picture varnished. The inventor claims as an advantage th

the film could be made (and printed) in long bands, which would be convenient for lantern purposes. No doubt; but what about the effect of heat upon such a film? We are having enough and to spare of lantern explosions just now; it is not desirable to increase the risks of conflagrations.

Aristotype paper, according to a writer in *L'Amateur Photographe*, involves so much care and trouble, that it is frequently abandoned by amateurs, notwithstanding the excellence of the results the process gives. The method of Commandant Legros, of developing a faintly printed image with gallic acid, is said to be both rapid and effective, all the fine details of the negative being reproduced, while the pictures so obtained are probably as permanent as collodion negatives. The writer recommends a three per cent. saturated solution of gallic acid, to which 20 c.c. of alcohol are added. Development takes place rapidly, and the normal tone of the picture is reddish-brown. The principle of developing a faint image on this kind of sensitive paper is, as most of our readers probably know, a very old one.

The *Photo Gazette* in giving such particulars as have been published of Mr. Dallmeyer's new tele-objective, prints a letter on the subject from M. E. Wallon, which contains several statements of considerable interest in connexion with the matter. The writer having concluded that the principle employed was not that of the Gallilean telescope, but of the solar microscope, wrote to Mr. Dallmeyer, who confirmed his conclusion and also sent M. Wallon a very remarkable picture taken with the new instrument. This represents the full moon, photographed in October, the diameter of the disc being twenty-six millimetres, the mountains of the satellite showing quite plainly. Truly, a most remarkable picture! We understand that Mr. Dallmeyer discourses on the subject before the Camera Club on December 10 next.

LIMELIGHT—SAFETY OR DANGER?

The use of the limelight has come to be so much a necessity that it behoves all interested in it to do whatever lies in their power to make its working as near as possible perfect. It is very lamentable that accidents should happen and be attended by loss of life, as recently was the case; but we can no more dispense with the limelight than we can with ordinary house gas and electric light, and every one knows that accidents have often happened with these.

The question is, What is the best way to minimise the risk? First and foremost, the apparatus must be well constructed. How often does it come to one's knowledge of "wonderfully cheap" jets and dissolvers failing the first time they are used, or soon, and why? When placed in the hands of experts to test, it is at once seen that they could never have been tested prior to sale. The haphazard way of constructing apparatus, and placing same in the hands of amateur and other inexperienced lanternists, cannot be too strongly condemned; and all purchasers and users of limelight apparatus and optical lanterns will do well to remember there is a limit to economy, for if the article is good it can only be reasonably cheap, and if nothing is allowed for time in adjusting and testing, it stands to reason the article or apparatus will be sold with all faults, although not stated so, probably. I know lately where a series of small explosions, or "pops," was caused by a faultily constructed dissolver, the gas passing round from the oxygen to the hydrogen side, because the groove or way in the plug was too long. If bags had been used instead of cylinders with automatic regulators keeping up a constant pressure, it is impossible to say what the result might have been, but somewhat serious under certain conditions it is easy to conceive.

Another fruitful source of failure is the nipple of jet not being properly adjusted for size to the pressure used. A large orifice is all very well when the maximum of light is desired, but it must be remembered that with a moderate pressure, such as one would get by two half-hundredweights on regular size (say, eight cubic feet) gas bags, a large nipple would be predisposed to allow of a return of ignited mixed gases down one of the pipes of jet; and if the gases were by accident mixed beforehand in the receptacle, there would be at the first stoppage of pressure or withdrawal (so that the flame could continue its downward course) an explosion.

Almost invariably the accidents that have come to light and been made public have resulted from apparatus bought piecemeal, or for which no maker or optician of good repute is responsible as a whole. Of the hundreds and thousands of exhibitions given by the aid of apparatus that have been "vouched for" as having been personally and practically tested, one cannot remember any accident or failure of any moment, but the risk run by untried or partially tried jets, dissolvers, and other gas or lighting apparatus, is considerable. I should not write thus strongly if I was not personally aware of many pieces of apparatus being made "to pattern," and placed on the market without one single thought as to whether structural or internal details have been properly attended to, it being with the seller a question of £ *s. d.* only. They cost so much, must be sold for so much, and we must undersell A. or B. at any hazard. If lanternists insist on a written guarantee that the apparatus has been practically tried, or, better still, *see* it tried, it would not be long before the "smart commercial community" confined their attentions to some probably more congenial occupation, which, it is to be hoped, would be fraught with less danger to their customers and the public.

Precautions when Using the Limelight.

1.—Make sure that your gas is not mixed before using it, by testing by some *harmless* method, such as Professor Flemings's explosive gas tester.

2.—See that all joints are sound, for very often the indiarubber tubes fit anything but well, and consequently the joints are not gas-tight.

3.—See that a good forward pressure is *maintained*. This is secured by such an arrangement as the automatic regulator, invented by Mr. Beard, used on condensed gas cylinders; for the spiral spring, acting on the collapsing rubber miniature bag, always ensures the pressure being maintained, and that at a constant quantity. Others and newer regulators may be as good, but as this has stood the test of several seasons' use without failure, the users of it have more and more confidence in its satisfactory working.

4.—Those that use the oxyether light must be *doubly* careful in seeing their joints are perfectly sound; and the "Grip" clip affords an excellent method of securing the indiarubber tubes to the saturator and jets, dissolver, or other supply. They must also be careful to use a *small* orifice to the nipple, certainly not more than one-twenty-fifth of an inch if they want to work in safety; and if they use a biunial or other lantern with a gas dissolver, it must be *specially* adjusted to suit this light. The ordinary method of cutting the grooves in the plugs of the "Universal" or "Star" dissolvers is not suitable for the oxyether light, if first adjusted to blow-through or mixed gas oxy-hydrogen limelight. It is also a wise precaution with this light to use pumice chambers as near as possible to the nozzle of jet, so as to stop any possibility of the flame going back. If the mixing box is not so fitted, and cannot be, then put pumice tubes immediately behind *each* of the taps of jets. The pumice tubes must be periodically looked to, and fresh powdered pumice put in, say, each season, or if used more than two dozen times at the end of that amount of use. The best place is below the nozzle of jet, and, in fact, forming the mixing chamber with *fine* wire gauze above and below to prevent the dust being blown into the nipple or getting into the tubes.

5.—If using gas from bags with either the oxy-house gas jet (blow-through), mixed gas jet, or oxyether light, take care to avoid (even at the risk of shortening an entertainment) the using of gas to the last fraction, for when any of the two sides of the surfaces of bags are flat between the board (that is, the top and bottom of wedge-shape bag in contact), sufficient pressure cannot be exerted on the gas, and the disposition will be for the gas to run back, and if in proper proportions for an explosion, go off, or at an rate fire some portion of the inflammable material of which gas bags are made.

Gas in Cylinders.—There is a general concensus of opinion with regard to this, that the safety of use is pretty well assured if the works that fill them use the precautions they state and promised to do, viz., (*a*) test every cylinder to twice the pressure to which it will be subjected in filling with gas, (*b*) empty every cylinder as it arrived at the works in the open air, and *never* fill up a partially full one, (*c*) use different fittings for oxygen and hydrogen cylinders, so that they cannot put hydrogen gas into an oxygen cylinder, (*d*) paint the cylinders distinctive colours—hydrogen RED, and oxygen BLACK.

Lanternists will do well to insist on these colours being observed for *all* fittings of cylinders, regulators, and gauges, and no matter who supplies them have those that relate to hydrogen painted RED. It is also wise to use red tubing for *all* hydrogen connexions, for it is at once recognised, besides being distinctive. The mention of tubing reminds me that with the oxyether light, *never* on any account use the tube through which the ether vapour has passed for the connexion with oxygen, and do not use it for *any* connexions of the oxy-hydrogen light on a subsequent occasion. It is wise to blow through in the open air any tubes used for ether prior to putting away, and the same thing should, I think, apply to benzoline, or any other

hydrocarbon or inflammable spirit, such as recently advocated for saturators for lime or incandescent gas lights.

Transit of Cylinders.—The sending backwards and forwards of cylinders to the opticians to be filled is a matter that requires a considerable deal more attention than has been paid during the past two seasons, for, although the cylinders are strongly made, and will stand a great amount of knocking about, it is not fair to the supplier and user that they should be subject to worse treatment than a bale of wool, and there is one portion of the cylinder that is more delicate than the rest. I mean the nozzle and screw valve. Familiarity breeds contempt, and we have somehow become so imbued with the strength of the cylinders that it is thought they can take care of themselves. Experience has recently shown that the valve can be damaged in transit, and as customers would not like to receive their cylinders unfit for use, one London optician and well-known lantern manufacturer has decided that *no cylinder shall be sent backwards and forwards to a customer without having a suitable protection of a box or crate*, so that in the event of haste or carelessness on the part of the railway people the valve and fittings will be free from injury. In the case of any part of the journey being by ship, the cylinders *must* be enclosed in boxes, for some of the shipowners will not carry them. The best class to declare them on returning them for filling is "Hardware." The special designation of class when full is "Oxygen in tubes," and this has been accepted at special moderate rates by the railway companies. It would be a great pity, now the system of compressed gas is established, and the transit undertaken at ordinary risks, for any check to be put on it by the want of co-operation on the part of users and sellers of gas, and it is to be hoped that *all* opticians, oxygen works, and lanternists will, without exception, at once adopt some wooden protection to *every* gas cylinder that passes out of their hands for a journey. A wooden box to thoroughly enclose the same, and permit of soft packing at the screw valve end will be best; and, besides that, it prevents inquisitive handling, or irrelevant remarks, such as "torpedoes," &c. The solid leather portmanteaus form the best method for carrying—personally—small pairs of cylinders for an entertainment for this very reason, and because of the convenient shape both in use and when travelling. G. R. Baker.

THE MEASUREMENT OF LENSES.*

Another important step has been the introduction of the conception of focal planes—a conception to which the use of the photographic camera has, doubtless, contributed its share. Less fully recognised, but none the less important, is the conception introduced by Gauss as the result of his studies in geometrical optics, that the properties of any centred combination of lenses might be represented by a system of planes and points which are, so to speak, the characteristics of the equivalent lens. A lens can be considered as having a single optical centre only when it is infinitely thin, or, at least, of negligible thickness. All thick lenses and combinations of lenses have two optical centres, described by Gauss as the two "principal" points ("Hauptpunkte"), which are considered as the places where the axis intersects two "principal planes." These principal planes are at a certain distance apart, and equidistant between the two principal foci at the back and front of the lens. They possess certain properties most useful in the geometrical treatment of lens problems, and act as though the light, however, obliquely it may be crossing the lens, were transferred straight from one to the other. The two "principal" points, or optical centres, possess the property that light proceeding from any direction towards the one of these points passes out from the lens combination as though it had passed through the other. Fig. 1

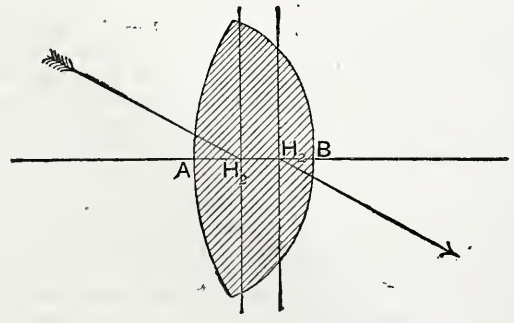


Fig. 1

shows a compound lens (in diagram), in which the two principal points of Gauss are marked H_1 and H_2, with the two principal planes drawn through them; also the two principal foci, F_1 and F_2, with the principal focal planes drawn through them. When the positions of the four* cardinal points are known for any lens or lens system, then all known that is necessary for a complete discussion of the formation of images for all objects lying near the principal axis. The true focal length is the distance from either of the two principal planes to the corresponding principal focus, the back focus and the front focus being equidistant each from its own optical centre. But hitherto it has been found difficult to ascertain the position of the principal planes of a lens combination. Optical instrument-makers generally have no information on the subject that they can furnish. They can tell us approximately the focal length, but they cannot, or do not, tell us the position of the optical centres or principal points from which this focal length is to be reckoned. Beginners in microscopic work, when they come upon an objective marked "quarter-inch," expect to find that the object must be placed a quarter of an inch below the front surface of the lens, and are often puzzled to find that the distance is perhaps only one-tenth of an inch. Naturally they ask the question, from what point does the maker measure his quarter of an inch? The correct answer is, that the quarter inch should be measured from the principal plane which corresponds to the front focus of the lens. But where this principal plane lies is never marked on the brass mount of the lens, though it ought to be. Again, the beginner often asks what is the correct way to reckon the true tube length of the microscope between objective and eyepiece. May he measure from the lowest point of the eyepiece to the highest point of the objective, or how? Again, the answer is that the true distance between objective and eyepiece is not the mere length of the tube, but the distance between the second principal plane of the objective and the first principal plane of the eyepiece. But how is the unfortunate possessor of the instrument to measure this if the constructor has omitted to mark on the eyepieces and objectives the positions of the principal planes?

It is one of the purposes of this paper to describe an instrument for measuring lenses, and ascertaining the precise position of these principal planes. Therefore, a few more preliminary words about the principal planes and the two Gauss-points through which they pass, will be appropriate.

In ordinary single lenses, if not very thick in proportion to diameter, the distance between the two principal planes is approximately one-third of the thickness of the lens at its middle. Exact formulæ are given in various modern treatises on geometrical optics. In lenses that have the two faces of different curvatures, the principal planes do not lie symmetrically between the two poles† of the lens, but are shifted toward the more highly curved face, or even beyond it. In plano lenses, whether convex or concave, one of the two principal planes is a tangent to the

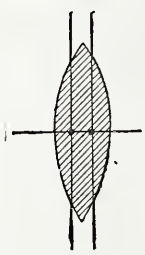


Fig. 2.

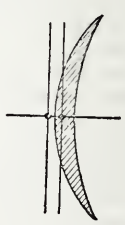


Fig. 3.

Fig. 4.

curved face. These matters are illustrated by the sketches in Figs. 2, 3, and 4.

If the positions of the four cardinal points are known for any two lenses separately, then, when the lenses are placed at any given distance apart, the positions can be found for the four cardinal points of the combination. The geometrical construction is very simple, and is illustrated in Fig. 5. Let h_1 h_2 be the two principal points of a lens, and f its principal focus for light passing through it to the right. Let h'_1 h'_2 be those of a second lens, and let f' be its principal focus for light passing the other way. It is required to find the position of the principal points, and of the principal focus of the equivalent lens. Consider any ray-path o parallel to the axis. Light travelling along from a will, after passing the principal planes of the first lens, turn towards f. Similarly, light passing the other way from b, after passing the second lens, will turn towards o. These paths cross at o. Join oh_2 and oh_1; and draw $h_1 x$ parallel to oh_2 and $h'_1 y$ parallel to oh'_1. The planes xH_1 and yH_2 drawn through x a

* If the lens system is not bounded by similar media on its two faces—for example if one side is bounded by air and the other by water—the two optical centres are shifted away from the two principal planes towards the denser medium, and are known as "nodal" points. In this case there are six cardinal points to consider.

† I have used this term for years to denote the middle points of the two faces of a lens, and find it very convenient.

* Continued from page 760.

l be the desired principal planes. And the resultant focus F is found nsidering the ray, which starts from a and passes through o towards d remembering that, as it passes through the second lens, it will be ed forward through the distance between the planes h'_1 h'_2, and ed as though it came from y. A little consideration will show that, e two lenses were close together, the width $H_1 H_2$ will be the sum of widths h_1 h_2 and h'_1 h'_2; whilst, if the two lenses are moved wider t, H_1 and H_2 will come nearer together, and may even cross past one her. If the lenses are placed at a distance apart equal to the sum of focal lengths, H_1 and H_2 will not only have crossed places, but will separated to an infinite distance apart.

ie formulæ for calculating the resultant focal length and resultant h, between the principal points for a combination of two lenses at a nce apart, are as follows:—

$$\text{resultant } f = \frac{f_1 f_2}{f_1 + f_2 - a};$$

$$\text{resultant } w = w_1 + w_2 - \frac{a^2}{f_1 + f_2 - a};$$

re a is the distance between the lenses, f_1 and f_2 their focal lengths, nd w_2 the widths between their principal points.

rom these formulæ it follows that the resultant focal length of a com- tion of two positive lenses when separated by an interval is always ter than the reciprocal of the sum of their reciprocals, and increases

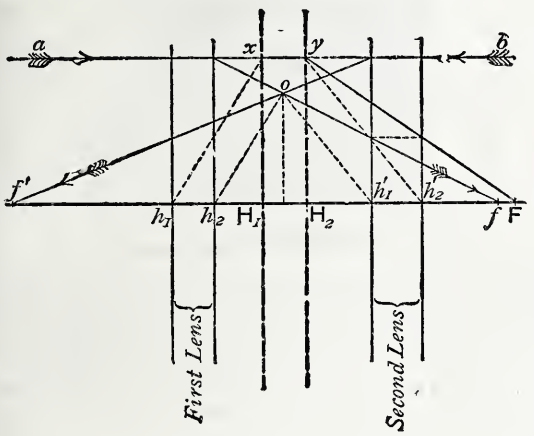


Fig. 5.

he lenses are separated. The resultant width between the principal its decreases from the value $w_1 + w_2$ down to nothing, and then in- ses negatively, becoming infinite when $a = f_1 + f_2$, and again becom- positive and finite when a exceeds that value.

the optical combination is not achromatic, then the positions both of cipal planes and of principal foci will be, in general, different for ts of different colours.

here exists yet another pair of points and planes, having special perties that should be noted. These are the points situated on the beyond the principal foci at distances respectively equal to the true l length on either side. They are marked S_1 and S_2 in Fig. 6,

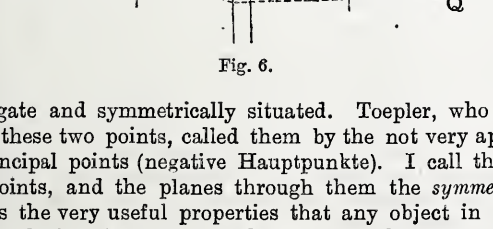


Fig. 6.

g conjugate and symmetrically situated. Toepler, who first called ntion to these two points, called them by the not very apt names of ative principal points (negative Hauptpunkte). I call them the two- *metric* points, and the planes through them the *symmetric* planes. y possess the very useful properties that any object in one has an ge of equal size, inverted, in the other, and that any ray which ses one of them at any distance from the axis will, after traversing lens, cross the other symmetric plane at an exactly equal distance n the axis, but on the other side of the latter.

have now cleared the way for discussing the methods that have been erto used or suggested for measuring the focal properties of lenses. ortunately, most of the ordinary methods of focometry which are ccepted use are based on the assumption that the lens may be treated f negligible thickness, and in some others one has to make assump- tions beforehand as to the probable width between the principal planes. This is easy enough in the case of a single lens, but for compound lenses the principal planes come in most unexpected positions, at an unknown width apart. After I have enumerated the methods of focometry, and briefly described each, I will describe a new method, and an instrument for carrying it out.

Methods of Focometry.

The methods of focometry may be classified under six general heads, and under these may be grouped the several varieties adopted by different authorities.

I.—Method of Direct Focal Search.

(*a.*) *Objective Methods.*—The classic simple method of ascertaining the principal focus of a lens or optical combination, applicable only to positive lenses, consisting in sending rays from any very distant object through the lens, and searching for the real image which is received upon a suitable surface, preferably that of a semi-transparent screen.

(*b.*) *Berger's* Method.*—A variety of the preceding, in which an illuminated object and a collimating telescope at a finite distance are substituted for an indefinitely distant object, and the real image at the principal focus is sought by means of an observing microscope.

(*c.*) *Maskelyne's† Method.*—A telescope, fitted with crosswise eyepiece, is focussed upon an object at indefinite distance. The (positive) lens under examination being then clamped over the object-glass, it is pointed to a near object, which is moved to such a position as will give an accurate image in the telescope, the position of the object being that of the principal focus of the lens.

(*d.*) *Merz's‡ Method.*—A variety of the preceding, adapted to negative lenses. The telescope, with the lens under examination fitted in front of the object-glass, is focussed upon an object at an indefinite distance, and then the lens, being removed, is pointed to a near object, which is moved to a position giving accurate focus.

(*e.*) *Kerber's§ Method.*—The positive lens being placed in front of an illuminated slit, it is moved to such a position that a slab of glass with parallel faces introduced into the path of the emerged rays produces, on being tilted, no change in the apparent position of the slit as viewed in a telescope, this being a test of parallelism of the rays.

None of the foregoing methods are applicable to very short-focus lenses, and gives no information as to the Gauss points.

(*f.*) *Pendlebury's‖ Method.*—The positions of each of the two principal foci are found objectively, and then the respective distances are found from these to two conjugate points by inserting a luminous object, and finding, objectively, its image. Then, calling these two distances p and q, the true focal length is found by Newton's rule as a geometrical mean between them. After this calculation has been made, the distance between the two principal points can be found by subtracting twice the true focal length from the distance between the two principal foci.

II.—Methods of Magnification.

(*g.*) *Ramsden's Method.*—Measurement is made of the size and distance of the real image formed at the conjugate focus of an object of known size, at known distance, and from these the focal depth is calculated. This method assumes the lens to be of negligible thickness.

(*h.*) *Meyerstein's¶ Method.*—This is a modification of Ramsden's method to meet the case of thick lenses. The lens is placed between an object and a screen fixed at more than four times the focal length apart. Measurement is made of the size of the object and image, together with their distance apart, and the distance of the lens from one of them. The lens is then reversed end for end, and is displaced longitudinally until the same magnification is obtained as before on the same screen. All assumptions about the Gauss points are thus eliminated, for it is clear that if in the second observation, after reversing the lens, the same magnification is obtained as in the first, the second principal point now occupies the position which the first principal point previously occupied, and *vice versâ*. From the magnification, the distance between object and image, and the measurements of the displacement of the lens, the true focal length is calculated. Dr. Meyerstein describes a special instrument for carrying out this method. This method was devised in 1844, but not

* Berger: 'Apparat zur genauer Bestimmung der Brennweite von Objectivgläsern.' —*Zeitschrift für Instrumentenkunde*, vi. 1886, p. 272.

† After considerable search, I am unable to find any writing of Maskelyne's which describes the method which goes by his name. The same remark applies to Ramsden's method.

‡ Merz: "Ueber einen neuen Apparat zum Messen der Brennweite."—*Pogg. Ann.*, 1845, lxiv. 321.

§ Kerber: "Verfahren zur Bestimmung der Brennweite von Linsen."—*Zeitschrift für Instrumentenkunde*, I., 1881, p. 67.

‖ Pendlebury: "Lenses and System of Lenses" (London, 1884), p. 82.

¶ Meyerstein: "Apparat zur Bestimmung der Brennweite sphärischer Linsen und Linsensysteme."—*Wied. Annalen*, i., 1877, p. 315; and *Carl's Repertorium*, xiv. 1877, p. 363.

published until 1877, after the same principle had been independently discovered and described by Dr. Hoppe.*

(*i.*) *Hansen's*† *Method.*—An object of given size being chosen, the positions of the lens are found which give (real) images of linear magnitudes respectively equal to that of the object multiplied by 1, 2, 3, &c., and from two (or more) of such observations, each of which requires a series of double adjustings, the focal length and distance between the principal points are calculated.

(*j*) *Mergier's*‡ *Method.*—This is an elegant mode of carrying out one of Hansen's suggestions. The two symmetric points are found by trial and double adjustment, as in Silbermann's method mentioned below, the magnification here being unity. Two micrometers serve as respecting object and as receptive surface for the image. This adjustment being made, then, in order to produce an image in the same place as previously, but of double magnitude, it is sufficient to displace the lens through a distance equal to the focal length and the object, though exactly half this distance. This is accomplished by simple mechanical means, with two screws connected by wheel-gearing.

SILVANUS P. THOMPSON, D.Sc., F.R.S.

—*Journal of the Society of Arts.*

(*To be continued.*)

Our Editorial Table.

UNITED STATES PICTURES.

By RICHARD LOVETT, M.A. London: The Religious Tract Society.

So great is the rapidity with which a London suburb grows, that in order to preserve any sort of acquaintance with it at all one must pay frequent visits to it at no great intervals apart. What is true of the London suburbs is also true of the United States of America. The rapidity with which towns and cities spring up is truly astonishing. We could name several such, having their railway depot, their newspapers, hotels, banks, and even electric lights, which, when we first saw them only a few years since, consisted of scarcely more than a solitary store and a public-house. The rapid growth of American cities and surroundings is the *raison-d'être* of *United States Pictures, Drawn with Pen and Pencil.* It is not a long time since a volume of a similar nature (*American Pictures*) was issued by the same publishers; but such have been the changes that have taken place in the United States, and so great has been its development within these few years, that the volume last named has had to retire, and make way for the present one, which is a new one entirely, and in which the subjects treated are brought up to date. *United States Pictures* contains a map and 157 engravings, several of which are full-page size. Some of these appeal very strongly to the sympathies of those acquainted with the scenes and subjects, as, for instance, *Customs Officers examining Baggage on a Steamer's Wharf at New York*, compared with which the terror of an ocean voyage, even in mid-winter, is quite insignificant. We see disconsolate-looking maidens, with their quondam carefully packed trunks, now opened, and the contents displayed to the bystanders and the ruthless examination of the officer, who tries to discover something dutiable in every package. But what of the poor *man*, whose belongings, packed at home by the careful and methodical mother, wife, or sister, have now expanded into a bulk which it seems a hopeless case to try to get returned into its original receptacle? A Customs baggage wharf is calculated to strike terror long in advance into the mind of one who knows what ordeal he has to undergo, and this picture recalls the scene with painful vividness.

The information given concerning the steps to be taken on landing at the great city is calculated to be invaluable to the traveller. We learn that in 1648 New Amsterdam, as New York was then called, numbered only a thousand inhabitants; in 1890 the number exceeded one and a half million. We are reminded of a caution which may prove useful to such of our readers as contemplate emigrating to America. "By the Contract Labour Statute it is declared illegal for any man or any company of men to enter the United States, if their arrival is due to any engagement on their part to work for, or to carry out, any labour contract with men already resident in the United States." Of course, this is often evaded, but it is illegal all the same. Much useful information relating to this is given by Mr. Lovett. Several fine engravings of scenes in New York City are given, including a characteristic one of Wall-street, taken at its busiest time. The Brooklyn Bridge also deserves special commendation. In the part devoted to New England we have, together with numerous scenes of historical interest, a noble portrait of Longfellow engraved in admirable style. The Federal Capital, Washington, is well illustrated, the Capitol, the White House, the famous Smithsonian Institute, and the beautiful Pennsylvania-avenue affording some of the scenes for pictorial representation. Chicago, San Francisco, Salt Lake City, the Yosemite Valley, the Yellowstone Park and the routes to these have all furnished subjects for the sketching artist and photographer, for both have been employed. The descriptive matter is highly interesting and well written.

* Hoppe: "Ueber die Bestimmung der Haupt- und Brennpunkte eines Linsensystems."—*Pogg. Annalen*, clx. 1876, p. 169.

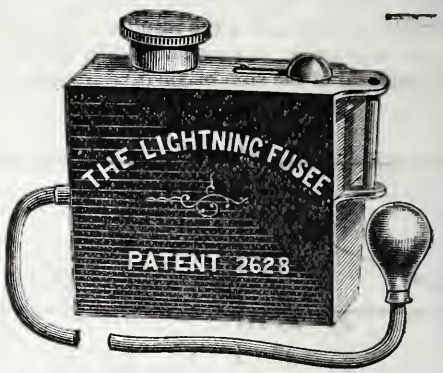
† Hansen: "Untersuchung des Weges eines Lichstrahls durch eine beliebige Anzahl von brechenden sphärischen Oberflächen."—*K. sächs Gesellsch. für Wissenschaften*, xv. 1871.

‡ Mergier: "Nouveau focomètre pour la détermination des constantes optiques des systèmes dioptriques en général."—*Séances de la Société de Physique*, 1887, p. 193.

THE LIGHTNING FUSEE FLASH LAMP.

J. F. SHEW & Co., Newman-street, W.

OF the various flash lamps which we have seen, this forms the smallest combined with efficiency, for it can be easily carried in the waistcoat pocket. It is one of the repeating class, and when it has received its charge of magnesium powder through the capped aperture in the top, and a fusee is inserted in the place provided, and ignited,



smart pressure on the pneumatic ball ensures a brilliant flash so long as the match continues to burn. This is advantageous, inasmuch as it enables one to take a portrait or interior by two flashes, the position of the light being shifted between them, thus preventing a too strong cast shadow. It is a really compact and useful instrument, and fulfils its purpose well. The cut, which represents almost the full size of the lamp, shows its various parts.

PARK'S DEAD-BLACK VARNISH.

THIS is an alcoholic varnish prepared for blackening the inside of dark slides and cameras. It is also suitable for metal work. It dries quickly, and does not rub off. We find it easy of application, and useful for the purposes intended. It is made by Mr. H. Park, 5 Station-buildings, Acton-street, N.E.

THE PHOTOGRAPHIC IMAGE.

By P. C. DUCHOCHOIS. New York: W. R. Jenkins, 851 & 853 Sixth Avenue.

To the development of the photographic image as it is created in the various gelatine and collodion processes, both negative and positive, the book before us will be found an invaluable guide. As a practical worker and a master of theory, Mr. Duchochois' experience reaches back over many years to the primeval, or Daguerreotype, era, and his reputation consequently ranks high with our American brethren. The present volume fully sustains that reputation. It discusses in a clear and intelligible manner the chemistry of the innumerable reagents employed in ancient and modern development, and lays down their practical applicability in a manner which will be of use to tyro and experts alike. Dark-room illumination, exposure, varnishing, and other sections of the subject are also introduced. In short, as a treatise on negative-making, the book is distinguished by an ideal completeness and reliability, and should find a place in the library of every professional and amateur. We understand that it will shortly be published in this country, and we are confident it will be welcomed in the measure of its deserts.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,068.—"Improvements in and connected with Photographic Sensitised Plates." H. M. CAMPBELL.—*Dated November* 18, 1891.

No. 20,177.—"Improvements in Portable Photographic Cameras." J. H. SKINNER.—*Dated November* 20, 1891.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 8	Great Britain	50, Great Russell-st., Bloomsbury.
,, 8	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 8	Derby	Society's Rooms, Derwent-bldings.
,, 8	Bradford	50, Godwin-street.
,, 8	Manchester Amateur	Manchester Athenæum.
,, 8	Carlisle and County	Cathed. Hall, 57, Carlisle-st., Carlisle
,, 8	Paisley	Committee Rm., Free Lib. & Museum
,, 9	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 10	Birkenhead	Association Rooms, Price-street.
,, 10	Cheltenham	
,, 10	Manchester Photo. Society	36, George-street, Manchester.
,, 10	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 11	Ireland	Soc.'s Rms., 15, Dawson-st., Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 26,—Mr. W. E. Debenham in the chair.

Messrs. A. L. Adams, A. J. Bills, and E. Simmons were elected members of the Association.

The proposed testimonial to Dr. Maddox was brought before the meeting.

The CHAIRMAN, in alluding to the subject, said that many people really knew nothing about what Dr. Maddox had done. As a matter of fact, he combined a bromide and silver in gelatine, and produced negatives by the process very much of the same character as those obtained nowadays, although without such rapidity. He (the Chairman) had made plates and got good negatives with more rapidity than wet collodion by Dr. Maddox's method, modified by himself. There were only two steps in emulsion-making made since 1871—these were the removal of the soluble nitrates and the attainment of rapidity. Maddox may be said to have started gelatino-bromide emulsions, and he thought that the appeal should be largely responded to.

Mr. A. HADDON was also of opinion that all should contribute to such a deserving case. It was far better to give to such a man as Dr. Maddox during his lifetime than to erect a statue to him after he was dead, which did him no good. Every photographer should add his mite to the fund, and thus Dr. Maddox would be able to complete his career in comfort.

Mr. F. A. BRIDGE thought that dealers, plate-makers, and others who had profited by the gelatine process, should subscribe to the fund. There was apparently a general feeling in favour of it. On the other hand, there were probably many who had reason to regret the introduction of gelatine.

Mr. T. E. FRESHWATER remarked that, although it was only that night that he learned that Dr. Maddox was the originator of the gelatine process, he knew that in the world of microphotography he had done good and important work.

It was then formally resolved that the members of the Association should contribute to the fund, and that Mr. A. Haddon (who was a member of the Fund Committee) be requested to act as Treasurer. Mr. Haddon subsequently demonstrated his fitness for the position by collecting a considerable sum of money from the members present.

Mr. J. S. TEAPE said he had recently intensified a negative with potassium ferridcyanide and uranium nitrate, and, as the result was not satisfactory, he had put it in a tray of water to wash out the intensifier. The tray got tilted, and the whole of the intensifier was abstracted from a part of the negative. Apparently it did not require running water to affect this intensifier. This led him to try the effect of soaking some bromide prints toned with uranium. From one of the prints soaked all night the image had almost entirely disappeared. It had been said that one could overtone with this intensifier, and then reduce the deposit to what it originally was. He employed a drachm of uranium nitrate, a drachm of potassium ferridcyanide, and a drachm of acetic acid in sixty ounces of water. In reference to the statement reproduced in last week's JOURNAL, that platinum prints could be toned with uranium, he produced some platinum prints so treated, and subjected to a prolonged soaking. The platinum image was apparently not reduced.

The CHAIRMAN thought the uranium intensifier had, in one of the platinum prints shown, much improved it.

Mr. DRAGE had soaked uranium-toned prints for four hours. They had lost a little, but nothing to the extent of Mr. Teape's pictures.

Mr. HADDON said that the very thin image left in one of Mr. Teape's prints might be redeveloped.

Mr. P. EVERITT referred to a former experiment of his in which potassium ferridcyanide and potassium bromide had reconverted an image into silver bromide. Perhaps there was a similar process here.

Mr. TEAPE said that it was curious that the metallic silver remained in the reduced negative and not in the bromide print.

Mr. HADDON said that, if the silver could not be removed from the negative, it could not be removed from the print. If a deposit had been converted into silver bromide, it could always be redeveloped. He thought that the silver was still there. He undertook to take the image away and redevelop it by the next meeting. He explained that by the ferridcyanide-hypo reducer the silver is converted into silver ferrocyanide, which is dissolved by hypo; but in the case of this uranium intensifier there was no solvent of silver present.

The subject for the evening was *The Protection of the Negative During Printing.*

The CHAIRMAN said that many people took it for granted that it was not necessary to protect the negative during printing. That day he had taken prints from a negative which had silver stains on it, which he removed by a little cyanide rubbed on the film. The deposit formed of nitrate by light appeared to be of a different character to that obtained by development. There was a prejudice against varnishing gelatine negatives, but he could not understand the objection. There were several plans devised for the purpose. One was to introduce a thin film of gelatine or talc between the negative and the print. The loss of definition was not noticeable. Collodion was used by some, but most people probably used a spirit varnish. The objections to this were that it was apt to stick in hot weather; and it was also apt to stick in moderately warm weather, especially if the varnish had taken up water. Through leaving the bottle open some of the spirit evaporates, and thus one would get a solution of lac or alcohol and water. He had found that varnish in that state never hardened properly, so that, although the negative may be varnished, heated, and dried, little pressure would make paper marks on it. It would then be best to clean off the varnish and do it again. In using a spirit varnish he did not expose to the air more than was necessary. One other objection was that, if the negative got wet, crystalline markings appeared on it. Of other varnishes he had had but little experience. He would like to know the experience of others upon the effect of water on a spirit varnish.

Mr. T. BOLAS said it was the custom of sinful oilmen to add water (and other things) to spirit. In making varnish he had noticed a similar thing to Mr. Debenham. His objection to gold size was that it contained various resinous matters, and sometimes bitumen, which gives a dark size.

Mr. BRIDGE asked if any member had noticed, when using varnish, a deposit of lac form? He had. It was a good usable varnish, but the lac had suddenly gone out of solution.

Mr. BOLAS said that an ordinary stone bottle may contain several pints of water which would gradually work out and dilute the spirit. This would not be the case with glass bottles.

Mr. J. E. SMITH mentioned that he had heard of a varnish which could be applied cold with a brush.

The CHAIRMAN said it was probably gold size.

Mr. EVERITT inquired if any one had experience of silicate enamel for the purpose?

Mr. COWAN remarked that Mr. Warnerke had stated that gold size would stand water all night.

Mr. BRIDGE had tried it. If you gave it time to dry well, hot water would have no effect upon it. In answer to the Chairman he said it did not give a good surface for retouching work.

Mr. J. A. SINCLAIR asked what was the best plan to preserve celluloid films?

Mr. WELLINGTON said spirit varnish would ruin a celluloid film.

Mr. A. HADDON said that there was one objection to goid size and benzole. One might varnish a negative, and not be able to remove the varnish afterwards. If any one wanted to do so, bisulphide of carbon would answer, and would not injure the other part. Gelatine was insoluble in bisulphide of carbon.

CAMERA CLUB.

NOVEMBER 26,—Mr. A. Maskell in the chair.

The Rev. F. C. LAMBERT, M.A., gave a lecture entitled, *Some Analogous Aspects of Music, Painting, and Poetry.* The lecturer gave description and graphic delineation on the blackboard of some analogies existing in the respective derivations of music, painting, and poetry from simple elements. The superiority of musical over graphic representation of some natural phenomena was argued and illustrated, and the lecturer asserted his liking for music with a motive, or, so to speak, story-telling aim, running through it. Some amusing sketches were given on the board to show the power in the arts exerted by the association of ideas and abstraction.

Lantern slides and musical illustrations were given of many of the points made by the lecturer.

The musical examples being given vocally and on the pianoforte by Mr. Albert Jell, Musical Instructor at Cooper's-hill and Organist at St. George's, Campden-hill. The selections were most admirably rendered in illustration of the lecturer's remarks, and greatly assisted towards the pronounced success of what was a novel and refreshing subject.

Previous to the lecture Mr. E. Calland exhibited some carbon prints on extra rough Arnold's paper and on etching paper.

On Monday, December 7, there will be the usual Monthly Club Smoking Concert. On Thursday, December 10, Mr. A. H. Fison, D.Sc., London, will give a lecture *On the Use of the Lantern for Scientific Instruction;* and on the same evening Mr. T. R. Dallmeyer will give a *Short Description and Demonstration of the New Telescopic Lens for Photography.* This will take place at eight o'clock, before Dr. Fison's lecture, which commences at the usual time, half-past eight p.m.

HOLBORN CAMERA CLUB.

NOVEMBER 27,—Mr. Miller in the chair. An excellent show of lantern slides by members of the Club was thrown on the sheet. It was announced that Mr. Ebsworth was the winner of the prize for the best flashlight taken at the Club Dinner.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 1,—Rev. E. Healy in the chair.

Mr. Edward Clark was elected a member of the Society.

Questions were asked from the question box as to the mode of light measurement, and also as to a mineral oil light for optical lanterns which would not give off a smell when burning. On the first question a short explanation was given by the Secretary, a more complete description to be given at a future date. To the second question no answer could be given, it being generally admitted that the question of smell was largely, if not entirely, a question of cleanliness and care in using, without which all mineral oil lamps must of necessity be offensive.

The evening being an "optical lantern night," a large number of slides were shown by the aid of the Society's lantern, under the management of Messrs. A. Mackie and B. J. Groves. The slides comprised views in Wales, Devonshire,

Epping Forest, &c., by the Rev. E. Healy; on the Yare, by Mr. Brewer; Holland and Belgium, &c., by Mr. Hume (taken with the "Quadrant" hand camera); Hastings, &c., by Mr. Tanner; flowers, by Mr. Taverner; Jersey, by Mr. Douglas; and Devonshire, &c., by Mr. Grover. Mr. Parfitt showed the slides which were prepared by him for the recent competition at the London and Provincial Society, in which he was one of the prize-winners.

Mr. A. Mackie was appointed Chairman of the next meeting, to be held on the 15th instant, when a demonstration of *Carbon Printing* is to be given by the Secretary, Mr. W. Bishop.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 27,—Mr. Charles Bilton, B.A., in the chair.

A letter was read from the Photographic Society of Great Britain with regard to the question of affiliation with that Society, but consideration of the matter was held over. The rules of the forthcoming exhibition were read by the Secretary.

Mr. JOHN HOWSON then gave a paper and demonstration *On Alpha Paper*. Having brought some exposed pieces of the paper with him, he proceeded to develop them before the meeting, and then toned them in a combined toning and fixing bath, showing the different tones obtainable by stopping the action of the bath at different times.

The next meeting will be held on December 11, when Mr. Charters White will give a paper *On Photo-micrography*, illustrated by means of the lantern.

CROYDON CAMERA CLUB.

NOVEMBER 30.—Lantern night. Between three and four hundred members and their friends attended.

RICHMOND CAMERA CLUB.

THE first Annual Dinner of the Club was held at the Greyhound Hotel on Monday, the 23rd inst., when a good proportion of members and a few visitors sat down to an excellent repast. Mr. Cembrano (the President) was in the chair, and a very pleasant evening was passed.

At the weekly meeting on the 27th inst. Mr. R. L. Kidd presided, and Mr. Cembrano gave a demonstration of the making of collodio-bromide emulsions and their use for transparency work, showing and explaining the whole process of making the collodion, bromising and sensitising it, washing the emulsion, and cleaning, edging, and coating the glass. He concluded by exposing and developing some lantern slides, and explaining the method of toning them.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 26.—Annual Meeting.—The President (Mr. J. B. Stone, J.P.) in the chair. He moved the adoption of the report (which had been printed and circulated) and strongly advocated members to take up special work and to excel in it, to increase their interest in photographic exhibitions, and to enlist the sympathy of the public by novelty, advancement, and improvement. He congratulated the Society on its report and the excellent attendance at its meetings.

The officers and Council elected for ensuing year are:—*President:* J. B. Stone, J.P.—*Vice-Presidents:* Messrs. W. J. Harrison, F.G.S., E. H. Jaques, J. J. Butters.—*Council:* Messrs. F. S. Goode, W. Jones, A. J. Leeson, A. J. Longmore, G. A. Thompson, T. Taylor, E. Underwood, G. Wilkes.—*Librarian:* W. S. Horton.—*Treasurer:* W. Rooke.—*Secretaries:* Messrs. J. T. Mousley and A. E. Tucker.

The President presented the late Secretary (J. H. Pickard) with a Watson's whole-plate camera and three slides on behalf of the members, as a souvenir of their esteem and good-will, and in appreciation of the many services he has rendered to the Society.

In the course of his reply, Mr. PICKARD said:—"In accepting this memento of your esteem towards me, I feel I must thank you in the highest degree, not only for its intrinsic value (for it is a valuable one), but especially for the good wishes that prompted it, which convey to me your hearty good-will and appreciation of what I have done as your Hon. Secretary during the past five years. The position of Hon. Secretary in a large Society like ours is an arduous one and, at times, somewhat difficult; but my work has been considerably lightened by the kind help and co-operation of my colleagues and co-Secretaries, Messrs. Karleese and Rooke and, lastly, Mr. Leeson. The Society during my Secretaryship has increased its number of members from sixty to about 200, and we have now the privilege of a club room, which has been much improved lately, and your Hon. Librarian, to whom great thanks are due, has gained for you an excellent library, which few provincial photographic societies possess. Although resigning the post of Hon. Secretary, I shall still be with you as Hon. Secretary of the Warwickshire Photographic Survey, of which soon there will be a public exhibition."

STEREOSCOPIC CLUB.

NOVEMBER 23,—Mr. W. Cunliffe (President) in the chair.

Mr. W. I. CHADWICK read the following paper *On Enlarging from Small Negatives*:—

We, the members of the Stereoscopic Club, believe that to appreciate natural size and distance no photograph can compare with a stereoscopic slide, for we know it matters not whether the subject be a portrait or a group, a foreground study, or landscape embracing mountains as big as Mont Blanc, with miles of distance in the view, the stereoscope, when provided with suitable lenses, will assist us to a sensation which no other photograph can convey. But, notwithstanding all this, we may desire a change even from the very best; we may wish to have a few large single pictures, perhaps, to frame and hang on walls, or it may be that we desire a few large photographs from no better reason than that which I can give for wishing to smoke. And how to produce these larger pictures is the subject of the present communication. There are, of course, two ways by which large pictures may be obtained—one is to take them large to begin with; but there are few amateurs of to-day who would care to tug about a larger apparatus than whole-plate, and even that is too heavy when on pleasure bent. The alternative method is to enlarge from smaller negatives. It may be thought by some (as, indeed, I know that it is) that direct pictures are superior to enlargements, and we have seen fairly large pictures exhibited on which was announced, "Taken direct—not an enlargement," just as though they were better for being taken direct. If sharpness and perfection of definition be desired, an enlargement from a small negative has many advantages, for it is a fact well known to those who have studied photographic optics that, the shorter the focus of a lens, the greater the proportionate depth of focus it possesses. What we mean by depth of focus is the power to render near and distant objects equally sharp and true defined on one plane.

It has been demonstrated at this Club that if we take a quarter-plate picture with a five-inch-focus lens, and a whole-plate picture with a ten-inch lens (both from the same point of view), the two pictures will be in the same proportion and perspective; but if we use the relative size stop in each case, let us say, *f*-15, the five-inch lens will define all objects at fourteen feet from the lens, and everything beyond that distance will be in focus; but, with the ten-inch lens, the same sharpness or definition will not be possible at less than fifty-six feet from the lens; thus the detail of all objects lying between the fourteen feet and fifty-six feet (that is to say, the whole of the foreground) will be more or less out of focus and fuzzy; if, on the other hand, we make the foreground sharp, the distance. Now, from this it will be seen the great advantage in using short-focus lenses when sharpness of detail is required. The term "short focus" must not be mistaken for "wide angle." A five-inch-focus lens is a short focus when compared with a ten-inch; but a five-inch lens, used for a whole-plate, is also a "wide-angle" lens, though the same five-inch lens, when used to cover only a quarter-plate, is no more a wide angle than a ten-inch lens used for a whole-plate, for they would embrace exactly the same angle of view.

To recapitulate. It is an established fact there is a very considerable gain in the amplification of small negatives over those taken originally large. Of course, when making comparisons, it must be understood that the conditions are the same in each case. If we apply a very much smaller stop when using the larger plate, the conditions are not the same—the exposure would be very much longer, and this is the reason why large pictures are usually exposed longer; but, if we can afford to use a small stop with the longer-focus lens, we could also afford it just the same when using the short focus, which would bring the conditions as before. A good sharp negative, taken on a quarter or half-plate, will bear amplification to three or four diameters, and I have frequently enlarged some of my stereoscopic negatives to five diameters. Thus a quarter-plate may be enlarged very successfully to 16×12, and a half-plate to 24×18. But, before we begin to discuss the various methods and processes, the small negative first claims our attention. The image should have been well focussed, and taken with a good lens, of course. For my own part, I always work with as large a stop as possible, but, when I have any idea of enlarging from the negative, a smaller stop is usually applied.

About the kind of plates that are best, I can say very little. All the plates in the market are good, if you only know how to use them, though, for certain subjects, some may be better than others. Many old workers maintain that collodion negatives are more suitable for amplification than those made on gelatino-bromide dry plate; and, in some cases, this contention may be true, for there is a great difference in the image formed by variations in developing gelatino-bromide plates. Slow development produces a much finer gradation, more suitable for our present purpose. The negative should be fully exposed, but not too dense; a rather thin negative is best, and in every way it should be as perfect as a negative can be made. It is very little use, for a beginnner at any rate, to hope to successfully enlarge under-exposed negatives; the absence of detail cannot be improved by magnifying the defect, though it is possible in certain circumstances for an experienced worker to "tone down" certain defects by various "dodges," some of which will presently be explained.

The first process to be described is that practised by the Autotype Company, London—the carbon process, which consists in printing in contact with the original negative a carbon transparency by what is known as carbon tissue. This carbon tissue is paper on which is spread a thick film of gelatine mixed with a very fine carbon pigment, such as lampblack, Indian ink, alizarine lake. &c., and, after drying, is made sensitive by imersion in a solution of bichromate of potash. Sensitive in this way, that, although no apparent change takes places during printing, the action of daylight renders the film insoluble in hot water, whilst parts of the film protected from light are very soluble in hot water. If a piece of sensitised tissue be exposed to daylight under a negative, the shadows—that is to say, the more transparent parts of the negative—allow more light to pass than other denser portions, such as the sky or high lights, and thus the film is rendered more or less insoluble, according to the light action. When sufficiently printed, which is gauged by experience and a little instrument called an actinometer, the tissue is made damp by cold water, and squeezed to glass plates, and after a little time the whole is immersed in hot water for development. Very soon the paper backing or support leaves the back of the film, the front still sticking to the glass plate. Now the soluble portions are washed away, the high lights, sky, &c., begin to show, leaving only the insoluble portions attached to the glass. Then, when dry, the image is seen to be in relief, the thicker portions, containing more carbon or colouring matter, being densest, and carbon transparencies made by this process are of exceedingly fine gradation. From this a large negative is made, generally in wet collodion, from which carbon prints are made in a similar manner to that already described for making carbon transparencies, only, of course, using a specially prepared paper on which to develop instead of glass.

The colour of carbon prints can be almost anything from engraving or velvet black to red chalk, or it may be blue green, sepia brown, &c., depending upon the pigment used; and it is almost impossible to obtain any but the uniform colour of the tissue selected, so that under or over-exposure, under or over

development, &c., makes no difference to colour or tone, which cannot be said of any other photographic process It seems a pity such a beautiful and simple printing process is not more used by amateurs. It is clean and inexpensive, and the most permanent process of any.

The next method is, in some respects, similar to that already described, but the process is different. It was sold as a secret process many years ago, and for which I had the infatuation to pay 5*l.*; but the secret was not long kept, and the details have been published on several occasions. A transparency is first made from the original negative by contact, but on a specially prepared albumen plate, and developed by acid pyro made hot, to which a small quantity of silver nitrate was added; indeed, it was in the preparation of this transparency that the principal secret existed. From this transparency a large negative is made, and from which any number of prints may be taken, either in carbon, platinum, or silver. By the transparency method many modifications may be made. One was to make an enlarged transparency from the small negative on a gelatine plate, which could be touched up much easier than a negative; high lights could be put in by pencil or Indian ink, skies could be shaded, &c.; and then a large negative is made by contact either on another dry plate or on a sheet of albumenised paper, which, when waxed, to render more transparent, gives excellent prints. But it may be thought that to make either an enlarged transparency or negative requires a large camera, and so it does; but that need not be an expensive affair. At one time I was as much infatuated with enlarging as I am with the stereoscope at the present day. (I was much younger, and had not the experience, you see.) The camera which I used was constructed in one evening from an old tea-chest. At one end was fitted a 12×10 dark slide and focussing screw, which I picked up secondhand, at the other end was a hole for the lens, which was a portrait lens, screwed on with the front combination nearest the box, the other end of the lens tube supported my quarter-plate camera, with rack-and-pinion focussing arrangement, and in the place for the focussing screen was fitted a very simple carrier to hold the negative. The whole affair was carried to a window, and the small camera or negative end of the apparatus pointed to the sky. The tea-chest camera was, of course, rigid, and of suitable length, so that the focussing had to be done by the rack and pinion of the small camera; and the amplification was always the same (in my case three diameters), so that all my enlarged negatives were uniform, and fitted printing frames and plate boxes, &c. But, as a rule, amateurs do not want more than one enlargement from a negative, and the tendency at the present age is to get something with as little trouble as possible. Then the gelatino-bromide paper is the very thing, for we have simply to project the negative image, and develop it, and the thing is done.

I am not going to tell you the bromide enlargements are the best, but there can be no doubt about it they are far the easiest for an amateur to produce, and by suitable appliances and a little care and judgment exquisite results may be obtained. The principle is this, original negative uniformly illuminated with a sheet of sensitive bromide paper—in the dark—at a suitable distance, and a diverging lens somewhere between. If daylight be used for the illumination of the negative, the room may be darkened to serve as the camera, but generally amateurs prefer to work by artificial light, when the whole operations may be conducted in the evening. There is a great advantage in artificial light, from the fact that it is more constant than the daylight with which we are blessed.

Now, the uniform illumination of the negative is one of the most important conditions. If we were to fix a naked gaslight behind a negative, we should find one portion more illuminated than another. If we introduce between the negative and the light a piece of ground glass, the illumination would be much more even, though the whole very much reduced, and based upon this idea many dodges have been suggested from time to time by various writers, who have asserted their modification a perfect success. Personally I have tried and experimented with a large number of these "dodges," such as rows of gaslights, paraffin lamps, and magnesium, with ground glass, opal, tissue paper, &c., between the light and the negative, and then came systems of reflectors, &c., but in no single instance have any of these been satisfactory, and it may be taken as a fact that the only practical way to evenly illuminate a negative by artificial light is by means of an optical condenser. The size of the condenser depends upon the size of the negative—when the whole of it is to be enlarged—and should equal a little more than the diagonal measurement of the negative; thus, for a quarter-plate a six-inch condenser is most suitable, though five and a half inches might be made to do; for a half-plate negative I prefer an eight and a half or nine inches condenser. The source of light may be limelight or a paraffin lamp. For some negatives limelight is the best, but generally an oil light will be found the most convenient. There are several forms of oil lamps used for enlarging purposes, and these, with the three wicks edgeways to the condenser, similar to a modern magic-lantern lamp, are, in my hands, decidedly the best. It must be remembered that large condensers used for enlarging purposes are not perfect optical instruments, and do not collect the whole of the rays from one point, but require a greater volume to collect from than more perfect optical instruments, which would increase the cost probably to ten times their present price, and the volume of light necessary is not only in superficial area, but in depth too. Thus it will be seen that, however brilliant a flat flame may be, it would be not so good as two or three flat flames one behind the other. On the other hand, too large a flame, or source of illumination, is, for opticul reasons, also objectionable, and the worst kind is such as a large Argand burner. We have heard a good deal about very powerful oil lamps, with five and more wicks; but, from repeated trials and careful observation, they have not been found to possess any advantage. As the illumination, powerful or weak, for a given negative effects the quality of the resulting enlargement, so the quality, dense or thin, stained or clear, for a given light effects the result in like manner. A thin negative requires a thin light, and a bold, vigorous negative requires a strong, powerful light, of course using a normal developer in each case. A thin negative, enlarged by a prwerful light, like daylight, will produce a fiat picture, whilst a vigorous negative, enlarged by a weak yellow light, such as that from a poor oil lamp, will give a hard result. But some modification can be made in the development, as will presently be explained.

Now a word or two about the lens, or objective, as it is called. Almost any moderately good portrait lens or rapid rectilinear which will cover a plate as large as the negative to be enlarged from will answer the purpose; the focus of it has very little to do with it, but if too short, the marginal definition would be deficient, and wide-angle lenses with small diaphragms are the most unsuitable. If a landscape lens be used the convex side should be next to the negative, with the diaphragm in front. When enlarging from a quarter-plate negative a quarter-plate portrait lens will be the best, and from a half-plate negative a half-plate or cabinet portrait lens is as good as any. Of course, a rack-and-pinion focussing arrangement is usually provided on such lenses, which is a convenience, but not absolutely necessary. Now, the objective negative condenser and light must be contained in something, and no better form has been devised than that of a magic lantern; it matters not for external shape or appearances so long as all the parts are kept in position, and the body light-proof. I have before now constructed such a lantern from a soap box, and two Australian meat tins for draw tubes and to carry the objective.

The easel on which to attach the sensitive paper may be contrived as is most convenient; a flat drawing board with drawing pins is as good as any, and this may be supported against a wall; but the one now on the table possesses many advantages, as you see it is portable and can be stowed away in a small space: it is self-supporting, and always at right angles to the table on which it stands, and three rubber toes on which it stands prevent slipping and rocking. The board to which the paper is attached is removable, and can be replaced in its exact position in an instant by means of vertical grooves; it is also provided with a vertical adjustments above and below the centre.

Very little information can be given for the exposure, as the conditions are so variable, and the different brands of paper in the market also vary in rapidity. It is usual to make a trial exposure from some average portion of the projected image, and on developing it will be seen if too long or too short an exposure has been given; but with a little experience, keeping to one brand of paper and one method of developing, the trial exposure will not always be resorted to.

The developing trays generally used for this purpose are those with glass bottoms and wooden sides, and are very convenient for small sizes when kept clean, one for each solution, and they should be frequently varnished. But I have frequently made big enlargements without these large trays by folding the sides of the paper to form a tray in themselves. American wooden clips are handy to hold the corners, whilst a drawing board about four inches larger each way than the paper forms a capital support, and can be easily handled; and it is by this "dodge" I shall attempt to make a few enlargements to-night.

The development of bromide paper may be conducted by pyrogallic acid, hydroquinone, eikonogen, or ferrous oxalate; and, after considerable experience with various formulæ, I feel bound to confess that nothing has succeeded in my hands so well as ferrous oxalate. It has been recommended to make up two saturated solutions, one of oxalate of potash and the other of sulphate of iron; but saturated solutions are not definite enough—they alter with change of temperature—and if the two solutions be mixed in certain proportions at one temperature, they are not in the proportion mixed at another temperature. The solutions made up as follows are much to be preferred:—

Oxalate Solution.

Neutral oxalate of potash	1 pound.
Water	50 ounces.

Made to turn blue litmus paper slightly red by sulphuric acid.

Iron Solution.

Sulphate of iron	½ pound.
Water	15 ounces.
Sulphuric acid	15 drops.

Bromide Solution.

Bromide of potassium	1 drachm.
Water	10 ounces.

Clearing Solution.

Acetic acid	1 drachm.
Water	30 ounces.
Alum	6 drachms.

Fixing Solution.

Hyposulphite of soda	3 ounces.
Water	20 ounces.

After exposure, flood the paper with water, and rub it gently by a pledget of cotton-wool; then place the cotton-wool into a clean saucer kept for the purpose. Drain the paper and apply the developer. A good normal developer will be—

Oxalate solution	6 parts.
Iron solution	1 part.

(The iron should be added to the oxalate, not the oxalate to the iron, or a precipitate may form.)

But, as has been stated, the ferrous-oxalate developer is capable of some modification. A smaller proportion of iron will produce softness, and thus, for developing prints from hard negative, showing great contrast, the proportions may be as much as twelve of oxalate to one of iron. On the other hand, a larger proportion of iron produces contrasts; bromide also assists in producing vigorous prints, but it must be very sparingly used—often a single drop of the solution mentioned per ounce of developer is sufficient, but there is a limit to the larger proportion of iron; three parts of oxalate will not take up more than one part of iron: after that a precipitate forms, which is injurious to the prints.

Like other processes in photography, over-exposure produces softness, under-exposure produces hardness. The developer may be assisted over the surface of the paper by a pledget of cotton-wool, which, when done with, should be placed in another clean saucer for future use. If the picture flashes out too quickly, it is a sign of over-exposure, and will, in all probability, come out flat; the slower the development—other things equal—the greater the contrast. Increase of temperature hastens development. Rocking the print during development, or pouring off and on the developer, thereby allowing air to get to

the print, often very much improves the colour—it gives brilliance. Local development is often resorted to, and may be applied with a soft camel-hair brush or a Blanchard brush. As soon as development is complete (which should be stopped before becoming too dark, as the vigour increases in the fixing), flood the paper with the clearing solution, without washing, and allow this clearing solution to remain on for a few minutes, then change it for another dose. The object of this very dilute acid solution is to prevent the iron precipitating in the pores of the paper, and thus staining, which would show most in the high lights being yellow instead of white. Now the print may be washed in water a few times, and fixed for ten or fifteen minutes in the hypo-sulphite solution, which should be made fresh, and not used too often; and, after a thorough washing for three or four hours in frequent changes of water, it may be hung up to dry, and mounted in the usual way.

If after fixing and washing any discolouration appears, such as degraded whites or a uniform yellowness, it is a sign of insufficient clearing after development (and as this solution is cheap enough, it should be freely used). However, if the hypo has been *thoroughly illuminated*, it may be flooded with a final clearing solution composed of—

Sulphuric acid	½ ounce,
Water	40 ounces,

and allowed to remain for at least ten minutes and again thoroughly washed.

The best results are only to be obtained from perfect negatives, correctly exposed and developed. And finally it must be remembered that the slightest trace of hypo, either from dirty fingers or dirty dishes, getting to the developer will cause stains which nothing will remove.

Mr. CHADWICK then proceeded to give a practical demonstration, using a lantern with five and a half inch condensers and a three-wick oil lamp, the exposure being two and a half minutes. No trays or dishes were used, but the paper on which the enlargement was made was folded at the edges to form its own tray; after development and fixing had been completed, the enlargement was passed round among the members, and it was universally admired.

A member remarked that the negative from which the enlargement had been made was a very beautiful one, and exquisitely suitable for enlarging from; to which Mr. Chadwick replied he had had nothing to do with its selection. There was a box of negatives in the room, and if the members would like to see the demonstration repeated, he would be glad if another negative was selected.

The worst negative was then handed to Mr. Chadwick, and to this an exposure of eight minutes was given, during which time, however, a portion of the foreground was covered. After development, the result was declared to be even better than the first one. Fry's roughest paper, Naturalistic brand, was used in the second demonstration.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 26,—Mr. Paul Lange (the retiring President) in the chair.

The following were unanimously elected members of the Association, viz., Colonel H. J. Robinson, Frederick Clibboon, J. E. D. Parker, J. C. Still, George H. Jackson, George F. Allender, Miss Harvey, Percy W. Dixon, George Allday, R. E. Roberts, and Dr. Dubourg.

The HON. SECRETARY (Mr. E. M. Tunstall) submitted an exhaustive report of the Society's proceedings during the year, which stated that there was now a membership of 303. The report was unanimously adopted.

Mr. P. H. PHILLIPS (the Hon. Treasurer) presented the balance-sheet, which showed that the total receipts for the year were 178*l.* 1*s.* 10*d.*, against an expenditure of 173*l.* 19*s.* 2*d.*

The election of officers for the ensuing year was then proceeded with:—*President:* Mr. W. Tomkinson.—*Vice-Presidents:* Messrs. Joseph Earp and A. Tyrer.—*Hon. Librarian:* Mr. J. Woolfall.—*Hon. Treasurer:* Mr. P. H. Phillips.—*Hon. Secretary:* Mr. F. B. Illingworth.—And the following to fill the vacancies created by retiring members of the Council, viz., Messrs. H. B. Millar, F. K. Glazebrook, Dr. Kenyon, F. Anyon, and Paul Lange.

The result of the prize competition—which, it was stated, compared very favourably with previous years in point of number of exhibits and artistic excellence—was afterwards announced, and an exhibition of lantern slides sent in for competition, to the number of 132, followed.

Messrs. R. Talbot Kelley, Edward Whalley, and George E. Thompson acted as adjudicators, and were accorded a hearty vote of thanks for their services.

List of Awards at the Annual Competition.—Eleven sets of six prints, half-plate and under—silver medal, J. H. Walsh; bronze medal, H. J. Mallabar; highly commended, H. Lupton. Five sets of six prints over half-plate—silver medal, T. F. Lloyd; bronze medal, H. Holt. Seven sets of two enlargements—silver medal, T. B. Sutton; bronze medal, J. T. Norman Thomas; highly commended, F. B. Illingworth. Nine sets of six pictures, hand-camera work—bronze medal, J. W. Swindon; commended, J. H. Ashcroft. Seven sets of six prints, not previously awarded—bronze medal, H. Holt; highly commended, E. A. Cauncell; commended, E. S. Gladstone. Three sets of stereoscopic slides—bronze medal, W. L. Ilsworth. Twenty-two sets of six lantern slides—silver medal, F. Anyon; bronze medal, A. Tyrer; highly commended, T. B. Sutton.

BATH PHOTOGRAPHIC SOCIETY.

NOVEMBER 26,—Mr. W. Pumphrey (President) in the chair.

The Rev. E. A. PURVIS (Batheaston), briefly explained the methods of enlarging in vogue, with an outline of the principles involved. He next drew attention to an apparatus known as "Hulme's Cantilever," which he exhibited as a whole and in sections. The apparatus was then put in action, and an enlarged photograph produced by artificial light. Besides the method of manipulating this, the after-processes of development &c., were demonstrated.

A discussion followed, in which the CHAIRMAN pointed out that, with an arrangement such as that shown by Mr. Purvis, everything was perfectly centred.

Mr. DUGDALE related how he made enlarged photographs, utilising daylight, and he mentioned that several specimens he had in the room were done with oblique sunlight.

The CHAIRMAN expected a less even result from the use of oblique sunlight diffused only by an interposing sheet of ground glass.

Mr. SWAIN referred to an enlargement made without a diffuser.

Mr. P. BRAHAM advocated the use of the oxy-hydrogen gas jet as producing the sharpest image.

Mr. AUSTIN J. KING and Mr. HARBUTT also took part in the discussion.

ROCHDALE AND DISTRICT PHOTOGRAPHIC SOCIETY.

NOVEMBER 30,—Mr. W. H. Hoyle in the chair.

Arrangements were made for the exhibition, which is to be held in January next. Lantern evenings will be given by the members.

Two new members were entered on the books.

After the transaction of business a demonstration on the making of lantern slides was given by Mr. WILLIAM INGHAM, one of the Secretaries, several different plates being used, which were afterwards passed through the lantern. Two frames were also sent by the Ilford Company of lantern and transparency plates, which were greatly admired, showing the several different tones which can be got on their Alpha plates.

OLDHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 26,—Mr. Wallace Thompson (President) in the chair.

Messrs. W. Lees, J. Ogden, T. Wild, and F. Wilkinson were elected members.

Mr. J. A. FURNIVEL (of Manchester) gave a description of *The Optical Lantern, its Construction and Use*, describing in detail the manipulation of gas bottles, the construction of the mixed and blow-through jets, the optical arrangements, &c., after which he threw on the screen, by means of his lantern microscope, various interesting examples of micro-photography. He maintained that high power could not be used in the lantern microscope without great loss of light, and that no alum trough was required to counteract the rays of heat emanating from the oxy-hydrogen light.

The Secretary wished the members to turn up in full force on Thursday, December 17, when Mr. J. W. Wade (Vice-President of the Manchester Amateur Photographic Society) would give a lecture on *Hand-camera Work*, &c.

HULL AMATEUR PHOTOGRAPHIC SOCIETY.

NOVEMBER 20,—Mr. J. H. ALLCOTT read a paper on *The Amateur Photographer's Ideal*, and, in beginning, advised all amateurs to let portraiture alone, at least for a time, until they had got more experience in their work. He (the amateur) should endeavour to make himself thoroughly acquainted with all photographic processes and methods, and the tools with which he worked, when all difficulties would vanish before the ardour of the earnest student. He should make himself acquainted with the allied sciences of chemistry and optics, to ascertain what is really done by his appliances. Photography was not a mere pastime; it was a pursuit worthy of the attention of the brightest intellect, and would not be thoroughly comprehended by any but those who, out of pure love of the subject, were willing to give much time and attention to it. If ambition formed part of the student's nature, he would endeavour to strike out a new path for himself, and his ideal would be to impress individuality on his work. Here, again, numerous difficulties would beset his path, which could only be overcome by persistent study and work, but to the courageous and determined mind all this would only lend incentive to the pursuit of his hobby. Having overcome the difficulties of manipulation, the difficulties from the artistic side have to be overcome. Art was not a thing of rule or measure, not a pictorial compound multiplication sum lending itself to strictly logical or mathematical tests and proofs; it was in itself of an ideal nature, and, therefore, to a great extent, imaginative. It acknowledged some rules, such as perspective, but it was largely a thing unto itself, not to be judged by its application of the rule of three nor the axioms of geometry; but here, again, diligent study of the work of great masters in the art would lead to ultimate triumph.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

A selection of the 268 slides sent into the Association competition were shown before an audience of over 700 in the Lecture Hall of the Literary and Philosophical Society, Newcastle, on the evening of November 25. The beautiful flower studies of Mr. J. Carpenter, London (who received one of the silver medals), were greatly admired. Messrs. G. E. Thompson's and J. W. Wade's slides were very fine, and the *genre* studies of Mr. W. J. Auckarn also call for particular mention. The slides sent in on a whole were of a very high average, and the show was, perhaps, the finest ever given by the Association.

GLENALMOND PHOTOGRAPHIC CLUB.

NOVEMBER 28,—The President in the chair.

MR. R. JOHNSTONE read a paper upon *The Platinotype Process*, with practical demonstrations. The lecturer gave an account of the mode of preparing platinotype papers and their development, and the various kinds which have been put into the market.

THE current issue of Fallowfield's *Photographic Remembrancer* attests the firm's enterprise by the numerous recent novelties of which particulars are given in its pages. The *Remembrancer* indeed, is well abreast of the times, as a remembrancer should be.

Correspondence.

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

THE LATE FATAL LANTERN EXPLOSION.

To the EDITOR.

SIR,—The influence of this accident is extending, to the detriment of lantern exhibitions, and who can wonder at the advice given frequently since to the "little ones," and to those of "older growth," "Don't sit near the lantern!" or the answer to an invitation, "I don't care that much for a lantern picture to risk going near the place!" In two instances in this district (Cheshire) the audiences have dwindled down to nearly one-half since the accident, and until faith is again re-established as to the perfect safety in using the limelight, the distrust will linger. The public have had a severe shock, and we must look upon this accident from the same standpoint as they do. There is no shelving this occurrence, and I trust that the Editor and lantern experts will probe this affair, and elicit a sound and satisfactory explanation as to the cause of the Ilkeston explosion.

The writer has before him two newspaper accounts of the explosion, but both unsatisfactory to him, and the evidence boiled down is as follows:—

1.—A possibility that the weights on the bag were disturbed. Supposing such was the case, was there sufficient admixture of gases in one or both bags to cause an explosion? This resolves itself into a question of time for the oxygen and hydrogen to mix in sufficient quantity. Evidence at the inquest states that the bags were full, and this would be sufficient to prevent the gases exchanging places. Further evidence states that both jets were burning hydrogen for five minutes. Mr. Scattergood here turns on the oxygen, which was followed immediately by a tremendous explosion. He remembers nothing further, being rendered insensible.

2.—Mr. Scattergood's theories are that there might have been a rupture fn the bag, caused by over-weighting (they must have been poor bags not to stand double the weight he used), and that the gas might have got alight by the proximity of a lighted candle upon the table. Supposing his theory to be correct, the result would be that the gas would burn (as a flame) from the puncture in the bags, but would not explode; of course, the opening would burn itself larger and larger; ultimately, the residue would explode, if it can be dignified by that term. If, however, the gases were mixed in one or either bags, then the requisite condition for causing a terrible explosion was fulfilled to the very letter. Mr. Scattergood's other theory is "that some tacks he had had in proximity to the bags before use might have damaged the bags." But how damaged to become a probable cause of a mixture of gases? Supposing the bags had had a few holes made in them from this cause, and one bag was placed upon the other, with a piece of canvas between, how is it possible, say, for the oxygen to escape from its receptacle and enter the hydrogen bag, with 112 pounds weight on both bags, and then mix!! Mr. Scattergood afterwards makes an important statement. He says he "had taken out the jet [jets!] at the beginning of the season, and found in the cavity a piece of gauze. At that time the gauze was intact, but, upon examining it now" (*i.e.*, after the explosion), "he found it was not large enough for the cavity." Could not these jets be forwarded to THE BRITISH JOURNAL OF PHOTOGRAPHY for lantern experts to examine and report upon? You, Mr. Editor, have expressed the fallacy of trusting to wire-gauze discs to prevent explosions, and I will not further touch upon that phase of the question.

This is the pith of Mr. Scattergood's evidence. But Mr. Chadwick made the important discovery that Mr. Scattergood had previously "lent his bag to somebody who used it out of his presence." It is unfortunate, if not strange, that the evidence of the gentleman who borrowed and returned the bag was evidently not called for. And here the inquiry terminates, the jury endorsing "Accidental death," and exonerating Mr. Scattergood from all blame.

It is earnestly hoped that this mystery will be cleared up, and if the Lanternist, or his attendant, or the gentleman who borrowed the gas bag, ultimately discover the true cause of this calamity they will at once divulge it for the benefit of lantern exhibitors, and the satisfaction of the public.

To sum up, the writer has no hesitation in stating his opinion that both bags contained mixed gases, but in different proportions in each bag. The hydrogen, we are informed, was burning for five minutes in both anterns, the oxygen was then turned on, and the explosion immediately occurred. This *proves* that the gases were in readiness for an explosion, for they were already mixed.—I am, yours, &c., SYLVESTER PARRY.

Chester, November 30, 1891.

To the EDITOR.

SIR,—By this time you will have seen the report of the inquest in this very unfortunate affair. I have only seen one report, and that, a condensed one, did not give my evidence clear enough for the scientific readers of this JOURNAL, and with your permission I propose to give you a condensed report.

The first witness was Mr. Scattergood; he had been a lanternist for about twenty years, and never in his life did he give exhibitions for money, but always for some charitable purpose, as in the present case, to help pay off a debt on the chapel where the explosion occurred—a new building about sixty feet long, forty-five feet wide, and height in proportion—indeed a spacious building. The apparatus he used was a biunial lantern, and a pair of mixed gas jets, such as are supplied commercially with wire gauze in the mixing chamber. He also used two gas bags, and thought the coal gas was ten feet and the oxygen eight feet capacity. They were of the same colour, black. On the oxygen bag was painted in white the letter O; the coal-gas bag had no distinguishing mark. The pressure boards were those known as "double boards," containing the two bags under one set of weights, with a canvas separation between the two bags, and he generally used two fifty-six pound weights, as he did on the present occasion. Mr. Scattergood admitted that at one time he used blow-through jets, and one bag, but had been informed that two bags and mixed gas jets were safer. Mr. Scattergood always made his own oxygen from chlorate of potash and manganese, which he bought in fairly large quantities, and kept it in two separate boxes in a convenient place in his workshop. On Tuesday, November 17th, he took from their storage place his two gas bags which were empty, and filled one with oxygen and the other with coal gas, and gave a successful exhibition in the chapel, having, he said, *about* two feet of oxygen and one foot of coal gas left in the bags; he then sent the bag marked O to his house, leaving the other bag in the chapel. The next day, Wednesday, he was making oxygen when his friend, Mr. Marlow, called, and, in answer to this gentleman's inquiries, he told him what he was doing, and explained the things, calling attention to the letter O on the bag, as signifying oxygen (all this was corroborated by Mr. Marlow in the witness box), the bag was sent to the chapel, and the other bag connected to the coal gas main, and when full was placed under the pressure boards in the usual way; about 7·30 p.m. he began to light up, he got the light going fairly well in the top lantern and turned the dissolving tap to the bottom lanterns, and on applying a light something went crack, a very loud nasty noise which he did not like, and in less than a minute after this the most fearful explosion occurred, the result of which your readers already know.

The lantern was not damaged, but the gas bags were blown into pieces no bigger than the size of one's hand, and the pressure boards into chips of matchwood. Of course, Mr. Scattergood gave two of his own theories as to the cause; one was excessive pressure on the bags, and the other something about spilling some tin tacks on the bags which might have punctured them. It would be wasting space to explain Mr. Scattergood's theories further. An expert from one of the colleges in Nottingham, engaged by the legal gentlemen watching the case in the interests of the injured (or killed), was allowed to question Mr. Scattergood, and he brought to light the fact that the wire gauze in the mixing chamber of one jet was only half its original size. This was passed round to the jury, who examined it carefully, and, no doubt, imagined they had "got at it." I was soon in the witness-box, and at once pronounced the defective wire gauze as having nothing to do with the case. Wire gauze in the mixing chamber of a jet did not fulfil the conditions for which it was intended; it served no useful purpose, and I never used it.

I was asked my opinion on the cause of the accident, and summed up as follows:—An explosion occurred on Wednesday night; the explosion took place either outside the bags, or inside one, or both. That it did not occur outside we have overwhelming evidence, and it could not have taken place inside either bag had there been oxygen only in one and coal gas only in the other. Then, had it not been so emphatically stated by Mr. Scattergood, and corroborated by his witness Marlow, that oxygen was put in the oxygen bag on Wednesday, I should have said that they had put it in the wrong bag and thus mixed the gases, and that the gases were mixed at some time before the explosion I still believed, but that the mistake was made in the first instance on Tuesday. Mr. Scattergood was alone that day; he took down the two bags which were empty and had not been used for some time, and put oxygen in the coal-gas bag, and coal gas in the oxygen bag, and that night all went off well. He says he had about two feet of oxygen and one foot of coal gas left in the bags (but we know that a man's idea of two feet or one foot in a flabby gas bag is not reliable). Now, we *do know* that he put oxygen into the oxygen bag on Wednesday, and if, as I have pointed out, he crossed the bags on Tuesday, he certainly mixed the gases on Wednesday, and thus the whole is accounted for.

Corroborative opinion was given as to the harmless nature of oxygen and hydrogen when kept to themselves. Medical evidence was given by the doctors who attended to the killed and wounded, and the jury brought in a verdict of "Accidental," exonerating Mr. Scattergood from all blame.—I am, yours, &c., W. I. CHADWICK.

TELESCOPIC PHOTOGRAPHY WITHOUT A TELESCOPE.

To the EDITOR.

SIR,—Dr. Miethe's letter in your last issue unfortunately makes him appear both inattentive and unappreciative, and, moreover, is contradictory in itself.

First he says: "Mr. Dallmeyer says that, from his description of October 16, it must be evident to every one having the necessary knowledge, *which construction* was meant, as only *one construction* had the described properties. This is, as Mr. Dallmeyer must well know, not correct, because any system of a long-focus object lens, or a short-focus positive lens, have this property, with the exception that they will produce *upright images*." *

Dr. Miethe will find, with due attention to the description that he refers to, that "the image given is that produced by ordinary photographic lenses, viz., *primary and inverted*."

Again, Dr. Miethe says: "Point 4 (*a*) of Mr. Dallmeyer's letter is to me an enigma. How can an optician, who must know the astronomical telescope, make such an assertion? Also, I do not know what is meant by paragraph (6) of his letter."

Dr. Miethe will find in the same description that, "in all constructions for the production of large images hitherto accomplished, the principle involved has been that of the formation of a primary image, which has been subsequently enlarged, *and herein lies the difference between the invention we refer to and former constructions*."

With that attention due from Dr. Miethe, he must understand the meaning of paragraph 6 in my last letter, to which he pleads ignorance, or must be able to show how an instrument composed of two elements can accomplish what is claimed and set forth by the description of my invention in a different manner. My last letter was, I think, intelligible to an expert, and ought to have been so to Dr. Miethe, had he given it careful perusal.

Dr. Miethe, however, contradicts himself in stating again "that it was through Mr. Dallmeyer's description that I took out my German patent, then and there. I would otherwise have waited until my final calculations had been completed. I would, anyhow, have taken out a patent, *not only in Germany, but also in England, had not Mr. Dallmeyer's prevented me from it!*" *

What does Dr. Miethe herein innocently acknowledge? That he knew how I had accomplished my invention. How was that information conveyed except through my publication? My publication, therefore, was the immediate cause of Dr. Miethe's application for patent rights in Germany.

I do not know what I could say more than I have already said with regard to Dr. Miethe's request for acknowledgment of independent research in the subject. By my statement, "Without the faintest reserve, I gladly accept Dr. Miethe's statement that the same subject has occupied his independent attention." I prohibited myself, according to German law, from applying for patent rights in Germany; had I not made this statement, there would have been no doubt that I could have established my patent in that country.

If Germany were included in what is termed the "Convention" of Patent Offices, it would have been impossible for Dr. Miethe to have applied there, as my patent was protected on October 2nd. Dr. Miethe has, however, received a spontaneous statement from me which has involved the withdrawal of any contemplated application on my part to the German Patent Office, and I regret that he cannot appreciate it.

What more does Dr. Miethe want in return for his action of rushing into print a month after my patent had been granted, and a fortnight after my publication, to assert for himself "the first publication?" an assertion he can no more justly maintain than I can honestly acknowledge.

As considerable attention may probably be brought to bear upon this subject of the production of large primary images, I may mention that my first patent in connexion with this subject was protected on the 27th of September last, in which I introduced a third (positive) element, treating the new double combination lens, which I subsequently patented on the 2nd of October, as an addition to positive elements. Of course, in this case too, direct, primary, and inverted, large images are obtained.—I am, yours, &c.,

THOMAS R. DALLMEYER.

25, *Newman-street, W., November* 30, 1891.

To the EDITOR.

SIR,—The argument put forward by Mr. T. R. Dallmeyer in the letter published on November 20, that the information given in your article (which simply described the capacity of a lens to produce a primary image larger than would be inferred from its distance from the plate, without indicating any details of construction) was sufficient to enable an expert to construct such an instrument as his from known principles, is a strange one as coming from the patentee. It would be easily understood if coming from another manufacturer, who might continue the argument by concluding that, such necessary principles of construction being known, there can be no valid patent excluding them from the use of these principles.

If, indeed, the mere statement that a lens can be produced giving a larger image than that inferred from its distance from the plate is sufficient to form "an adequate preliminary description" of Mr. Dallmeyer's present construction, then that construction was indicated a quarter of a century ago in the orthoscopic lens, which had this property, and the difference between which and those now in question (Dallmeyer's and Miethe's) would be one of degree merely, and not of kind.—I am, yours, &c.,

E. RUSSELL.

London, November 30, 1891.

* The italics are mine.

THE LANTERN MICROSCOPE.

To the EDITOR.

SIR,—Mr. Leach agrees with me as to magnification required, but at the same time he contradicts most emphatically Mr. Chadwick. At the meeting referred to the slides were handed to me by the lecturer along with his two-inch objective, and I was to use that to all the slides except three; this, of course, I did. I did not show, I admit, the structure, for this simple reason, *they were not in the section*. Mr. Leach, of course, will lay the fault on my lantern microscope, but really I cannot help it; I showed close upon one hundred slides in about an hour. The lecturer expressed himself both that night and afterwards highly pleased with what I had done. Two of the first botanists in this district, men whose names are known all over the world, spoke very highly of the demonstration, and two days afterwards I received a note from the Hon. Secretary enclosing my fee and saying, "I must compliment you upon your portion of the evening's work; it was, in the opinion of almost *everybody* present by far *the best* demonstration ever seen in Manchester." So much for my own exhibition. Now for what Mr. Leach calls comparison.

He was little if any more than half the distance from the screen I was; he occupied about three hours and showed about forty slides. Mr. Leach says I did not show certain structure. I admit it. He says he did. I deny it, for this simple reason, some of the structures he mentions are neither in those or any other vegetable section. Am I not justified in saying this is misrepresentation? One advantage has come out of this discussion, Mr. Leach admits that only a half-inch objective can be used with the lantern microscope; this has been my contention all along. True, he says that the amplifier makes it equal to quarter-inch, but Mr. Leach is too good an optician not to know the difference between magnifying the object and magnifying the image. If the effects are the same, why buy a quarter-inch objective for the microscope, and spend 50*s.* or 60*s.*, when by spending 20*s.* on an eyepiece, and using your half-inch, the same results can be obtained? Moreover, a quarter-inch is never called a higher power; it may be perhaps a medium, and a very poor medium too, but no microscopist would ever dream of calling anything less than one-eighth or one-tenth inch a high power.

I do not see anything about special objectives in Mr. Chadwick's paper, but, in a pamphlet published by Mr. Leach about four years ago he says, "Generally objectives made to use with an eyepiece perform wretchedly on the sheet. I have used about forty, but my labours have been in vain." How does this accord with his latest suggestion? Surely Mr. Leach is not unaware of the fact that more than one style of lantern microscope has been tried and has been discarded by the College authorities.—I am, yours &c.,

J. A. FURNIVEL.

Manchester, November 30, 1891.

[We have taken the liberty of suppressing a considerable portion of Mr. Furnivel's letter, in which the personal equation as between himself and Mr. Leach was more pronounced than likely to prove interesting to our readers. In this excised portion he controverts the reference as to his having only recently entered the field of microscopic projection. And now for a few words suggested by the subject. Is not the alum trough of somewhat mythical value as a means of arresting the heat? We ourselves have not found any special advantage in using a solution of alum, while a writer in a scientific contemporary has lately declared, as the result of various trials, that a trough containing pure water alone stops more of the heat rays than when the water contains alum in solution. To stop the transmission of heat, while permitting that of light, it were much to be desired that opticians generally, including our Manchester opticians to whom the world owes much, would thoroughly investigate, modify if necessary, and adopt that system of the late Rev. J. B. Reade, F.R.S., originally suggested in the *Philosophical Transactions*, 1836, and subsequently published in our ALMANAC for 1868, in which he shows how lenses may be arranged so as to effect the separation of the light and the heat rays. We may here state that his system consists in allowing the rays of both light and heat to cross at the focus of the condenser, and outside of that focus to interpose a second lens, by which the light and the heat rays, now changing their relative positions, shall for the former be brought to a focus on the micro-objective, while the latter is projected forward, if not in parallelism, at any rate in a cone so much elongated as not to fall with focal power upon the object or the objective. Let our good Manchester friends bury their local hatchet, and devise practical means by which high powers may be employed for lantern projection. Let them bear in mind that, so far as luminousness is concerned, the late Mr. Thomas

Grubb could project through a quarter-inch objective the whole of the light transmitted through a five-inch condenser.—Ed.]

To the Editor.

Sir,—I note there is a pretty lively discussion on this matter, and as one who has worked with both Leach's and Furnivel's lantern microscopes, I may perhaps be able to clear matters a little.

In the first place, my lantern is, I believe, as near optically perfect as lanterns can be made; it was designed specially for exact work of all kinds, and my micro-objectives, Powell and Lealand one-fifth aprochromatic, four-tenths Zeiss, and half-inch Wray, were specially selected for the purpose. The one special object of the comparative tests was the separation and identification of different yeast cells, a very simple matter with a good microscope and a quarter-inch objective. For this purpose a special screen was made on my lantern-room wall, of carefully finished Keene's cement (the best of all screens); the light used was a Nottingham, and afterwards an Excelsior lime, with coal gas and oxygen compressed, and every care was taken to obtain exact results.

We found that with Leach's microscope, with alum cell, and Furnivel's with or without alum cell, the one-fifth objective was practically useless, the four-tenths gave a good picture with both forms; the definition being distinctly the best with Furnivel's, and the light being also slightly better than Leach's. With the latter, without alum cell, glycerine mountings were destroyed instantly; with Furnivel's and no alum cell, they could be left safely about two minutes as a maximum. Therefore Mr. Furnivel's statement must be slightly modified, as there is certainly some heat which will, in time, damage a glycerine mount. Balsam mountings were quite untouched after any length of time.

So far as the special object was concerned, the resolution of yeast cells, both failed totally. It is evident that the limelight is unsuitable for high powers, and when Mr. Leach states the contrary, he denies the correctness of all authorities on the subject.

Of course, if we ignore exact work, and show the children the "proboscis of a blow fly sixteen feet long," and this sort of thing, there is no difficulty, and after experience with both I most decidedly prefer, and get better results with Furnivel's, both as to definition and light, and I use it in preference to Leach's, although I look on the lantern-microscope for screen work as little better than a toy, unless the electric light is used. The woolliness of all shown, except with low powers, condemns the limelight for such a purpose.—I am, yours, &c., Thos. Fletcher, F.C.S.

Grappenhall, Warrington.

MR. HEYWOOD'S PAPER.

To the Editor.

Sir,—After the very circumstantial evidence brought forward by Mr. Thornton in his letter in your Journal, it is quite evident that to Leeds, and not to London, belongs the honour of being the first town to establish a photographic society. Glasgow is now placed fourth on the list. You will readily understand how disappointing all this is to the photographic community of the second city of the empire, but we must just accept it *sic transit gloria mundi*.—I am, yours, &c., William Lang, jun.

Cross Park, Partick, Glasgow, November 28, 1891.

To the Editor.

Sir,—I am much obliged to the gentlemen who have been good enough to point out errors in the introduction to the paper I read before the Manchester Photographic Society at a recent meeting. The information referred to I necessarily had to take at second hand, but I can scarcely regret its publication, seeing that it has produced such kindly and ample correction. I fear there is not more than one man left in the Society who was one of the original members.—I am, yours, &c.,

Abel Heywood, jun.

Higher Broughton, Manchester, November 30, 1891.

BROMIDE PAPERS.

To the Editor.

Sir,—It would be of great assistance to photographers if the various makers would state on the outside of the envelopes how the papers are packed, as in the dim light of the dark room it is impossible to distinguish the sensitive side. Hence many mistakes arise, and I note no two makers pack their papers the same way.—I am, yours, &c., Printer.

November 30, 1891.

We learn from the *Journal of Education* that the "Teachers' Guild of Great Britain and Ireland" are about to form a collection of lantern slides for loan to members, and amateur photographers and others are invited to contribute any suitable slides they may be able to spare to form the nucleus of such a collection. Parcels should be addressed to the Offices of the Guild, 74, Gower-street, London W.C.

Exchange Column.

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

Wanted, photographic apparatus, studio furniture, &c., in exchange for a gentleman's single-stone diamond ring.—Address, H. Grayson, 1, Inkerman-street, Blackburn.

Backgr ound frame on rollers, to carry six backgrounds. Exchange for Instantograph set, or half-plate rectilinear lens.—Address, P., 3, Nightingale-terrace, Sutton, Surrey.

Wanted to exchange a nearly new silver English hunting watch, value seven guineas for whole-plate or half-plate set of apparatus.—Address, A. J. P., 1, Watercote, Brighton-road, Redhill, Surrey.

Will exchange pneumatic X.L. safety bicycle, ball steering and bearings, new this summer, for whole-plate or 12×10 landscape camera lens, slides, and tripod, with latest improvements.—Address, E. Wilson, Crawford Building, Wigan.

Wanted, rapid rectilinear lens, 7½×5. Exchange new black Melton overcoat, forty breast, cost, four guineas. Also double-extension camera, 7½×5, and slides. Exchange new Scotch tweed suit, cost 80s., for same figure.—Address Camera, Kirkcudbright, N.B.

Smith & Evans' whole-plate burnisher (new), value 3*l*., also 12×10 polished and brass-bound retouching desk, with drawer and brass fittings (new), value 35s. Wanted in exchange half-plate camera and lens; must be good.—Address, F. Smith, 22, Bow-lane, Preston.

Answers to Correspondents.

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to "*The Editor,*' 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

**** Communications relating to Advertisements and general business affairs must be addressed to "*H. Greenwood & Co.,*" 2, York-street, Covent Garden, London, W.C.*

Photographs Registered:

W. H. Jacob, Sandgate, Kent.—*Portrait of the "Volunteer" Lifeboat Crew.*

G. Harris, transferred to E. P. Adams, Greenwich.—*Photograph of a set of six pencil sketches of Greenwich.*

J. D. Trengrove, Crowland, Lincolnshire.—*Photograph of Crowland Town with the Wash flooded, taken from the Abbey tower.*

Thomas Boxell.—Thanks.

J. Leisk.—Received. Next week.

W. B. Osborn.—It was a printer's error.

Slide.—See article on the subject in the present issue.

Miss Cox.—Messrs. Frith's address is Reigate, Surrey.

A. A.—The rims are supplied by Marion & Co., Soho-square.

J. E. G.—Probably Mr. J. T. Chapman, of Manchester, or Messrs. Marion, of Soho-square, will supply you.

J. L. S.—Even with a condenser such a light as you are employing would necessitate an extremely long exposure. Try a duplex oil lamp, and use an eight-inch condenser.

Inquirer.—1. Impossible to say; probably the paper was not dry when packed. 2. See our volumes for 1889–1890. 3. There is no work on the subject we could recommend you beyond the articles referred to.

A. T. (York).—The spots are due to metallic particles in the paper. The sample of paper, although its surface may be what you require, is not suited to photographic purposes. Try a similar surface paper made by Whatmans or Hollingsworth. These papers answer very well in photography.

Enthusiast.—1. The uneven developing action of eikonogen may be due to some peculiarity of the paper used. In our experience it is most uniform in working. Experiment with two or three different papers. 2. An excellent one. 3. As you surmise—a misprint. 4. The formula we have successfully employed for bromide paper is the No. 2 you refer to.

West Coast asks where he can procure mounts that the manufacturers, who must be a responsible firm, will guarantee to be inert upon photographs mounted upon them in the West Coast of Africa?—We can only refer our correspondent to our advertising columns. He should communicate with some of the advertisers, definitely stating his requirements.

Jumbo.—1. To tell whether a print is produced either in platinotype or developed bromide of silver, apply a solution of mercuric chloride to it. If the print bleaches the image is composed of silver. Platinum images will not bleach. 2. Not much used at present. There are two flash lamps for giving time exposures on the market. Try and see one of these demonstrated.

H. Rust.—1. Mr. Barrett's address is 50, Kellett-road, Brixton. 2. The Air Brush Company have not, we believe, any address in London.

Thomas Arden.—Any printer who makes a speciality of working for amateurs—dodging thin negatives, &c.—will undertake the work (see our advertisement columns). A great deal of time and trouble must necessarily be involved to do what you require, which will, of course, have to be paid for, and this will naturally make the work somewhat costly, as compared with plain printing.

Ferro.—None of the fine French and German gelatines are well adapted for mounting purposes, and for two reasons. First, they set so quickly that, even when very weak solutions are used, it is impossible to coat a large surface of the mount before the gelatine sets. Second, these gelatines are almost invariably acid, and are therefore liable to act injuriously on the photograph.

Lens asks us to inform him of a good flux for reducing resides, viz., sulphate of silver and chloride of silver. By "sulphate" of silver we presume our correspondent means sulphide of silver. The best flux is equal parts of carbonate of potash and carbonate of soda. In reducing, when the contents of the crucible begins to boil, a few small crystals of nitrate of potash (saltpetre) should be dropped in cautiously, so as to avoid the contents of the pot boiling over.

W. Longmore.—1. The cause of the "wavy mottled marks" is that the plate was not rocked while it was being developed. The dish should always be kept in motion during this operation. 2. The yellow stain is due to imperfect fixation; either the bath was too weak, or the time of immersion too short. 3. The alum had nothing to do with the staining. 4. The lens is an old-fashioned one of French origin, and although it may be a good tool, is of little commercial value.

H. W. B. asks: "Where can xylonite or celluloid be purchased, and is it a similar substance to that used for the roller slides, a piece of which I enclose?"—Xylonite is the English name for celluloid, and may be had from the British Xylonite Company, High-street, Homerton, E. Whether they supply it as thin as that enclosed we cannot say. The sample appears to be similar to that of the Crystalos film, which is manufactured in France, and is only supplied coated with emulsion.

C. Chater.—Carbon tissue, as sent out ready sensitised by the makers, may, as a rule, be depended upon for a fortnight or three weeks, supposing, of course, it be kept with care. If it be allowed to lie about, exposed to the air, it will, as in your case, seriously deteriorate in a week, or even less, if the atmosphere be warm and damp. A dark room, the light of which will be sufficient for manipulating silver paper, will do quite well for carbon while it is dry. When it is in a wet condition it may be manipulated in the light of an ordinary room.

Xeno says a year or so ago he stripped some negatives according to Plener's method with fluoric acid on to gelatine films. Now they are so brittle that they cannot be handled without breaking. He asks the cause, and if there is any remedy.—The negatives have evidently been allowed to become abnormally dry, and the gelatine did not contain glycerine; or, if so, not in sufficient quantity. A poor quality of gelatine in thin films will, if kept very dry, become brittle, unless glycerine be added. If the negatives be placed for a time in a moderately damp place they will become pliable. Then care should be taken that they do not again become over-dry.

C. Jeman.—The only thing we can suggest for patching the corners of the camera bellows is indiarubber cloth attached with indiarubber cement. But whether you will succeed in making the camera light-tight for open-air work, we—from your description—very much doubt. The way to attach the cloth to the bellows is this: Smear some rubber solution over the defective places, and do the same on the cloth cut to the necessary sizes and shapes; let both dry, then lay the cloth in the required position, and rub in close contact; it will then adhere. No attempt must be made to remove the mackintosh after it has once touched the rubbered surface of the bellows.

S. A. H. (Leeds).—The case may be as you state, and we have no reason to doubt it, but we cannot insert your letter unless it is authenticated by your full name and address. Any one can lodge an opposition to the sealing of a patent on any ground he chooses on payment of a fee of ten shillings. But, of course, he will have to substantiate his grounds of opposition before the Comptroller, and before the Law Officers of the Crown; also before the Court of Chancery if you choose to take the case there. Many patents are opposed, and maintained, entirely by "bounce and bully." Such, however, is the present state of the Patent Law. In this respect it requires serious alteration.

Spots says: "Can you please help me in my difficulty by telling me your idea as to the cause of the spots on the prints I send you per same post? I have been greatly pestered with them lately, as well as with numerous metal spots. The white spots generally appear about two days after mounting, but I have on one or two occasions seen them before mounting. I keep my paper in a cellar, which is cold and not too dry. My toning bath is common washing soda and gold, and to six pints of fixing solution, composed of three ounces hypo to the pint, I add one ounce of borax, to prevent blistering, and which, I find, is most effective. The prints wash all right in constantly changing water."—It is difficult to account for the spots without actually seeing the conditions under which the prints are produced. Common washing soda is a very indefinite substance, and is generally very impure. That may have something to do with the trouble. With regard to borax in the fixing bath, we do not consider this a desirable addition. However, as some of the spots have a nucleus, we are inclined to attribute the spots to floating particles of pernicious matter in the atmosphere of the workrooms. Is there a coke stove in them, or are the rooms swept out while the prints are hanging up to dry?

H. (Cardiff).—Thanks; the Imperial Portrait Association should be more careful whom they circularise. Photographers, at least, can see through the scheme.

The Lantern Society.—Next meeting, December 14, Mr. E. M. Nelson on *Some New Forms of Lantern Condensers.*

In our notice of the Edinburgh Photographic Society's exhibition Mr. Patterson's initials should have read J. G., and not L. G.

The Photographic Club.—Subject for discussion, Wednesday, December 9, *Architectural Photography.* December 16, *Toning Bromide Prints.*

Croydon Camera Club.—Fixtures for December.—7, *The Open Sesame of Successful Photography*, by Mr. H. Maclean, F.G.S.; 21, Lantern Night (members' slides).

The Maddox Fund.—We are happy to be able to say that so far over 200*l.* has been received or promised for this fund. To the subscription being raised in America, Mr. John Carbutt has contributed 50*l.*

London and Provincial Photographic Association.—December 10, *Gas Bottles and their Safety*, Mr. F. A. Bridge. December 17, Monthly lantern night. December 24, *Warm Tones in Lantern Slides.* Visitors are welcome.

Photographic Society of Great Britain.—At the ordinary meeting on Tuesday next, at eight p.m., the adjourned discussion on Mr. Warnerke's paper will be taken, and a paper will be read by Mr. A. Pringle on *Photomicrography.* On December 22 the subject for discussion will be *Photography by Artificial Light.* On December 29, lantern evening.

International Photographic Exhibition, Leeds, 1891.—The preliminary arrangements for this exhibition, which is likely to prove to be one of the most important ever held in the country, are now approaching completion. The exhibits are numerous and, for the most part, of the highest order of merit and importance; and, fortunately, the wall space at the disposal of the Committee has enabled them to hang the frames in such a way that every work may be seen to the best advantage. The judges, Messrs. V. Blanchard, J. Gale, F. P. Cembrano, W. England, and A. Pringle, will award the medals on Friday and Saturday next, and the exhibition will open with a *conversazione* on the evening of Monday, December 7. Arrangements, we understand, have been made for lectures, with lantern illustrations, by eminent men on, at least, three evenings a week; and these will be given more frequently should it be thought desirable. On the other evenings there will be music, and occasionally in the afternoon as well. The press day will be Monday, December 7.

The crowded state of the firm's rooms last Friday evening amply proves that the Fry Manufacturing Company's series of practical demonstrations are receiving the appreciation they deserve. The subject on the occasion in question was *Bromide Enlarging*, and in Mr. S. Herbert Fry the audience had a teacher who was thoroughly conversant with his subject, which is not always the case in photographic demonstrations. Mr. Fry's hints upon vignetting, printing-in clouds, dodges in exposure, and latitude in development, were of great practical value. It should be noted that the system employed for making the exposure obviated the use of a condenser. It consisted, in the main, of an ordinary camera and lens attached to a large box, on each side of which was an oxy-hydrogen blow-through jet, the light from which was caught up and reflected through the negative and lens upon the screen by means of a concave reflector made of tin, upon which plain white paper was pasted. With such a system, and a negative of medium density, an exposure of about three minutes sufficed.

Staffordshire Photographic Survey Society.—An adjourned meeting, to consider the establishment of a Society for carrying out a photographic survey of the County of Stafford, was held on November 23. The proposal was discussed at a former meeting, and in the meantime the North Staffordshire Naturalists' Field Club was waited upon to ascertain the views of that body upon the matter. The present meeting was called to consider their reply. Mr. C. Lynam was voted to the chair. Mr. Caddie intimated at the outset that the Naturalists' Field Club had received the deputation kindly, and, whilst expressing inability to undertake the suggested work, had wished any society that might be formed to carry it out every success. Eventually it was agreed, on the motion of Mr. Caddie, seconded by Mr. Meigh, that a systematic photographic survey of the county was highly desirable, and that a Society should be formed to carry it out. Mr. Caddie mentioned that, compared with similar societies in other parts of the country, a new departure was contemplated, inasmuch as they proposed to publish, at certain intervals, a volume of their work, consisting of photographic illustrations with descriptive notes appended. It was decided that the name of the Society should be "The Staffordshire Photographic Survey Society," and the subscription was fixed at 3*s.* per annum. It was resolved to ask the Marquis of Stafford to accept the Presidency. Mr. A. Scrivener was elected a Vice-President, and Mr. A. J. Caddie, Secretary and Treasurer.

*** Owing to the extreme pressure on our columns, a large number of letters referring to the recent lantern explosion and other interesting topics, as well as several articles, must be held over till next week.

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THE BRITISH
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THE PHOTOGRAPHIC SOCIETY.

Our readers will see from the report in another part of the Journal that a long debate took place at the meeting of the Photographic Society of Great Britain on Tuesday night, which we are confident will carry a great amount of interest to a far wider circle than that comprised by the Society's own members. For several weeks past all kinds of things have been said and written with reference to some occurrences which distinguished the preliminary arrangements of the late exhibition, and it is not unsafe to say that many of these accounts have been of a highly fantastic nature, and scarcely founded upon facts. We ourselves have refrained from making any comment upon the matters in question, inasmuch as they were not public property. We were also sure that in due time an official explanation would be forthcoming which would enable the photographic public to form an accurate judgment upon the points. That explanation was made on Tuesday night by the officers implicated.

Perhaps it is needless for us to place any narrative of the circumstance before our readers in this part of the Journal, since it is fully set forth in another; but we cannot neglect the opportunity of recording our opinion that, although those circumstances were regrettable and even deplorable enough in themselves, their ultimate results upon the fortunes of the Society will be of a beneficial character. There are times in the history of institutions, as in that of an individual, when change or reformation is not only necessary but imperative. This critical stage has recently been reached with the Photographic Society, and it is our agreeable duty to record that it has been safely passed.

In the exercise of what he conceived to be his duty, the action of the Assistant Secretary in freeing the room, in which the Hanging Committee were at work last September, from intruders, was courageous and dignified. It is true that he was ignorant of the fact that one gentleman had a legal right to be present (which he frankly admitted on Tuesday night), but it is also equally true that Mr. Robinson, the gentleman in question, who has protested so vehemently against Mr. Lawrance's action, entirely failed to remind the official that he was within his rights in being there. Thus there were faults on both sides—but only on this single point. The other individuals who were impeding the Hanging Committee had no shadow of a right, legal or moral, to be present, and they were quite properly ordered out.

Certain allegations have been made imputing the most unwarrantable "farming" of the places of honour on the walls of the exhibition, which we should be glad to see refuted. They are expressed with a most laudable freedom and directness in our report, and we hope they will be met and answered—if it is possible to answer them. Of the action of the Hon. Secretary in taking Mr. Davison's pictures down from the walls we hope that, under the circumstance, there can be but one opinion, and that is, that he acted with excellent judgment and justice.

The action of the two Secretaries—which had already been endorsed by the Council—was spontaneously confirmed by the General Meeting of members in a manner which must have been gratifying to those gentlemen. This action on the part of the Society is, to our mind, highly significant of a desire on its part to assist its officers in administering its affairs in a wise and impartial manner; and we are sure that its moral effect, both upon the present esteemed officers and their successors, will be most excellent.

The future of the Society never looked brighter. Old abuses are being stamped out; the affiliation scheme is thriving; a beginning is to be made in realising the endeavour to give it a hold upon popular favour by holding a series of public lectures by such men as Professor Meldola, Mr. Thomas Bolas, and Mr. H. Chapman Jones, and we have no doubt that at the annual meeting next February a considerable infusion of new blood will take place. It is said that prophecy is risky, but we believe that the Photographic Society's career of usefulness is in no danger of abbreviation either by its own acts or the opposition of its enemies.

LANTERN EXPLOSIONS FROM PRESSURE GAUGES.

"Tried and found wanting" will, we fear, have to be the motto inscribed upon the Bourdon pressure gauge, as applied to a cylinder of oxygen under severe compression.

Had such gauges burst only once or twice, some excuse might have been found to meet the special cases; but, when these accidents become multiplied to the extent they have been of late, we imagine that but one course is left, viz., to discontinue their use entirely. As we stated last week, the Bourdon gauge, by whomsover made, is, of necessity, formed of thin metal, and it is unable to withstand a very strong pressure, more particularly when such pressure is applied with a sudden jerk, as is bound to be the case unless the tap at the cylinder is opened with a degree of slowness and care which we do not always find exercised.

It has long since been shown in these pages that, by the sudden impact of the oxygen, the air which is contained in the gauge becomes compressed, and consequently heated. The effect of such heat upon any traces of oil present can readily be imagined. We have now here all the elements for an explosion, happily the mixed gases being not in quantity sufficient to do more than shatter the gauge itself and its surroundings.

So far, nothing can be urged against the safety of compressed oxygen as it is stored in cylinders, and in this form it may

and will, be continued to be employed without the slightest misgiving on the part of any one. If the Bourdon gauge continue to be employed, absolute safety cannot, we fear, be hoped for, unless by the adoption of such an expedient as was, some time since, suggested by Mr. Parry, viz., that a small hole be drilled in the entrance to the gauge-tube, to serve as a means of preventing a too sudden impact of the gas; but, even with this, the danger is only reduced, not entirely annihilated. What would better meet the case would be a small hole at the outer end of the gauge coil, which should be open when the gas is turned on at the cylinder, and be then closed after two or three seconds have elapsed, during which time the air previously contained in the coil will have been driven out, the small hole then being closed effectively and smoothly by means of a fine adjustment plug, such as we described, with a drawing, in a former volume of this JOURNAL previous to the advent of the modern compressed gas cylinder, the opening and closing of the tiny plug being effected by a milled-head screw on the outside. This proved so much of a fine adjustment as to require a complete revolution before enough gas to give a good light was emitted.

Returning to what we have said as to the presence of oil in the gauge being the probable cause of the explosion, we have had an interview with Mr. A. A. Wood (of E. G. Wood, Cheapside), a gentleman who has for some time made a study of the causes of such explosions, and he says that there is no doubt of the fact that they almost invariably arise from the presence of oil, fluid or indurated, in the gauge. Gauges at one time were tested by oil, and, so long as their application to steam is concerned, may still be continued to be so, and with the most perfect safety; but, when oxygen under pressure, instead of steam, is admitted, the case assumes a totally different aspect; for a chemical union takes place, accompanied by a degree of heat sufficient to inflame the mixture. Safety, in Mr. Wood's opinion, is to be found in effecting the total removal of the oil by boiling the gauge in a strong solution of potash. He also thinks that the molecular condition of the metal gauge undergoes a change by the constant motion of its particles under the great pressure to which it is subjected, and that these, assuming a somewhat crystalline arrangement, may possibly weaken the wall of the gauge, and cause it to give way in the form of a bursting, not necessarily an explosion, unless the oleaginous matter were present.

After all, what is the use of a gauge? In the great majority of cases it is merely a means of enabling the exhibitor to know whether he will have enough gas left in his cylinder to give him another two hours' exhibition on a subsequent occasion without the necessity of recharging. If its employment were only to be had recourse to when the oxygen had run so low as to render it problematical whether another hour's illumination could be got out of the cylinder, and when the pressure was consequently low, then would there be little or no fear of any mishap arising, even with a gauge in which traces of oil might be found lurking.

All that we have written refers to the gauges constructed on the Bourdon principle. There is another one, of a much more portable type, which has been lately introduced. It is the Suiter gauge, and consists of a dry piston, working in a dry cylinder of very narrow bore. The piston is pressed down by a strong spiral spring, and, on being raised by the pressure of the gas, registers such pressure by a movable piece at the top. Not having examined or tried this gauge, our opinion is not based upon intimate acquaintance with it, but we think it ought to be a safe and fairly reliable instrument, although its indications are more difficult to read in the dim light of an exhibition-room than those given by a pointer on the white dial of the Bourdon.

As the subject of gas explosions, whether by the agency of pressure gauges or otherwise, is one of such vital importance to photographers and photographic societies, we trust this matter will not be allowed to drop until the causes of explosions have been thoroughly elucidated, and means devised for ensuring absolute safety made known.

DOES THE LATENT IMAGE FADE BETWEEN EXPOSURE AND DEVELOPMENT?

THE experiences of a correspondent, as set forth by himself in a letter printed in our present number, appear to indicate that, where bromide paper is concerned, the light impression, under some circumstances, is wholly or in part removed between exposure and development. This is not by any means the first time that the same point has been mooted, not unsupported by evidence of an affirmative character. So far as we can charge our memory, it is, however, the image on gelatine or glass which has hitherto come under suspicion, and never the impression on paper.

But the suggestion—for it would be inadmissible to hold that it can rank as a formal theory—but the suggestion that the latent image is amenable to some internal influence, which causes it to fade between exposure and development, has also more than once been supplemented by another, referring, if not implying, its exact converse. In other words, it has been held, on more or less sufficient grounds, that, instead of fading, the latent image sometimes gains in force between exposure and development, so that, when it comes to be subjected to the last-named operation, what was originally a properly exposed picture will exhibit all the symptoms of over-exposure.

Our correspondent's experiences with the fading of the latent image on bromide paper are of a curious and remarkable nature. It seems he deferred development of some exposed paper for three weeks, and, notwithstanding the fact he had used test slips of paper, so as to arrive at the correct exposure, development of the pictures only resulted in bringing out the familiar signs of hopeless under-exposure of the prints. Supposing the paper to have been at fault, he exposed two sheets of paper from the same packet, test slips, again, indicating about the same exposure as previously given. On at once developing, the pictures were found to be correctly exposed.

He also tells us that, in making the second exposure, he exposed an extra test paper, and kept it for four weeks, when, upon development, the result was even fainter than that given with the paper first exposed. A final experiment proved that this was not due to any loss of sensitiveness of the paper, for, upon exposing the piece with the weak image upon it to light behind a negative, and applying a developer, this weak image disappeared, the newly formed image came up fully, and was then followed by the original image reversed—that is, as a negative instead of a positive.

The destruction of the latent image in a film of gelatine on glass or paper cannot easily be explained on the grounds that the emulsion itself holds anything in suspension which would be liable to bring about such an end. It is, however, well known that the presence of a strong oxidising agent near or upon an exposed film will obliterate the impression. Indeed,

nitric acid, which is a strong oxidising agent, used in conjunction with potassium bromide, can be taken to restore light-struck plates to a condition of sensitiveness, and has been often recommended in these columns for that very purpose.

Our correspondent does not describe the receptacle in which he stored his exposed papers so minutely as we could wish. We may as well say without further delay that, in so far as the partial disappearance of the images on bromide paper which he mentions are concerned, we are inclined to look for the explanation to some such cause as we have hinted at in the previous paragraph, although not necessarily to an oxidising one. Might not the paper have been submitted to the fumes of some such compound as sulphuretted hydrogen, which is always with us in our dwelling-rooms? Did the paper absorb misture, and then slowly become bone-dry? Probably both these causes would so react upon the exposed film as to destroy its amenability to development—a phenomenon which might very easily be mistaken for an actual "fading" of the image. The immediate agency is, of course, obscure; but we are inclined to suppose that the *rationale* of the change is as we have stated. The image has not spontaneously faded, but has been brought in contact with some gaseous or vaporous body, which has more affinity for the reduced parts of the picture than for the unexposed, the result being a lowering of the image's amenability to the action of the developing solution, and a consequent thinness of picture.

For any one to seriously contend that the latent image in gelatine is liable to spontaneous fading would be to court a refutation of the most convincing kind, namely, the enormous weight of practical experience to the contrary. Old workers of the now extinct tannin process will, however, remember the fugacity of the undeveloped images, which was a characteristic of that process. Gelatino-bromide plates are free from any such reproach, which, if it is ever made, could not be more effectively removed than by a reference to the enormous number of exposed pictures on glass and papers which are not developed for weeks, and probably months, after exposure without any "fading" of the image being noticed.

COLLODION EMULSION WITH CHLORIDE OF SILVER FOR TRANSPARENCIES.—IV.

We anticipate that the majority of our readers will prefer to rely on pyro development, which, while it has many advantages, is, so far as collodion is concerned, entirely free from the faults it possesses when gelatine is in question. Thus it undoubtedly offers a far wider range of tones, quite independently of any variations in exposure, and is altogether more manageable than iron, hydroquinone, or eikonogen. There is no necessity for making "stock" solutions, as, owing to its ready solubility, it may be dissolved as required; or a plain solution, sufficient for the development of half a dozen or a dozen plates, will keep perfectly well during the time occupied over such a number. If a stock solution be preferred, then a plain solution of ninety-six grains in an ounce of alcohol, without any so-called preservative, answers every purpose. It is also entirely free from any tendency to stain collodion films as it does gelatine, and therefore no additions of sulphite of soda or other substances are necessary as preventives.

Speaking of sulphite, however, reminds us that this salt, when employed in conjunction with pyro on collodion films, has a tendency to produce warmer tones, whereas the contrary is the usual result with gelatine. The use of sulphite may, therefore, be resorted to with pyro for that purpose, if not for preserving the solution or preventing stains.

As in the case of the iron developer, it is scarcely needful to give any definite formula for the employment of pyro for the purpose we have in view. It is only necessary to keep in view certain leading points. Of course, the longer the exposure, the weaker and more restrained must be the developer; but it is well to bear in mind that, while pyro may be used upon collodion films without any bromide at all, the latter has a proportionately far greater effect upon such films than upon gelatine. Another point that may be emphasised is that, the smaller the proportion of pyro used, in any circumstances, the redder will be the tone, while strong pyro produces black and greenish black colours. This means that, without unduly increasing the exposure, but by simply reducing the pyro, and, if necessary, increasing the bromide, a similar result may be obtained to that which would accrue if a long exposure and a generally weakened developer were resorted to.

Then, again, the alkali used has a not unimportant influence upon the colour of the image; and here it may be pointed out that ammonium carbonate gives far pleasanter and warmer tones than any of the other alkalis in general use. It should, however, be picked from freshly broken and translucent lumps, and dissolved at once, and kept in well-corked bottles.

If a general idea of a formula be desired, we would suggest pyro, one and a half to two grains to the ounce; ammonium carbonate, two to eight grains; with sodium sulphite to taste, and potassium bromide as may be required by circumstances.

For collodio-bromide plates it is frequently recommended to add such substances to the developer as acetate, phosphate, or tungstate of soda, with a view of modifying the tone, and with that class of plate the practice is frequently useful. But with chloride or mixed plates the capabilities of these salts—if they are of any use at all—seem to be far inferior to the system of modifying exposure and development. There is, however, one addition that may sometimes be made with advantage to the pyro developer, especially in the case of chloro-bromide plates, namely, gallic acid. This is another instance of difference of behaviour on gelatine or collodion plates respectively; for, as is well known, with the former gallic acid acts as a most powerful restrainer or retarder. With collodion, however, there appears to be no such retarding effect, and, though much slower in action than pyro, gallic acid alone in the presence of an alkali is capable of developing an image. Combined with pyro, it helps decidedly in the direction of warm tones, and so may be mentioned along with other means.

We may also touch upon a modification of the pyro developer, which is particularly well suited for transparency purposes, or whenever a delicate image and warm tone are the desiderata. We allude to the process published some fifteen years ago by the late M. L. O. Sammann, of Paris, and known as the "hydrosulphite developer." In this process the extraordinary reducing power of hydrosulphuric acid was utilised in conjunction with pyro instead of alkali, and the result was as we have described, a peculiarly delicate image of a pinkish colour, eminently suited to subsequent toning with gold, or with pyro and silver.

The following is the method of development:—Provide a bottle filled with scraps of granulated zinc, and shortly before the developer is required—for the solution will not keep long—introduce a saturated solution of sodium bisulphite. After twenty minutes' or half an hour's contact, the solution—which constitutes the "hydrosulphite" solution—is ready for use,

and for negative work is mixed in various proportions with a three-grain solution of pyro. The action is slower than that of alkaline pyro, but very regular, and there appears to be absolutely no tendency to abnormal reduction or "fog." The process is not well adapted to gelatine plates, owing to the difficulty of preventing the precipitation of a basic zinc salt in the pores of the film. The hydrosulphite solution in a few hours precipitates the same salt, and reverts to its original condition of bisulphite.

Hydroquinone is a favourite developer for transparencies upon gelatine plates owing to its freedom from stain and the pleasing tones obtainable by its use, but neither in the case of this nor of eikonogen have we been able to discover any advantage over pyro when collodion is the basis. Those, however, who are in favour of their use may employ them, bearing in mind the principle that weak developers, especially weak in the reducing agent, give the warmest tones.

We had almost omitted to mention, but may do so in conclusion, that it is very often difficult to retain the warm tone of an image beyond the very earliest stage of development—in other words, before vigour is attained the colour has changed to cold grey or black. In such cases, if the development be stopped while the tone is still pink or red, the plate washed, and acid pyro and silver intensifier applied, some of the finest tones obtainable are produced. Pyro and silver, indeed, form one of the best toning agents we know.

Photographers often have to copy old and faded silver prints, the finer details of which are hidden by the yellowness of the paper. If the copy be made in the ordinary way, the result is generally very unsatisfactory; but, if the print be treated with a weak solution of bichloride of mercury, although no lost detail is restored, the yellowness will be removed, so that a good negative can be secured. When, however, the print must not be treated, a good copy may be obtained with a plate specially sensitised for the yellow rays, as with eosine. We were recently shown a very good negative made on such a plate, when, with an ordinary one, no passable result could be produced; the yellow lights and the faded shadows having, apparently, only the same photographic value.

Photographic societies are much indebted to those firms who send skilled workers to practically demonstrate the working of the processes in which they are immediately interested. By this means the members are not only able to judge of the capabilities of the processes, but at the same time they receive instruction. Also they have the opportunity of asking questions on the subjects with the assurance that the information obtained is to be relied upon. Sometimes papers and demonstrations are given by those who have but a superficial knowledge of the subject upon which they treat, with the result that little or no useful information is imparted. And, what is more, it sometimes happens, through the inexperience of the novice who essays to teach, that the process suffers and progress is retarded. However, thanks to the enterprising firms, societies are now enabled to have certain processes demonstrated in their own rooms, and information direct from the fountain-head. What advantages the modern photographer enjoys!

The editor of the *Chemical News* gives a most interesting extract from a private letter from Professor V. Schumann in last week's number of that journal. "By means of a new vacuum spectro-photograph which I have personally constructed during the last twelve months, I have found it possible to resolve into separate lines the region of the hydrogen spectrum discovered last year . . . . situate beyond the wave length 1820, and in addition to photograph a more refrangible region which likewise displays a considerable wealth of rays." He points out the unexpected richness in rays; one group, for instance, which does not exceed eleven millimetres displays no fewer tha "ninety sharply defined lines." The success of such delicate proof depends also on an exceptionally fine texture of the sensitive plate.

Such investigations as this display the marvellous power photograph puts in the hands of the scientific investigator. The physical studen learns through its aid alone that light, if it may be so termed, exists fa beyond regions where the eye can detect it. Just as there are sound too shrill for the human ear to perceive, so there are lights whose vibra tions are too frequent for the eye to perceive. The darkness of the sky i studded with stars that no observer ever saw with the most powerfu telescope, but photography portrays them unerringly. Our science unfortunately, had little to do with the recent lunar eclipse, but wha little it could do was of a contradictory nature, for Mr. Ranyard, at a meeting of the British Astronomical Association, in referring to some photographs taken at the time by Dr. Eastman, stated that not only did not the edge of the shadow as shown on the photograph coincide with its position as observed at the same time by the eye, but a later and denser photograph puts the shadow further back.

At the same meeting a paper by Lieutenant Molesworth, suggesting the employment of photography as a means of determining the much-vexed question of the existence of a lunar atmosphere, was read. The President, however, seemed to think such work would be trouble thrown away, as observations of his own, which he described, showed the existence of an atmosphere round the moon to be an impossibility.

Mr. Schooling exhibited and described, at the same meeting, some apparatus which he had used for astronomical photography. An ordinary achromatic telescope, he said, might be readily adapted for photography merely by fixing a plate-holder to the eyepiece tube, and moving it in and out until the photograph proved to be in focus; but, he said, a much more useful work would be to try short-focus portrait lenses, of, say, four or five inches' aperture. He earnestly hoped that an additional section for co-operation and help in celestial photography would soon be set on foot. Such a section, he thought, might do most good and useful work, also, by making lantern slides to be useful in illustrating papers read at their meetings or for lectures in different places. It appears to us that one who had attained sufficient proficiency to be successful in using a telescope for a camera, and securing results of any value, would not experience much difficulty in producing a lantern slide, though we are far from assuming that lantern-slide work is of facile accomplishment.

SPOTS ON PRINTS.

During the last few weeks we have received from correspondents a large number of prints showing numerous minute spots, which the senders are quite unable to account for. In many instances the mounts are suspected; but, in the majority of cases, they cannot be the cause, inasmuch as the pictures have not been long enough in contact with them, even were they of the most pernicious kind, as the spots usually make their appearance within a few days of mounting. Sometimes they are seen before the prints are mounted. Often the spots have a nucleus; but, when they have not, they usually have the appearance of once having had one. How are the spots to be accounted for?

Curiously enough, we always receive more complaints of this particular kind of spot during the autumn and winter months than at any other season of the year. This fact caused us to suspect, a few years ago, that they must be due to some extraneous cause that did not exist at other times. On thoroughly investigating the subject, we came to the conclusion that, in many, if not in all, cases, the spots were due to floating particles of pernicious matter in the atmosphere settling on the prints while they were in a moist condition. This may occur when the prints are drying after mounting, or when they are wet from the washing water. At this season the workrooms have to be heated; thus the dust on the floors often becomes abnormally dry, and, when the room is swept, the particles become disseminated

through the atmosphere, to settle again anywhere or on anything. The dust particles may consist of hyposulphite of soda, bichloride of mercury, sulphate of iron, and other things equally as harmful, the solutions of which get spilt or splashed on the floors of photographic workrooms. There they crystallise, and ultimately become converted into dust. If a minute particle of either of the substances just mentioned came in contact with a moist silver print, a spot would be fully accounted for.

Many workrooms are heated by closed coke stoves, which are frequently a fruitful source of spots. When fresh coke is put in, or the ashes are raked out, dust is generated and flies about the apartment. Now, coke ashes are highly pernicious on a photograph, as they are largely composed of sulphur compounds. When investigating this subject some years ago, we placed some damp prints in proximity to a coke stove, and then disturbed the ashes. The prints were put aside, and in a few days they were studded all over with spots identical with several examples we have lately received. We advise those who are troubled with spots, for which they cannot otherwise account, to direct their attention to "dust."

ON THINGS IN GENERAL.

The optical lantern has been well to the front the last few weeks, and, in some instances, in a most painful manner. It is a matter of wonder that the accidents from the manufacture of oxygen, and its use in lantern projection, have not been more than the past has shown, seeing that so many exhibitors, ignorant of any danger connected with the work, have, with a light heart, made and used the gas in the presence of imminent danger. But, in the cases recently brought into such sad prominence, we have proof that even in experienced hands every contingency cannot be seen and provided for. Each accident reveals a new danger, which, once explained, can be provided against. But what is to be done when the cause remains wrapped in mystery? The Editor, with his usual insight, seems to have arrived at the main cause of the Photographic Club explosion—the weakness of the pressure gauge at a particular point. As to the flame, I think that, although there can be no certainty, it can easily be adjudged to be one of two causes. First, from that indicated some months ago by the manager of Brin's works, the heat generated by the suddenly arrested rush of gas generating sufficient heat to set fire to any particle of organic matter it came into contact with in the tap and fittings. Then, as the Editor suggests, this would be sufficient to ignite and cause the combustion of the metal. Especially would this be probable if, as was likely, particles of metal were produced when the rupture took place, which would—with brass more easily than iron—burn rapidly when once ignited, and then set fire to any thin, jagged edge of metal. Secondly, the combined friction of the gas and metal against metal would be, under some possible conditions, quite sufficient to generate enough heat to initiate combustion.

Then, again, we have microscope *versus* lantern objectives, which has been mainly treated in such a diffuse manner as to permit both sides to be right and both wrong. The employment of the microscope with the lantern may subserve two distinct purposes—the amusement of a popular audience, or the instruction of a scientific class. It is certainly true that a class of image quite sufficient for the former would be entirely inadequate for the latter. Histological detail with a high power cannot with advantage be exhibited on a scale of magnitude suited for a large audience, though it must not be supposed that the smaller field is on a minute scale. In some Continental classes, where the microscope is used for screen work, it is, I am given to understand, no unusual thing for the students to be provided with opera-glasses, which is sufficient proof of the high character of the projection. As regards Mr. Fletcher's characterisation of lantern-screen work as a mere toy unless the electric light be employed, he does well to point out what is well known to experts. No one but an armchair theorist would expect to get a critical image with very high powers when the radiant could not be reduced to what might be practically considered a point. I have had experience with a screen of Keene's cement, and can bear out what Mr. Fletcher says about it. In large public lecture-rooms, however, it shares the fate of other delicate surfaces—it gradually loses its pure whiteness, and then, though this surface is perfectly amenable to the scrubbing-brush, it has to be treated to a coat of white paint of some sort, a water medium being most easy of use. It is worth while drawing attention to the contention that the slide or object need not be injured by heat if the heat rays come to a different focus from light. Leaving aside the question of the character of the optical arrangements that permitted this to any appreciable extent, it should not need to be pointed out that an injurious amount of heat might be concentrated, though very far from being brought to a focus. The usual schoolboy knows he can set fire to a piece of paper by a "burning-glass" without the sun's image being at all distinctly focussed. A cigarette may easily be lighted by a condenser at varying distances from it.

In the rather one-sided controversy on "perspective," it is very singular to find so much inability to see matters in a proper light by one who starts by calling in question the correctness of other people's views. Mr. Flather confuses, in a most remarkable manner, the treatment of spheres, cones, and circles. His language is obscure, and in places devoid of meaning; but he draws no distinction in his first letter between a sphere and a circle, and his words appear to mean that the section of a cone by a plane not perpendicular to its axis cannot be an ellipse, when any beginner in geometry knows that such a section must be either an ellipse parabola or hyperbola. Mr. Flather is no student of perspective as taught by recognised adepts, or he would not speak of a plane behind a picture plane to be represented. I would further point out an omission made by all parties to the discussion—the term "perspective" is used with no limitation except by inference. In a discussion on scientific principles, exact terms should be employed, and the expression "linear perspective" ought to have been employed. The "great circle of a sphere" sounds very great, but it is more suitably employed by astronomers than by artists. By the bye, to return for a moment to lantern matters, it is enough to make any one break the tenth Commandment to read the account of the lantern described at the London and Provincial Photographic Association a few weeks ago; but, when I read of the size of the picture on the screen being altered when the objective and the slide are moved as a whole, I feel that my natural optical provision must be a long way behind the demonstrator's on that occasion, for I candidly confess that I should be quite unable, even with an opera glass, to distinguish any alteration in size of the picture under such conditions.

What interesting reading can be got out of the lists of new patents. Photographic human nature must really be different from that of the general. Who could believe it possible that the man now lived who could care to take out a fresh patent for colouring paper photographs by rendering them translucent by some varnishing method, and then daubing paint at the back? No one, I think, except the man who (see Patent No. 13,799) could suggest and patent the use of alcohol for coagulating the surface of a fixed silver print upon albumenised paper.

Free Lance.

THE USE AND ABUSE OF SHORT-FOCUSSED LENSES.

The choice of a lens is often a matter of some difficulty to the amateur, especially when it is required to perform every class of work, though, when portraiture is included, the choice lies within narrower limits, since it is almost essential that an instrument of the rapid-doublet class be selected. Even here the question of focus may be a difficult one, though such lenses are not, as a rule, constructed of very short focus in proportion to the size of plate they have to cover, and therefore what are termed "wide-angle" lenses may be eliminated from the list of those from which the choice has to be made.

But when the lens is to be the solitary one with which every class of landscape or outdoor work is to be executed, including not only pure landscape, but architecture (with interiors), groups, figure subjects, and instantaneous work generally, it becomes exceedingly difficult to reconcile the various conflicting conditions. For pure landscape work, it is usually advised that a comparatively long-focussed objective be used, one whose focal length is one and a half times, some say twice, the length of the base-line of the picture. In opposition to this, a writer in last year's Almanac points out that

in the narrow valleys of Switzerland, and amongst scenery of that class, such a lens would be comparatively useless, and nothing longer than the base-line of the picture should be employed.

For architecture, and especially that branch of it including interiors and ruins, as well as "bits" and studies of detail, a rectilinear lens of short focus or wide angle is considered the most generally useful; while, for groups and figure subjects, rapidity has to be conjoined with the capacity for focussing sharply objects at widely different distances from the camera.

It is, perhaps, fortunate for the ordinary amateur that, in purchasing a "complete set" or a hand camera, the choice seldom rests with himself; but he is provided with the lens that is supposed to be the best for general purposes, or that it is most convenient for the maker to adapt to the camera. In this manner he is saved all trouble and anxiety in the matter of selection; but it is possible, in these days of hand cameras and small pictures for enlargement, that he may be thus led into serious error in the matter of pictorial truth and perspective.

Short-focussed or wide-angle lenses—the two terms are often erroneously used as synonymous—have been over and over again roundly condemned for the distortion and false perspective they give; but it has been as frequently pointed out that it is not the lenses themselves that are to blame, but the method of using them. A wide-angle lens—that is, one of very short focus in proportion to the size of plate it has to cover—is often not only of the greatest use, but an absolute necessity when working in confined situations; and, though such a lens would, if used indiscriminately *in the same manner* for every class of subjects, probably give unnatural and distorted renderings of the original, it does not follow that, properly used, it is not capable of giving as true a picture as one of longer focus.

There is a vast amount of misunderstanding on the subject of the effect the focal length of the lens has on the perspective of the picture, and that, too, amongst those who profess to have studied their optics. Thus, only a few days ago, I heard an amateur of many years' practice, and capable of doing first-rate work, seriously argue that every size of picture should be taken with a lens of a certain focus, in order that the perspective should be true to nature; and, in fact, it was alleged that, if a $7\frac{1}{2} \times 5$ picture in correct perspective were enlarged up to, say, 30×20, the perspective would then be wrong. The propounder of this dreadful theory was, however, unable to give any rule as to how to arrive at the proper focal length of lens to use, and went so far as to confess that he himself used, for a $7\frac{1}{2} \times 5$ plate, lenses varying from six inches to eleven, without, so far as he ever noticed, anything abnormal in the perspective of the pictures.

The truth is, the fault lies, not with the focus of the lens when unnatural perspective is obtained, but with the selection of the point of view. From a given point the perspective, as rendered by two lenses, of, say, three and six inches focus respectively, will be identical, the images only varying in size, and, if brought to the same dimensions, the lines of the two pictures would be found to coincide absolutely if superposed.

This is very easily demonstrated by erecting the camera at a distance of, say, one hundred feet from a high wall or building, and planting a long rod or stake twenty feet in front of the camera. Let two marks be made on the rod six feet apart, the lower one at such a height that it falls on the ground glass on the same point or line as the base of the distant wall. With the three-inch lens let the point be noted on the wall at which the upper mark on the rod cuts it, and then, without moving the camera, substitute the six-inch lens, and after focussing it will be found that the mark on the rod falls upon precisely the same point as before. And so, however the distances or dimensions may be varied, the two lenses render the different portions of the landscape or picture before them in precisely the same proportions to one another.

But with the same simple arrangement we can easily demonstrate the truth of what has been already stated, namely, that unnatural perspective arises solely from the improper selection of the point of view. With the camera fixed as in the previous experiment, let a picture be taken with the shorter-focussed or three-inch lens; then, moving the camera twenty feet back, or to double the distance from the marked rod, take a second picture for comparison, readjusting he marks on the rod so that the lower one again falls on the ground l el on the picture. We shall now have two negatives in which the s e between the points on the rod are equal; that is to say, by alte g the distance of the camera from the rod we have made, it giv a rendering of objects *at that distance* equal in size to that given by e three-inch lens at close quarters.

But if we now compare the two negatives, as to the points at wl h the upper mark cuts the distant wall or building, we shall find t t these by no means coincide, for in the negative taken with the lon - focussed lens the upper mark falls upon the wall at a height li more than half the other, or if it be a building, and the compari be made with the windows, it will be about one story lower. fact, if the two heights be measured on the wall, they will be fo to be, roughly, thirty feet and eighteen feet respectively.

Or, to put the matter in another way, a foreground object—sa figure six feet high—is rendered by the six-inch lens of the sa dimensions as a tree eighteen feet high at a distance behind the figu at the same time, the three-inch lens, while rendering the figure t same size, makes it as big as a thirty-feet tree the same distance aw Or, if the distant objects were made the same size in the pictures would take a "ten-foot" giant in the six-inch negative to equal measurement the six-foot man in the other. This explains how d tances are dwarfed and foreground objects magnified by the injudici use of wide-angle lenses.

The matter may, perhaps, be made clearer in the following way: When the two pictures are taken from the same point, the figure rod) being twenty, and the wall or tree one hundred, feet distant, bo are reduced in the same proportion—the more distant object five tim more than the other; but, when the camera is moved, this proporti is upset, for the respective distances are then forty feet and o hundred and twenty, and the more distant of the two objects is on reduced proportionately three times more than the nearer one. E selecting these particular distances, the principle involved is clear shown; but it must be borne in mind that the disparity increas rapidly as nearer foreground objects are chosen, and practically di appears as the distance of the nearest foreground increases.

The moral of this is, of course, that short-focussed or wide-angl lenses can be used with safety, if only the operator will refrain fro introducing too close foregrounds in his pictures. But there is th difficulty. Given a plate of a certain size, which has to be filled, wide-angle lens will only do it by the introduction of a lot of fore ground as well as sky. It may be possible to get rid of the super abundance of these by going close up to the subject, and and there i where the temptation commences. Instead of a wide expanse o foreground, we have less of it in an exaggerated or distorted form Besides, in getting too close to an ordinary landscape subject, th composition is often spoilt merely by some comparatively small tre or bush, or rock in the foreground, or near to it, being then undul magnified, and hiding more important objects behind.

In one way the hand camera is likely to lead the amateur furthe and further into wrong-doing in this respect, inasmuch as the powe possessed by short-focussed lenses of dealing at once with near an distant objects is in itself a powerful instigation to err. Whenever I read the statement, "All objects beyond nine feet in accurate focus," I see visions of what one may expect when such instruments are turned on to landscape. Yet I do not blame the lens; for, short as the focus may be, it is perfectly capable of doing its work properly if allowed. But the photographer himself must be strong-minded enough to abstain from near foregrounds, at least in connexion with distance; but, better still, to refrain from taking any objects whatever, groups or figures even, at too close quarters.

And further, when circumstances compel him to take a picture including a great deal of foreground, owing to the subject being one that requires a long-focussed lens, let him ruthlessly cut it away in the print or enlargement. The negative may be quarter-plate size, but the *picture* may be contained in a patch the size of a postage stamp in its centre. It is the fortunate property of short-focussed lenses that they give images of such optical perfection as to stand enlarging much better than those produced by lenses of long focus, and therefore an extra time or two of enlargement does not greatly matter.

W. B. Bolton.

AMERICAN NOTES AND NEWS.

GLISH manufacturers do not yield to Yankee inventive genius out a struggle," the *Boston Herald* is good enough to inform us; , after all, they have to 'come to time' sooner or later in almost y sort of invention or labour-saving machinery. This is espey true of photographic appliances and apparatus. English eras are far behind those of American invention and design. Their plates are also behind those of American manufacturers, both in lity of action and working qualities. But noted English plateufacturers and photographic supply manufacturers and dealers moving toward American inventions. The Stanley Brothers, ufacturers of dry plates, at Newton, have just completed negoons with the members of one of the foremost English photohic dry-plate houses, whereby they are to build for that house a e-coating machine, and one of the Stanley Brothers is to go to don to set it up." Come, come, friend *Herald*, why not give us name of that "foremost English" &c. house?

HE machine is entirely the invention of the Stanley Brothers, and is ut the only one of the kind in the world. Up to the time this hine was made and set up in the factory of the Stanleys, photohic plates had always been coated by hand—the old slow process ouring the emulsion over the glass from a graduate or dipper. in this machine the plates are fed on to an endless belt or carrier, lower part of the belt running through ice-water. The plate es under the coating apparatus and out at the other end of the hine evenly coated, and with the emulsion so thoroughly chilled t the plates are ready for standing on end to dry. The coating of plates is almost as rapid as cards can be fed into a job printing ss. The Englishmen were captivated by the working of the hine, but they take it only by binding themselves that it is not go outside of their own factory, and none but their own trusted ratives are to see it. The Stanleys have never allowed another hine to be built like it in this country, controlling it by patents as y do. Other plate-makers have never been able to obtain it." at has the onnat'ral old parent to say to this? Only, we fear, t sweet are the uses of advertisement — especially in Boston, S.A.

. W. H. HYSLOP, who was known to many of our readers when this country a few years ago, contributes the first of a series of cles on "Modern Methods of Illustration" to one of our Transntic contemporaries. Strangely enough, in reviewing the various otographic methods available, he omits mention of the bromide nting process. This method of printing for book illustration sesses in a favourable degree the cardinal advantage of rapidity, ich Mr. Hyslop deplores as absent from the platinotype processes, l we are surprised that it is not more generally employed for the pose.

FORE the Society of Amateur Photographers of New York, on vember 10, Dr. Charles Ehrmann discoursed on toning and intening by uranium salts, in which, after giving a brief history of nium toning and a description of the reactions which take place when mixed solution is applied to a silver negative or positive, he disnts the novelty of adding acetic to the toning bath in order to keep whites of the picture clear. The making of uranium-toned prints th pure whites, he observes, is not new; and he further claims t it is an American invention. He quotes a formula by Dr. Vogel taining acetic acid, which appeared some time ago. Dr. Ehrmann not imagine why so much noise has been made about "this new ning method."

NCE considerable obscurity prevails on the point, we will quote m Dr. Ehrmann's paper a description of the reaction which takes ce in uranium toning. Uranyl salts are not precipitated by tassium ferricyanide. When the latter comes into contact with silver deposit, the ferric salt is reduced to the ferrous state, and a rtion of the silver is converted into silver ferrocyanide. The anium nitrate now combines with the reduced ferrocyanide of tassium, and forms uranium ferrocyanide, which is the toning posit. Before reduction takes place the undecomposed toning solution permeates the gelatine film. Potassium ferricyanide hardens or tans gelatine, so that decomposition products, as well as undecomposed portions of the salt, become so closely enveloped within the film that they cannot be washed out. It is this yellowing which acetic acid either prevents or removes—it is not clear which.

THE Chicago Camera Club is happy in having a very large number of ladies as members. Mr. F. K. Morrill, in the *American Amateur Photographer*, devotes an article to the fair camera women, several of whose portraits are given. The Club boasts possession of a complete and elaborate studio, with all the necessary accessories. Mr. Morrill has noticed that lady amateurs are more interested in work adapted to the studio than in "viewing," and wisely concludes that, where they have the facilities, they would naturally be attracted by them. Here is a hint for our English Societies. The Chicago Camera Club has ladies admitted from its very beginning, and, according to Mr. Morrill, no small share of its success is to be attributed to the energy and capacity, the interest in the meetings, outings, and exhibitions, of the lady officers. English Societies, please copy.

THE MEASUREMENT OF LENSES.*

III.—METHOD OF UNIT MAGNIFICATION.

THESE methods constitute a special case of II., but are quite distinctive.

(*k.*) *Silbermann's*† *Method.*—In this method the lens (positive) is placed at the middle of a graduated bench, upon which two transparent micrometers are placed on either side, so that the image of one micrometer falls upon the other. By a well-known theorem, the total distance between object and image will be a minimum when the distance between them is equal to four times the focal length, and each is situated at one of the symmetric points of the lens. The operation of finding these symmetric points consists, then, in a series of double adjustments of the following kind:—One of the micrometers being placed at a distance judged approximately as twice the focal length, the second micrometer is then moved until upon its surface an exact image of the first is formed. If, on comparing the size of the divisions of this image with those of the surface on which it falls, it is found that they do not coincide, but are either magnified or minified, the distance of the first micrometer is either increased or diminished, and the second micrometer is again adjusted to the new position of the image, and a fresh comparison made. By successive trials and approximations the symmetric points are approached; and, when so found, the distance between them is measured, and one-fourth of it taken as the focal length. The method is open to the objection, (1) that it is inapplicable to thick lenses, as it does not take into account the distance between the Gauss points, and (2) that it requires a tiresome series of double adjustments. The simple modification of this method, suggested by Webb,‡ needs no notice here.

(*l.*) *Donders'*§ *Method.*—Donders improved the method of unit manification by substituting for the series of double adjustments a simpler mode of equalising the size of object and image. He used as object an opaque screen provided with perforations, the linear dimensions of which from one to another were measured with a Helmholtz's ophthalmometer. The lens to be measured being placed in front of this object, an image is then formed on a translucent screen, and the lens is then moved to increasing distances until the size of the image, as measured by the ophthalmometer, is equal to that of the object.

(*m.*) *Snellen's*‖ *Method.*—This method, which closely resembles that of Donders, is carried out by the aid of an instrument called a *Phokometer*, consisting of a graduated bench, at the middle of which the lens is placed No ophthalmometer is used to measure the sizes of object and image, a translucent screen, figured with marks, serving to detect any want of equality between the size of image and object. It is assumed that the lens has a single optical centre at its centre of figure, and a mechanical adjustment serves to move the object and the screen at equal rates from the lens at the centre. The scale is divided to read off direct in *dioptrics*

* Continued from page 776.

† Silbermann: *Comptes Rendus*, xiv. 1830, February 22, p. 340. See also Verdet, *Cours de Physique*, wherein it states that this instrument was referred to a Commission, consisting of MM. Arago, Babinet, Biot, and Pouillet. No reference to any report of this Commission can be found.

‡ Webb: *Literary Gazette*, 1857, p. 1101; and *Fortschritte d. Physik*, xiii. 1857, p. 276.

§ Donders: "Bepaling van den Brandspunt afstand van Lensen."—*Versl. en Mededeel*, xv. 1863, p. 402.

‖ Snellen: "De Phakometer, ter bepaling van focus en centrum van lenzen."—*Maandblad voor Natuurwetenschappen*, vii. 1876, p. 23.

the focal power of the lens. Snellen applies the method to negative lenses and long-focus positive lenses by placing them between two positive lenses of equal and known focal power; and, in the case of plano-convex and meniscus lenses, he recommends that to secure symmetry such lenses should be taken in pairs, back to back, and measured together.

IV.—Methods of Approximate Unit Magnification.

(*n.*) *Bessel's** *Method.*—In this method the object and the apparatus to receive the image are placed at a distance from one another, exceeding four times the focal length, and the (positive) lens is placed between them. Two such positions of the lens can be found, for either of which the distance between the two conjugate foci is the same. Bessel gives a formula for deducing the focal length from the measurements of the various distances. The method assumes the distance between the Gauss points to be known beforehand, and therefore fails to give any information on the more difficult point to be determined. The advantages of the method are that no measurements have to be made from the curved faces of the lenses, and that none have to be made of the sizes of optical images.

(*o.*) *Oudemans'*† *Method* is simply the method of Bessel carried out by means of a special apparatus, consisting of a simple graduated bench and hair micrometers. Oudemans gives approximate formulæ for calculating the distance between the Gauss points, for insertion in Bessel's formulæ, but confesses that this procedure fails in the case of many lens-combinations.

(*p.*) *Hasselberg's*‡ *Method.*—In applying Bessel's plan, Hasselberg employs as objects the real images of spectrum lines as formed in the focal plane in the eyepiece of a spectroscope. He compares to some hundredths of a milometer, the performance of a Zeiss's objective constructed of ordinary glass, but assumes the Gauss points by approximate calculation.

(*q.*) *MacGillavry's*§ *Method.*—This elegant method departs from Bessel's in that it requires measurements to be made of the respective sizes of object and image, as well as of the distance between them, and of the displacement of the lens between the two intermediate positions of adjustment to exact focus. But by this means all assumptions or estimates about the distance between the Gauss points are avoided. MacGillavry gives three formulæ, from each of which this unknown quantity has disappeared by elimination, the true focal length being given in terms of the quantities directly measured, namely, from the relative sizes of object and image in the two positions, and the change in any one of the three measured lengths. Apart from the experimental difficulty of accurately measuring the magnification, MacGillavry's method appears to be very satisfactory.

V.—Method of Approximate Interior Unit Magnification.

(*r.*) *Cornu's*‖ *Method.*—This is one of a group of possible methods in which the respective distances from their related principal foci of two conjugated points are measured, and the true focal length (which is their geometrical mean) is calculated from them, the peculiarity of Cornu's plan being that the two conjugated points employed are close to the two Gauss points, one of them being always interior to the lens. The lens is temporarily marked with ink-lines upon its faces, and the experimental process consists in observing by a reading microscope of sufficiently long focus the positions in space of the principal focus of the lens, the marks on the nearer face, and the internal vertical image of the marks on the further face. From the distances thus measured, together with a measurement of the thickness of the lens, the true focal length, as well as the distance between the Gauss points, can then be calculated. In practice, the direct measurement of the thickness of the lens is avoided by the device of reversing the position of the lens, and repeating the three readings from the reversed faces. M. Cornu describes an apparatus constructed for him by Duboscq for carrying out these measurements.

(*s.*) *Mebius'*¶ *Method.*—This is a modification of the method of Cornu for the particular case of negative lenses, and needs no extended notice here.

Silvanus P. Thompson, D.Sc., F.R.S.

—*Journal of the Society of Arts.*

(*To be continued.*)

* Bessel: *Astronomische Untersuchungen*, vol. i. p. 137.

† Oudemans: "Sur la détermination des distances focales des lentilles à court foyer."—*Archives Néerlandaises*, t. xiii. 1877, p. 149.

‡ B. Hasselberg: *Bull de l'Académie des Sciences de St. Pétersbourg*, xxxii. 1888, p. 412; and *Beiblätter*, xii. 1888, p. 782.

§ MacGillavry: "De bepaling der focaal-afstanden van samengestelde optische stelsels."—*Maandblad voor Natuurwetenschappen*, v. 1875, p. 73.

‖ Cornu: "Détermination expérimentale des éléments principaux d'un système optique."—*Journal de Physique*, 1e Série, vi. 1877, p. 276.

¶ Mobius: "Détermination expérimentale des éléments principaux d'un lentille divergente."—*Journal de Physique*, 2me Série, ix., p. 511.

Our Editorial Table.

Concentrated Rodinal Developer.

We have received from the Actien-Gesellschaft für Anilin Fabrikation, of Berlin, a sample of para-amidophenol dissolved in concentrated form along with alkalies and preservatives, which is placed on the market under the name of "Rodinal." We have developed several plates with Rodinal, and, as a developer, we like it much. For negatives and transparencies we first tried it diluted to the extent of thirty parts of water to one of the solution, afterwards very greatly increasing the water, in which state it answered well for paper prints.

Dr. Andreson deserves our thanks for giving us a compound with such an easy name, as well as so powerful a combination of developing reagents.

"The Doré" Lantern-slide Printing Frame.

Mr. J. Dore, High-street, Sandown, sends us one of his new frames. It is compact, made of hard wood, and is for printing lantern slides of the standard English size. It is made so that a vignetting apparatus can be used in front of frame. Film negatives can be used, and stereoscopic and other transparencies can be made by it.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,302.—"Collapsible Background for Photographic and other purposes." Complete specification. F. Wiese.—*Dated November* 23, 1891.

No. 20,391.—"An Improved Form of Stereoscope for Viewing Photographic Pictures." B. Acres.—*Dated November* 24, 1891.

No. 20,432.—"An Adjusting Apparatus for instantly securing Head Rest for Photographers, &c., and other purposes where vertical slides or frames are used." T. Hall.—*Dated November* 24, 1891.

No. 20,489.—"Improvements in Camera Boxes for Microscopic Photography." W. Tylar.—*Dated November* 25, 1891.

No. 20,557.—"An Improvement in the Method of, and Materials and Compounds employed in, Toning Photographic Prints on Paper, Glass, or other Surfaces." T. H. Powell.—*Dated November* 26, 1891.

No. 20,600.—"Improvements relating to Photography in Natural Colours." Complete specification. R. Kopp.—*Dated November* 26, 1891.

No. 20,632.—"Improvements in Condensers used in Instruments for Optical Projection." W. I. Chadwick.—*Dated November* 27, 1891.

No. 20,641.—"Improvements in the Application of Photo-mechanical Printing Processes for the Decoration of every description of Glass and Pottery, and the Production of Photo-ceramic Enamels and the Ornamenting of every description of Enamel Surface." H. Meller.—*Dated November* 27, 1891.

No. 20,690.—"The Use of Aromatic Amido Compounds, and of Derivatives of Pyrogallol for the Development of Photographic Images." J. Hauff.—*Dated November* 27, 1891.

No. 20,770.—"Improvements in Mounts for Photographic Pictures." Complete specification. J. Reynolds.—*Dated November* 28, 1891.

No. 20,951.—"Improved Photographic Plate-washer." Complete specification. S. H. Smith.—*Dated December* 1, 1891.

No. 20,988.—"A Combined Purse or Pocket-book and Photographic Camera." H. Kassel and E. Kassel.—*Dated December* 1, 1891.

No. 21,176.—"Photographic Exposure Shutter." H. S. Starnes and A. Pringle.—*Dated December* 4, 1891.

No. 21,195.—"Improvements in Photographic Printing Frames." Partly communicated by M. Lehmann. Complete specification. F. Shew.—*Dated December* 4, 1891.

No. 21,233.—"Improvements in Photographic Cameras." A. C. Smith.—*Dated December* 5, 1891.

No. 21,274.—"Photographic Camera for Instantaneous and Prolonged Exposures." Z. Ajdukiewiez.—*Dated December* 5, 1891.

London and Provincial Photographic Association.—December 17, Monthly Lantern Night.

Brixton and Clapham Camera Club.—A reception will be held on Saturday, the 12th inst. (half-past seven to ten), to inaugurate the opening of the new quarters at the Clarence Rooms, 376, Coldharbour-lane, Brixton, to which any ladies or gentlemen in the district interested in photography will be heartily welcomed.

Photographic Society of Great Britain.—December 22, at eight p.m., *Photography by Artificial Light.* December 29, at eight p.m., Lantern Evening. January 5, at eight p.m., lecture by Mr. T. Bolas, *The Relation of Photography to the Industrial Arts.* January 12, at eight p.m., paper by Mr. T. R. Dallmeyer, on *Reflections Combined with Refractions.* January 19, at eight p.m., lecture by Mr. Chapman Jones on *Distortion of Outline in Photography.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 14 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
„ 15 ...	North London	Wellington Hall, Islington, N.
„ 16 ...	Bury	Temperance Hall.
„ 16 ...	Hyde	
„ 16 ...	Manchester Camera Club	Victoria Hotel.
„ 16 ...	Edinburgh Photo. Club.....	5, St. Andrew-square.
„ 16 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 17 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

DECEMBER 8,—Mr. J. Spiller (Vice-President) in the chair.

Mrs. Roach, Messrs. F. S. Hollyer, J. G. Hudson, H. C. Heinrich, Carl Greger, T. Mansell, Ezra, A. C. Edwards, H. G. M. Conybeare, E. Stern, J. A. Sadler, E. Patry, E. W. Parfitt, Douglas Pym, the Duke of Newcastle, and Major Wilkinson were elected members of the Society.

Owing to the non-appearance of the Society's *Journal*, containing the text of Mr. Warnerke's paper on *Photo-technical Education Abroad*, the discussion on the paper could not take place.

Mr. ANDREW PRINGLE gave a discourse on *Photo-micrography*, in which, after referring to the excellent results achieved in former times with relatively inferior apparatus, &c., he described recent improvements in apparatus, &c., for photo-micrographic work. Orthochromatic plates had been the means of inducing Dr. Koch and others, who had once abandoned photography for the representation of bacteria, owing to the difficulties set up by stained objects, to take up photo-micrography again. Not the least remarkable improvement in the optical department was the production of objectives by the Abbé-Schott glass. The metal of the new glass contained more elements than the old, and the gain had been chiefly in the direction of a larger angular aperture. Achromatism had also been brought to an almost ideal point of perfection. It was to the credit of Powell and Lealand that they had promptly produced an objective not inferior to that recently introduced by Zeiss. The apparatus before them was devised by himself and Mr. Swift, and he drew attention to an arrangement at the ocular end for obviating tremors. Some people considered the use of the eyepiece unnecessary, but Nelson, Comber, Pfeiffer, and others used it, and he (Mr. Pringle) always employed it. The method of illuminating the objects by monochromatic light, recently introduced by Mr. Nelson, was very valuable. Mr. Pringle exhibited a number of bacteriological objects on the screen to illustrate the difficulties encountered in their preparation, and under various degrees of amplification, &c., and at the conclusion was warmly thanked for his discourse and demonstration.

The CHAIRMAN announced that, following the precedent created by Mr. Warnerke's technical paper, three other lectures of a similar nature had been arranged for as follows:—January 5, Mr. Thomas Bolas will lecture on *The Applications of Photography to the Industrial Arts;* January 19, Mr. Chapman Jones on *The Distortion of Outline in Photography;* February 3, Professor R. Meldola on *Photography as a Branch of Technology.* These lectures had been arranged for by the activity of the Assistant Secretary, to whom, with the small informal Committee that assisted him, the credit was due.

Mr. G. L. ADDENBROOKE stated, with reference to the affiliation scheme, that the Society had received letters of approval from the North Middlesex, North Kent, Oxford, Holborn Camera Club, Lancaster, Liverpool Amateur, London and Provincial, North London Photographic Club, Photographic Society of India, Dorset Amateur, and other Societies, in all sixteen, and the formal affiliation in those cases would take place in due course. He thought this a very fair start for the scheme, and was glad to say that several other Societies were moving in the matter.

The CHAIRMAN having announced that the Council had abolished certain so-called bye-laws, which left the ground free for the introduction of new measures by the incoming Council,

Captain A. M. MANTELL (the Hon. Secretary) explained that a number of resolutions of Council had, from time to time, been made as to the management of the Society, but not one of these laws had been published, so that a certain amount of inconvenience may have arisen therefrom. They had been recently collated and distributed, and several references had been made to them in the public press. As there was some uncertainty as to whether they were in force or not, a resolution of Council had been passed that evening that all those bye-laws should now be void, and that an announcement to that effect should be made to the Society that night. The Council had formally resolved that those bye-laws were of no effect, and in that way had recognised the ruling of the President at the Council meeting that the bye-laws, having been passed by a previous Council, were of no effect.

Previous to Mr. Pringle's demonstration, the CHAIRMAN observed that certain statements had been printed with regard to the recent conduct and management of the Society, in the form of letters published week by week in two photographic papers. No response had been made to them, because the sanction of the Council was required for any official statement of the case, and because it would be necessary for those who were principally concerned to make their own statements, which they could not do without the permission of the Council. The Council had endorsed the view that it would be better to let the Hon. Secretary and the Assistant Secretary make their own plain statements in that room than to bring them before the Council itself, as then upon the Society would rest the responsibility of determining between their statements and those made in opposition, so that after Mr. Pringle had finished, he would call upon the two gentlemen to make their brief rejoinders.

Accordingly, at the conclusion of Mr. Pringle's demonstration, Captain MANTELL rose and said: I am sorry to have to refer to such a trifling matter as this before the Society, and I feel that the less time I occupy with it the better. In the last few numbers of *Photography* and the *Amateur Photographer*, references have been made which reflect very seriously on the Society and its management in connexion with the late exhibition. These strictures scarcely refer to me personally, except in connexion with one incident, namely, the alleged illegal and arbitrary removal of Mr. G. Davison's pictures. The bulk of the remarks refer to the action of the Assistant Secretary. I consider it my duty, if Mr. Lawrance is alleged to be wrong, to probe the question. Hitherto his tongue and mine have been tied, for, as officials of the Society, we could not rush into print without leave of the Council. The Council has given us permission to make statements to-night in order that those interested in the exhibition should know that there are two sides to the question. It is a matter of regret to me, but you all know why it is, that there is now no chance of Mr. Robinson and Mr. Davison making any remarks they would like to. Those gentlemen caused the difficulties. I will now give way to Mr. Lawrance, and, when he has finished, I will make a brief statement as to the one point in which I am personally concerned.

Mr. H. A. LAWRANCE (the Assistant Secretary), who was received with cheers, said: I am sorry, indeed, to have to occupy the time of the meeting with this personal matter. The statements in the photographic papers may be classed as referring to the exhibition management, the finances of the Society, the "illegal" removal of Mr. Davison's pictures after they had been hung and medalled, and sending for a policeman to remove a harmless gentleman from the gallery. (Great laughter.) I find it difficult to split up my reply among these points, but with regard to the finances of the exhibition, I may say that the takings were 100*l.* higher than last year, and 40*l.* above those of the best year on record. Twenty-eight lantern evenings were held against six or seven in previous years. Now, as to the offences offered to exhibitors by the regulations laid down as to the receipt of exhibits. Many people wrote for an extension of time, but owing to the fact that the hanging committee only had two days for the work, I understood that nothing more could be received, and I wrote to this effect to all the applicants. Mr. Davison's pictures were delivered on Friday, September 18, the receiving day being Wednesday, September 16. Feeling that, if they were received without comment, a great injustice would be done, I pointed out that they could only be received as not for competition. This Mr. Davison would not consent to, and the pictures were not hung. But a member of the Committee h ung the pictures; a second member of the Hanging Committee objected to their having been hung; and a third member of the Committee, with whom I discussed the matter, instructed me to make strong representations on the matter to the Secretary. This was on Friday. On Saturday I wrote to the Honorary Secretary a statement of the facts. As Captain Mantell was away, I only received his reply on the following Thursday. Mr. Robinson came to the gallery on Thursday—I understood on his own initiative. I heard him say to one member of the Committee that *here* had always been considered the post of honour, and that he would like his pictures hung on the line there. Mr. Robinson was there on the following Monday with a Mr. Maskell, and Mr. C. W. Hastings. A member of the Committee asked me why they were there. I said I did not know; and the Committeeman in structed me to ask them to leave. I politely asked them to do so. They left. Mr. Robinson returned after lunch. I insisted upon his withdrawal. I must plead ignorance of the bye-law which allowed members of Council to be present. As regards Mr. Maskell, he spent a great part of the 16th inspecting the exhibits as they came in. He was there on the 17th before the Hanging Committee asked him to withdraw, and he was there on the following Monday to change a print. He asked for a pair of pincers he had left; they were given him, and he was asked to withdraw. He declined. I ordered him to withdraw, and, as he asserted he would not, I sent for a police constable, and treated him as a trespasser. Mr. Maskell was said to be a representative of the press; if I had known this I should probably have objected to his presence on previous occasions. I don't intend to remain Assistant-Secretary much longer, but I am not prepared to resign while this matter is unsettled, although really it is immaterial to me whether I resign now or later.

Captain MANTELL (who was applauded on rising) said: As far as the Assistant-Secretary's action is concerned, it seems to me to have been clear and to the point. The only matter on which my judgment may be called into question is that of Mr. Davison's pictures. The Assistant Secretary wrote to me when I was in Devonshire. I answered by return of post, making an appointment at the Gallery to meet him on the following Thursday. I discussed the question with him, and with a member of the Committee then present. The facts were these. Several exhibitors had been refused when they asked for extension of time. One set was received late and was hung. Clearly those exhibitors who had been refused extension of time would have been able to say that we had not acted impartially if we exhibited one set of pictures that had been received late. I, therefore, went to Mr. Davison (who I may say is a personal friend), and asked him whether he would permit these pictures to remain on the walls and to be marked, "Not for competition?" He said no, and absolutely refused unless they were for competition. I reminded him that they had been sent in late, and that a mistake had been made in hanging them. I had had these facts formally reported to me, and I was responsible for any action in the matter. I would have referred it to the President, but there was no time. It was late on Thursday evening. Friday was the Press view, and the catalogue was in preparation. I might have shelved the matter by writing to the President, and so have got out of the responsibility, but I decided to take the responsibility myself, and I removed the pictures. One point may be brought forward,

viz., among the so-called bye-laws is one which says that no picture is to be exhibited late without the permission of the President, and it has been argued that this means one should not take down pictures without his permission; but it has nothing to do with it, and I am unable to see the relevance of the remark. Mr. Davison's pictures were hung by a member of the Hanging Committee, and the responsibility for removing them rests upon me, and I accept it readily.

Mr. W. S. BIRD said they had had the misfortune to seriously offend an old friend, who was highly respected and in many of their annual exhibitions had often occupied a place second to none. Quite apart from the question of right or wrong, it was a painful loss to the Society. He thought that an expression of feeling on their part might remove the wrong Mr. Robinson felt. It was most unfortunate the Assistant Secretary should not have been able to remember the dispensing power in the hands of the President. He sympathised with Mr. Robinson. As to Mr. Davison, he had nothing to complain of, as his pictures were late, and he thought he could afford to comply with the rule laid down that his pictures could only be hung as not for competition. Mr. Davison was clearly in the wrong. Mr. Robinson was an old member of the Society, and his feelings had been hurt. He (Mr. Bird) regretted the incident should have occurred very much; at the same time, one must confess that the carrying out of the laws of the Society was the duty of the officers. A Vice-President had a right to be present at the hanging. A member of the Hanging Committee had invited him to be there, and did not remember to communicate the fact to his colleagues.

Mr. CHAPMAN JONES said that, with regard to his invitation to Mr. Robinson to be present, his only endeavour was for the good of the Society, and if he had done anything unwise, he would apologise for it. Probably the full facts had not been stated. Those who were present at the Council Meeting when the Hanging Committee was appointed would remember the difficulty to get a Committee at all; and they would remember, perhaps, that Mr. Robinson, among others, was pressed to take office on the Committee. Mr. Robinson said he would not, but would lend a hand. His (Mr. Jones's) invitation was simply urging Mr. Robinson, if possible, to be present, because he knew some of the members of the Committee would not be present; two were not, and took no part in the hanging. He had urged a man who had permission to come and do what he could. It had been said that he did not communicate this invitation to the other members of the Committee. He (Mr. Jones) did not know Mr. Robinson's presence was unacceptable to them. He did not keep Mr. Robinson's promise from the other members of the Committee. It was true he had not mentioned it, but not intentionally so.

Mr. W. E. DEBENHAM asked if the minutes of the Council meeting referred to could be produced; he had no remembrance of Mr. Robinson being asked to assist at the hanging. Did the other members of the Council remember?

Mr. J. TRAILL TAYLOR said he had no recollection.

Mr. T. SEBASTIAN DAVIS said Mr. Robinson declined to act on the Committee. There was an old law of the Society which said "no one to be admitted into the gallery except members of Council and judges," and it was introduced to meet a difficulty which often occurred in a few members making indirect reference to their own pictures during the hanging. (Great laughter.) Another law was, "No picture to be received after the date of admission, except under very special circumstances, the same to be submitted to the President for approval." He thought such matters should be left to the Hanging Committee.

Mr. F. INCE agreed with what Mr. Bird had said, and would like to see harmony restored with the members who had withdrawn. If some of their old and valued members, who knew how much they appreciated Mr. Robinson, would take the matter in hand, they might yet get him back. If Mr. Robinson had called the Assistant Secretary's attention to the fact that he had a right to be present, this difficulty would not have occurred. Mr. Lawrance admitted he had made a mistake, and Mr. Robinson might very fairly be satisfied with their expression of opinion that it was a mistake, forget the past, and become one of them again. As to Mr. Davison's matter, it was different. To avoid occurrences of the kind in future, he hoped a strong revision of the rules would be made, with one as stringent as those of the Medes and Persians, that if pictures were not delivered by a certain date, they were not to be accepted. If it were explained to Mr. Robinson how the difficulty occurred, and that the President was not at the moment available, and if they told him that at their revision of the rules he could express his views, and see if they could make some rules that should be kept, they might have their old friend among them again.

Mr. T. BOLAS, while sympathising with Mr. Robinson, said that it had been said that Mr. Robinson suggested places of honour for his own pictures. He would ask Mr. Chapman Jones if that were so?

Mr. JONES could not say exactly what took place; but, so far as he heard, Mr. Robinson said "his pictures were generally *there*, and he would like them there again."

Mr. DEBENHAM thereupon asked Mr. Jones to retract a statement he (Mr. Jones) had made in a published letter.

Mr. BOLAS said Mr. Jones had practically accused Mr. Debenham of invention in implying that Mr. Robinson had indicated places for his own pictures. If Mr. Jones did that, he assumed knowledge of all Mr. Robinson said.

Mr. A. MACKIE said he heard what Mr. Robinson said, and the words were: "*This* has always been considered the place of honour in the Gallery, and I should like my pictures placed there." It was not the only action in which Mr. Robinson was guilty of what appeared to be partiality, for he told the man to mark the pictures of his friends for good places. With regard to Mr. Lawrance, he had asked Mr. Robinson to leave the room not simply because Mr. Robinson was there, but because he had the editor of a photographic paper with him. A complaint on the subject was made to him (Mr. Mackie) by the editor of another journal who came to the Gallery on business, who said that it was decidedly wrong to allow one editor and not another. Another point was, whether one member of the Hanging Committee should have power to invite pictures to be exhibited or persons to be present. Such a thing placed the other members at a serious disadvantage. One of the late Hanging Committee had asked a country exhibitor to send some pictures, and he was afraid that they treated their colleague's friend with scant courtesy. A member of a hanging committee should have no power in himself. He must say that, taking it altogether, he did not regret the late occurrences so much as some people did. For years and years there was a feeling that the exhibition regulations were deliberately broken through. This showed the importance of regulations, once made, being kept to.

Mr. ADDENBROOKE observed that Mr. Robinson had been asked to select some pictures for reproduction at the late exhibition. He wrote to the President on the matter, and apparantly got his approval. No doubt Mr. Robinson, taking it as such, took an editor with him, with a view of the pictures being selected as soon as possible.

Mr. BOLAS then moved the following resolution:—"That this meeting endorses the action of the Council in supporting both Secretaries in doing their best to uphold the rules of the Society."

This was seconded by Mr. E. CLIFTON, and carried *nem. con.* amid cheers.

Mr. BIRD then moved:—"That this meeting desires to make known to Mr. Robinson its regret that there were circumstances attending his visits to the hanging of the exhibition pictures which should have led to causing him unintentional pain, and the members here assembled regret the occurrences."

This was seconded by Mr. INCE, but was subsequently withdrawn.

The meeting concluded at a late hour.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 3,—Mr. J. B. B. Wellington in the chair.

Mr. W. P. Dando was unanimously elected a member of the Association.

It was arranged that Thursday, February 18, 1892, be set apart for a Ladies' Night. Members are asked to assist in providing the entertainment.

Mr. A. HADDON referred to the reduced uranium-toned picture brought to the last meeting by Mr. Teape, from which he (Mr. Haddon) thought the silver had not been removed. He had also offered to redevelop the image. Since then he had removed the print from the mount, washed it, and had converted the deposit into silver bromide. He had then redeveloped the picture with pyro-soda, had again reconverted the deposit into silver bromide, and redeveloped with iron, and had yet a third time changed it to bromide and redeveloped with eikonogen. The whole of the silver must originally have been there, probably in the state of ferrocyanide. The intensity was practically the same in each redevelopment.

Mr. T. BOLAS thought it would be an excellent plan to try the action of various developers upon strips of these reconverted pictures.

Mr. J. S. TEAPE, in connexion with the same subject, had taken sections of an uranium-toned print, and reduced them by washing. One section had been chlorised and another bromised; and both had been treated with Monckhoven's silver intensifier, with practically no effect. A third section redeveloped with pyro came up very well.

The CHAIRMAN suggested that toning by redevelopment would be a useful field for experiment.

Mr. BROMLEY SMITH said that bromide prints might be bleached and redeveloped, and any variety of tones so obtained. The operations should, however, be conducted in sunlight.

Mr. A. MACKIE observed that he had fixed an exposed plate before development, and had then developed an image. He had given an ordinary exposure in the camera.

Mr. BOLAS had produced a like result with collodion-emulsion plates, using pyro and silver as the developer.

Mr. J. E. SMITH had exposed a plate under a negative in the printing frame, and, having fixed the plate, had intensified the weak image left. He did not know if the idea was of any value.

Mr. BOLAS remarked that Gaudin had recommended a similar method for rapid paper printing.

Mr. HADDON showed a picture to illustrate the conversion of an ordinary gelatino-bromide print into a "blue" print. It had been effected by flooding the print with a solution of potassium ferricyanide, to which a ferric salt had been added.

The CHAIRMAN mentioned that he had a very hard under-exposed negative which he had coated with collodio-bromide emulsion, and exposed through the back to reduce the silver. Upon applying the developer, instead of the clear parts being reduced, the dense parts gained still more in density, while the clear parts were not acted on. He thought it might be possible to intensify negatives in that way.

Replying to some points raised in a short paper on *Exaggerated Perspective by Wide-Angle Lenses*, read by Mr P. Everitt,

Mr. BOLAS remarked that Mr. Everitt had said artists had the privilege of painting from any angle, which was an advantage. But artists often found it convenient to compromise in the representation of perspective, inasmuch as people do not look at the picture from one point of view only. They know their pictures will hang in a gallery, and that people will walk in front of them, and thus they are forced to compromise. Occasionally an artist paints

very wide-angle pictures in true perspective. In the Wiertz Museum there was a picture which had to be viewed at an angle of 170°. If it were viewed by the spectator immediately in front, it was wrong indeed, but, viewed from that particular point from where the picture could only be seen through a small opening provided by the artist, the ellipse appeared as a circle. The picture had simply to be looked at from the proper point of view. Mr. Everitt had adversely criticised the drawing of the vase in a recent leading article of THE BRITISH JOURNAL OF PHOTOGRAPHY, but the perspective of that vase was true enough if it was looked at from the proper point of view.

Mr. W. E. DEBENHAM disputed Mr. Everitt's right to speak on behalf of artists in the wholesale way he had done. Mr. Everitt was under an entire misconception as to the way in which objects in the margins of pictures should be looked at. The eye is perfectly free to look from one part of a picture to another, and need not be kept in one place. Photographic perspective was the only true perspective, and, as Mr. Bolas had said, the vase referred to was in true perspective according to the point from which it was looked at. He defended the rules of perspective which were taught under the Science and Art Department. Dennis' text-book was his authority in his recent lecture on the subject. Mr. Everitt's paper was evidently an attack upon what he (Mr. Debenham) had said at those lectures. Mr. Everitt spoke of the difficulty which is raised by our having to look at an object with two eyes instead of one. He was bound to tell us in what direction pictures should be painted differently, and whether objects should be made wider or narrower. He could not understand those who spoke against photographic perspective; no other perspective was possible which shall include all the subject seen, and which shall give objects in their relative proportions.

Mr. EVERITT briefly replied to these and other criticisms, and the meeting closed.

CAMERA CLUB.

NOVEMBER 30.—Mr. Frank Haes exhibited his slides illustrating what was done in animal photography in the days of wet collodion. The slides were from negatives made twenty-seven years ago, and the excellence of the representations met with, and deserved, both surprise and admiration. After Mr. Haes' pictures, other slides were shown by Messrs. Davis, Hughes, Bolton, Burchett, Greene, Bridger, Walker, Laurie, and Major Becher.

DECEMBER 3.—Mr. Dresser read a paper on *Toning Rough Bromide Paper and Transparencies*. Mr. Francis Cobb occupied the chair.

Mr. DRESSER gave different formulæ for mercurial and for uranium toning, referring to a large number of his own examples, which were arranged on the Club walls.

Mr. Dresser being compelled to leave early, Mr. Herbert Fry kindly gave a demonstration of the toning process, and Mr. Weir Brown added much information, and showed some instructive illustrations.

Thursday, December 17, Mr. Leon Warnerke will give a description and demonstration of his *Simplified Collographic Process*.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

IN the report of this Society's meeting, furnished last week, it was omitted to be stated that, in connexion with the optical lantern, Mr. A. Mackie exhibited a series of slides illustrating the results of a number of experiments made by him to test the effect of altering the proportions of the ingredients constituting the ordinary pyro developer. Taking the ordinary standard developer—as represented by two grains of pyro, one grain of bromide potassium, and two minims of ammonia to the ounce—he had had made a succession of similar exposures on a sensitometer scale, and then developed the exposures in three sets, which were shown on the screen. In one set the pyro was increased and decreased by regular stages, in the second the bromide, and in the third the ammonia were subjected to the same treatment, the results being received with much interest, as showing the amount of control of density given by thus varying the proportions. It appeared to be evident that the knowledge of the power thus given might be of great service in dealing with different classes of plate, and in making the developer thus suitable to varying exposures.

HOLBORN CAMERA CLUB.

DECEMBER 4,—Mr. Herbert Thompson in the choir.

Messrs, Daw and Gunn were elected members.

M. F. J. COBB then opened a discussion on *Enlarging*. He thought that the reason why so few amateurs had taken up with enlarging was because they thought it required expensive apparatus. All the enlarging he had done was by means of apparatus costing, not four or five guineas, but four or five shillings. When he first started enlarging—about three or four years ago—he knew next to nothing about the subject, and he had to gain his knowledge by experience. His apparatus consisted an old 10×8 camera, to which he had fixed a baseboard with an easel at the other end, the negative to be enlarged being placed in the dark slide of the camera. He covered the apparatus up by means of a hood, and exposed with magnesium ribbon. The distance of the light from the negative would depend on the density of the negative. He had a silver print by his side while exposing, so as to tell which part of the negative would require most light, and which required shading. That was one of the chief difficulties. The negative itself should be thin. He first used a portrait lens, but could not make it answer, and he finally used a single lens. He used the ferrous-oxalate developer. He had tried hydroquinone, but he did not like it so well. When he first started he always obtained very black and white results, instead of the grey tones which he wished to obtain. He now left out the bromide of potassium, using Eastman's paper to obtain the desired results. In conclusion, he advised beginners to stick to the same negative until they obtained a good print. They would by that means know what to do with the next negative to be enlarged.

Mr. E. H. BAYSTON gave a description of the method of daylight enlarging.

Mr. E. BENEST said he did not recommend any one to use the iron developer, because of the great difficulty of getting rid of the iron in the paper, which, if left in the print, would cause it to fade. He had tested prints which had been developed by the iron developer, and had been through three separate clearing baths and well washed, and found iron still existed in the paper.

To-night (Friday) Mr. A. J. Golding on *Composition*.

PEOPLE'S PALACE PHOTOGRAPHIC CLUB.

DECEMBER 4,—Mr. Patten in the chair.

A very soft and effective bromide print was shown by Mr. R. Edwards. This much resembled a sepia platinotype.

Mr. S. Beckett handed round a few prints on the Ilford printing-out paper. It was observed from these that a beautiful black was to be obtained on this paper.

The Chairman brought up an old book on photography, with a price-list appended, published by Horne, Thornewait & Wood in 1852. Among other interesting items the following prices were noted :—Hypo, three shillings per pound; pyro, four shillings per drachm; Daguerreotype plates, whole-plate size, seven pounds ten shillings per dozen!

The subject for discussion—*Enlargements v. Direct Pictures*—was warmly entered into by all present, the summary of opinion being that it was now quite possible to produce enlarged pictures quite equal to direct. It was generally agreed that it was preferable to enlarge direct on to the paper, unless a large number of prints were required, when it was perhaps better to make a large negative, which could be well worked up, thus saving a deal of labour on each print. It was remarked that an enlargement was generally harmonious as to sharpness, whereas in a large direct some parts were very sharp, which showed in great contrast to the fuzzy places. This was very noticeable in large direct portraiture.

It was announced that a social evening and exhibition of prints and slides would take place on January 8. Absent members, please note.

CROYDON CAMERA CLUB.

DECEMBER 7,—The President (Mr. H. Maclean, F.G.S.) lectured on *The Open Sesame of Successful Photography* to an attentive gathering of members. As the title indicates, the discourse dwelt upon the paramount value of art knowledge to all those who aim at attaining eminence as photographers. By means of simple diagrams and other clearly defined premisses, the lecturer deduced that a considerable amount of culture of the mind and eye is not merely possible, but is urgently necessary as far as the average amateur is concerned. How to attain this was also indicated, and lastly some trenchant criticism upon the "obscure" school of amateur photography was delivered in no uncertain terms.

In the ensuing discussion Mr. CHARLES HUSSEY endorsed the major portion of the lecturer's remarks, particularly emphasising what had been said in condemnation of the "phenomenally dark skies" just now so much in vogue.

Mr. H. MAURICE PAGE also gave his support to the views enunciated as to the need for more art training.

The CHAIRMAN proposed the vote of thanks, which was seconded by Mr. H. E. NEEVES, and carried with much evidence of appreciation.

Inasmuch as the attendance was less than usual, it shows that photographers do not attach much value to the study of art, and therefore is it all the more needful that lectures such as the above should be given as often as possible, in order to impress upon workers the important part which art plays in the production of successful photographs.

A special meeting will be held at 53, Birdhurst-rise on the 15th at 8 p.m., when members are invited by Mr. Hussey to inspect his collection of photographic masterpieces.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

DECEMBER 4,—Mr. Edward Lovett (President) in the chair.

Mr. Lovett read a letter received from the Photographic Society of Great Britain relating to the affiliation scheme, and, after due consideration, it was thought desirable to defer it to the next meeting, when the members would then be able to express a more decided opinion on the subject.

Mr. J. Lewis, of Birmingham, then demonstrated the Kallitype process. Mr. LEWIS described the old method of working the Kallitype No. 1, and set forth the disadvantages that it had with regard to the manipulation and otherwise marring the popularity that it might have claimed. He then explained the improved Kallitype process No. 2, where all these disadvantages were done away with, and now the process could be worked with a nicety and exactness that called forth no comment. He developed several matt surface and albumen prints, and the examples that were shown to those present were very fine, and would complete most favourably with the finest platinotype or bromide prints, and were everything that could be desired.

LEYTONSTONE (OUR) CAMERA CLUB.

DECEMBER 2,—Mr. R. Sefton in the chair.

A lecture was delivered by Mr. TOM SYMONS on *The Cad and the Camera*. He defined a cad, contrasted caddish and gentlemanly conduct with a camera, and related several anecdotes to illustrate his meaning. He then asked the members present to give their views of the matter, which most of them did.

The question was raised as to whether an amateur had the *legal* right to snapshot, print, and distribute copies of an individual against his will. This was

left undecided, although strong opinion was expressed as to its reprehensibility considered from an ethical standpoint.

The SECRETARY then read a communication from the Photographic Society of Great Britain referring to the affiliation scheme, which was placed upon the table.

Gentlemen in the neighbourhood interested in photography are informed that this Club combines sociability with technicality. Meetings are held every Wednesday evening at eight at the Assembly Rooms, High-road. Visitors are invited.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

DECEMBER 4,—The Vice-President (Mr. A. R. Dresser) in the chair.

Lantern night: slides by Messrs. Jones, Taylor, Grant, Dresser, Clarke, and Hawkins were shown.

Next meeting, Friday, December 18, at Station Hotel, Sidcup. Mr. A. R. Dresser on *Hand Cameras*.

RICHMOND CAMERA CLUB.

DECEMBER 4,—Mr. Davis in the chair.

The subject of *Lenses* was discussed, with the aid of specimens and illustrations lent by Messrs. Taylor, Taylor, & Hobson, of Leicester.

Mr. ARDASEER explained the exhibits, which comprised flint and crown glass in the rough state, and ground and polished flanges in all stages of manufacture, and several finished lenses, including one of the well-known casket set. Slides were then passed through the lantern, illustrating very clearly the principle and the action of lenses, and the method of their arrangement in the various combinations commonly in use.

LEWES PHOTOGRAPHIC SOCIETY.

DECEMBER 1,—The President in the chair. He said he was sorry to have to announce the death of Mr. E. Miller, a member of the Committee, and the Hon. Secretary was requested to forward to the relatives a letter of condolence and sympathy with them in their bereavement. The President mentioned that he had received a letter from the Hon. Secretary, stating that, owing to his professional engagements, he could not devote so much of his time to the Society as he had done in the past, and the Committee had asked Mr. Percy Morris to act as a joint Hon. Secretary, which he hoped he would be able to do.

Mr. PERCY MORRIS read a paper on *The Development and Printing of Hand-camera Negatives*, demonstrating both processes. He used hydroquinone for negatives and ferrous oxalate for paper.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

DECEMBER 8,—Mr. F. J. Lyndon in the chair.

Mr. JOS. TAYLOR gave a slight history of the various emulsion processes which had been brought out, and showed some of the advantages attending their use. He exhibited some excellent prints which he had made with the new gelatine emulsion paper of the Ilford Company. The results obtained by squeegeeing on ground glass were much admired.

Mr. W. J. HARRISON followed, and confined himself to the toning and fixing of the above paper, which is a gelatino chloride. He mentioned that he thought the Company did well in bringing the paper out during the winter season, because the alum bath could not be dispensed with if the water were at all warm. He thought in summer alum would have to be used. Mr. Harrison further showed the effect which could be obtained by simply washing and fixing. Omitting the toning, the resulting colour was very suitable for some subjects. Altogether both speakers were very sanguine as to the success of the paper.

MIDLAND CAMERA CLUB.

DECEMBER 4,—Dr. Hall Edwards (President) in the chair.

A paper was given by Dr. LEECH upon *The Keeping Qualities of Dry Plates*, which, however, dipped largely into the question of the invention of the gelatino-bromide process, and also into the effect of damp upon plates and the destruction of the latent images by prolonged soaking in bromide of potassium. Dr. Leech had prepared a very complete and elaborate series of negatives, which were passed round for inspection. Plates were shown made as far back as 1880 (gelatine-bromide) and 1878 (collodio-bromide). A Swan plate made in 1880, exposed and developed in December, 1891, gave a good result. But undoubtedly the best were of the Liverpool Dry Plate Company, made in 1878, exposed and developed in December, 1891. There was but the slightest trace of marginal fog, and the image was bright and vigorous.

In the discussion that followed considerable stress was laid upon the methods of packing plates; the use of paper between was strongly condemned, and it was pointed out that the old methods avoided any such plans.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

DECEMBER 1,—Mr. B. J. Taylor in the chair.

Mr. BRAHAM, the representative of the Autotype Company, London, gave a practical demonstration of carbon printing, showing the various processes from the exposure on the negative to the finished pictures as transparencies, and on opals and other beautiful colours in sepia, red chalk, &c.

The CHAIRMAN announced the winners of the Annual Competition as follows:—Class 1, Mr. Crowther; Class 2, Mr. Toplis; Class 3, Mr. E. Beck; Class 4, Mr. Bromley first and Mr. Crowther second; Class 5, Mr. E. Beck both first and second. The competition slides were then passed through the lantern.

ROCHDALE AND DISTRICT PHOTOGRAPHIC SOCIETY.

DECEMBER 6,—Lantern evening. The lantern was worked by Messrs. Spedding and Stott.

OXFORD PHOTOGRAPHIC SOCIETY.

DECEMBER 1,—Mr. A. Robinson in the chair. Mr. H. M. Phillipps gave a demonstration in autotype.

ROTHERHAM PHOTOGRAPHIC SOCIETY.

DECEMBER 1.—A lantern evening.

EDINBURGH PHOTOGRAPHIC SOCIETY.

DECEMBER 2,—The President (Mr. H. I. Blane) in the chair. In opening the business, he stated his sorrow at the absence of the Secretary, who was ill with the prevailing epidemic, influenza.

Mr. Oliphant brought before the meeting a new French lens adapter or holder, by which a lens of any diameter could be held by an arrangement similar to the Iris stop or diaphragm.

On examination by several of the more practical members, while the idea was welcomed, the verdict was that it was much too bulky and heavy, and, while quite suited to keep the lens light-tight and safe against internal or external thrusts, it had no provision to keep it from lateral revolution.

The PRESIDENT suggested that that could be secured by a simple pin, or by a spring, slot, or snap to keep the lens in such position as not to interfere with applied shutters, instantaneous or otherwise.

The principal work of the meeting was the reading of a paper by the curator (Mr. Hugh Brebner) on *The Value of the Evidence Given by the Galvanometer as to the Nature of Photographic Action*. This was accompanied by ample demonstrations, carefully carried out, to prove the points insisted upon in the paper. Mr. BREBNER stated that early in the spring he obtained, through the kindness of Mr. Hugh Auld, a Thomson's reflecting galvanometer, with which he had since been almost constantly engaged endeavouring to ascertain whether electrical currents corresponding to the normal and reversed phases of the photographic image were or were not induced. While he found that the exposure of commercial dry-plate films, subjected to the action of most of the standard developers, showed that a current was set up which at first deflected the mirror one way and subsequently, but after a considerable interval, in the opposite direction, he had not been able to eliminate grave sources of error, nor ensure such conditions as should satisfactorily prove that these alternating, if not fluctuating, currents were due to the direct result of the action of light. Generally speaking, while his experiences were practically those of Colonel Waterhouse, as recently detailed in THE BRITISH JOURNAL OF PHOTOGRAPHY, and his method of experiments almost identical, although he had been engaged upon them long before the publication of the Colonel's paper, making allowance for the different instruments employed, Mr. Brebner did not feel satisfied that the evidence of the galvanometer was sufficiently conclusive to allow him to state definitely that there was any precise correspondence between the two actions—light and development. Briefly Mr. Brebner's line of inquiry was threefold: First, to ascertain whether the current which Becquerel found to result from the unequal exposure of two equal films became a reversed action after prolonged exposure, independently of any extraneous development; second, to see in what manner this action was modified when a developer was used, and changed chemical action supervened; and, third, to find the relations existing between period of exposure, density obtained by development, and intensity of electrical current. In all three he showed his success in obtaining a certain amount of positive as opposed to negative evidence; he seemed to feel that, everything considered, each point would require the most keen and elaborate sifting, and careful elimination of all non-essential elements, if reliable conclusions were to be deduced from experiments of this nature, however carefully they may have been made or by whom. These researches of Mr. Brebner seemed based upon one central conception—that "ordinary development," that "resulting inhalation," and that "exhibiting the phenomena of reversal" are simply degrees of one and the same cause, and that the action of development of a bromide of silver plate and its results bore no direct relation to the similar reduction which constitutes a printed-out image in silver chloride. In support of his theories, he showed much ingenuity in the various methods of proof adopted, which gave great interest to the demonstration.

In the conversation which ensued, Dr. DRINKWATER suggested that there were other reasons and causes which might be held more accountable for the electrical actions exhibited, more especially as they were of a type difficult of detection and isolation. The chemical changes going on during the development of a plate might—he did not say would—account for much of the electrical phenomena. Further and varied experiment would be the only method of determining this.

The PRESIDENT mentioned that the Council had been kept pretty busy with the details of the work and meetings of the Photographic Convention, which was to be held next year in Edinburgh. They had not yet succeeded in arranging for suitable central premises for such a large body as they expected to be present at the various meetings, but he might state that they had a fair prospect of being fully successful in that matter also.

The following twelve new members were balloted for and admitted:—Messrs. John K. H. Crawford, Alexander Leslie, C.E., John M'Ewan, George M'Gibbon, John Mackie, Charles MacLaurin, A. Mann, G. Sime, Dr. Richard Simmins, Thomas Stronach, William Thomson, and William Trotter.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

DECEMBER 3,—Mr. J. D. Cox (the President) in the chair.

The slides sent in for competition were passed through the lantern. On the votes of the members present being scrutinised, the following were declared

the prize-winners :—1st, D. Ireland; 2nd, J. D. Gibson; and, 3rd, G. G. Maclaren. The American set of slides lent by *Photography* were next exhibited, many eliciting applause. A number of slides were then shown by Messrs. Ireland, Kerr, Salmond, and Sharp.

Two questions were found in the question-box :—"What is the most effective manner of vignetting bromide prints?" The best result was obtained by using a deeply serrated vignetting mask, and kept in motion during exposure.

"A landscape negative, on being fixed, was found to have a clear spot about the size of a threepenny-piece in the centre of some foliage. What is the best way to dodge the blemish in printing? The negative cannot be duplicated." By vignetting in from another negative a suitable piece of foliage, or block out the hole and work in the foliage with a brush on the print.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

DECEMBER 3,—Mr. William Lang, jun., F.C.S. (President), in the chair.

The CHAIRMAN read the following paper :—

Gentlemen, as we are having to-night a paper and a practical demonstration, it is not my intention by any means to attempt what is generally accepted as a President's address. I feel that you will hear me quite sufficiently in an ordinary way during the session we have just entered on. I don't know that I am altogether to blame for this; your indulgence has again been the means of retaining me as your President, and, while I have to thank you sincerely for the honour conferred, I cannot but feel that this position is being held by me for a length of time that is beginning to exceed the bounds of ordinary propriety. Not that the cares of the office are such as to bring my grey hairs, with their accompanying sorrow, to the grave, for, as I have already said from this place, the work is congenial, and the cares are all really the other way. There are one or two things, perhaps, I should refer to when I am on my feet. I am not going to enter into the work done last session; this would be encroaching on my friend Mr. Mackenzie's ground, for you know his report has yet to be given us; but I would like to urge upon members the necessity of taking a personal interest in the work of the Association.

Although we may still congratulate ourselves on the continued numerical strength of our Association, yet that is no reason why each individual member should not do what he can to get others interested to join. We have every year resignations to face and deaths to deplore, so that we need all the accessories to our ranks that we can possibly get. As you are aware, there are no restricted qualifications necessary for any one becoming a member of the Glasgow Photographic Association. We make no distinction between amateur and professional; all interested in the art-science of photography are truly welcome. So varied are the phases presented by the photography of to-day that the lover of art, the scientist, and, I may add, the man who goes in solely for picture-making, all find in it something to meet their particular reqnirements, and all are equally fascinated.

During the recess several important events (I believe the correct term to use nowadays is "function") connected with photography have taken place. I may be allowed to refer in a word to the International Photographic Exhibition held in September in our Fine Art Galleries. It was a success in every way.

At the British Association, held in August at Cardiff, Dr. Huggins, in his presidential address, paid the highest tribute to photography that perhaps has yet been made when he said, "Modern photography has put a new power into the hands of the astronomer, and has led already, within the last few years, to new acquisitions of knowledge of vast importance." And again: "Photography puts it in the power of the astronomer to accomplish, in the short span of his own life, and so to enter into their fruition, great works, which otherwise must have been passed on by him as an heritage of labour to succeeding generations."

The members of the Photographic Convention attending the Bath meeting had the practical results of photography as applied to astronomy very forcibly brought before them in an astronomical lecture delivered by Mr. Taylor, when a large series of photographs of nebulæ, constellations, planets, &c., were shown by projection on the screen. Speaking of the Convention recalls to my mind the fact that next year Edinburgh is to be the place of meeting. It will be incumbent on us all, both as an Association and as members, to give this gathering all the support we can. In this particular instance the plea of great distance cannot well be put forward. The Bath meeting was really a very enjoyable and successful one, although in point of numbers it fell considerably short of the one held the previous year at Chester. Only two Glasgow men put in an appearance—Mr. Mason and myself. Of course this shows how enthusiastic we all are in Glasgow regarding the progress of photography. There is this to be said, however: Bath is a good bit off, and most people only go there when ordered by their doctor. Bath is classic ground for the photographer. It was in the neighbourhood of Bath that Talbot lived, and it was my good fortune, when there, to visit Lacock Abbey, and see many of Talbot's early examples. The first Herschel—the father of Sir John—was also associated with the City of Hot Springs, and his early astronomical discoveries were made while resident there. The Council of the Photographic Convention did me the honour of asking me to compile a paper bearing on the photographic work of Talbot and Herschel, which perhaps some of you may have seen, as it was printed *in extenso* at the time in the various photographic journals.

Perhaps some of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY may have seen a letter which appeared last week, which stated that Glasgow was the third city in the kingdom to establish a photographic society. This was going on the assumption that London was the first to organize a photographic association, Liverpool the second. From a letter which subsequently appeared from a correspondent in Leeds, it would appear that the place of honour belongs to that town, Leeds being the first place in the United Kingdom to found a photographic association. This has the effect of placing us fourth on the list, the first Glasgow Photographic Association being formed in March, 1853. All this is very disappointing to the photographic community of the second city of the empire, but I dare say we will be all able to survive it.

Developers are still increasing and multiplying, the latest addition being a salt of the chemical substance known as para-amidophenol. I regret I am not in a position to show results, but these may be forthcoming at a subsequent meeting. Those who have experimented with it place the character of the results obtained with it as being between eikonogen and hydroquinone.

Before I conclude these somewhat desultory remarks, I perhaps might refer to the lantern craze which is presently pervading all classes. There is just a chance that the thing is going to be overdone. I had a chat recently with a gentleman of the cloth, who was deploring the difficulty of getting a congregation out at nights. Half in jest, I said he would require to introduce the lantern. Judge of my surprise a day or two afterwards to see in the papers an account of a Sunday evening service (in Edinburgh, if I mistake not) in which the lantern played a prominent part. In an article the other day in the *Bailie* the writer was deploring the comparatively small attendance at the Water-Colour Society's Exhibition, and somewhat sarcastically added that nowadays the public could only appreciate pictures that were shown by means of projection on a screen.

Mr. JAMES GARDNER read a paper, and gave a demonstration, on *Collotype Printing*. The various stages of the process were shown, and a large collection of finished prints exhibited.

Correspondence.

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

PERSPECTIVE AND THE PHOTOGRAPH.

To the EDITOR.

SIR,—As one who was present at Mr. Debenham's lecture, and who has taken much interest in the subject, I should like to refer to what I consider the most essential point of Mr. Henry Flather's recent letters. He in these letters sets out the views a tyro—or, as he puts it, the "merest tyro"—might reasonably be expected to take; still, I assume that the substance of Mr. Debenham's argument should be quite clear to any one standing a grade higher.

While most heartily sympathising with Mr. Flather's very natural desire for the formation of classes where instruction in perspective may be had, I would rather suggest, with Mr. Debenham, that Mr. Flather may not have sought for what he requires with sufficient diligence. Even if there is no school of art in Scarborough—and Mr. Debenham's recommendation consequently becomes impracticable—I would suggest to Mr. Flather that, as several Board schools in London hold evening art classes, it is by no means unlikely that some class for giving such instruction as is required may exist in connexion with one of the Public Elementary Schools at Scarborough. Certainly, one can hardly expect the most advanced instruction at such a class, but it should at any rate be sufficient to prevent the pupils being liable to fall into very obvious misconception on elementary points.—I am, yours, &c., THOMAS BOLAS.

Chiswick, November 30, 1891.

MAKING WINDOW TRANSPARENCIES.

To the EDITOR.

SIR,—I observe that in your report of the Croydon Camera Club's meeting of the 9th inst., at which I was present as a visitor, it is stated that I advised, for the making of window transparencies from thin negatives, that the positive be over-exposed and subsequently reduced. My suggestion was that the positive be slightly *over-developed* (not over-exposed) till the shadows had attained sufficient density, and that it be subsequently reduced till the highest lights were just cleared. In such a case the reduction in the shadows would be scarcely discernible, while the high lights and half-tones would be brightened up.

This method, however, is only a makeshift where a rather full exposure has been given, either inadvertently, or on purpose to obtain a certain effect; or, at best, an alternative mode of dealing with this class of negative. Probably the better plan would be to use the hammer and make another, the *shortest* sufficient exposure, and employ a vigorous developer.

For warm tones the former, for black tones the latter would be the better mode of procedure. I shall feel obliged if you will publish this correction in your next issue.—I am, yours, &c., J. WEIR BROWN.

Croydon, November 27, 1891.

BLISTERS.

To the EDITOR.

SIR,—Some months ago, when Mr. Clarke stated that boiling water was a prevention of blisters on sensitised paper I gladly tried it, only to fail in doing what was put up as a positive cure; and, now that Mr. Bishop has again brought it forward, I have tried it again, and still cannot get success. You will, of course, say, you do not do it properly. I think you will agree with me when I say I have done so. My method is at follows:—I have a kettle of water (boiling, of course) on an oil-stove close by me, and so give the prints a thorough doing, so much so that they assume a greasy appearance at back just as if they had been in liquid oil, and after this they blister as much or more than they did without any precautions. I have just finished a batch of thirty whole-plates, and only two or three of them are fit to send out.

If you are in a position to send this to either of the gentlemen mentioned, it might prompt them to explain more fully their way of doing it, as it seems I must be at fault.—I am, yours, &c.,

Ladbroke Studio, Redhill, Surrey. FREDERICK GEORGE SMITH.

DOES THE LATENT IMAGE FADE BETWEEN EXPOSURE AND DEVELOPMENT?

To the EDITOR.

SIR,—The above question may appear stale, for I dare say most workers of dry plates would answer it off-hand in the negative, that is, if development follows exposure within a reasonable limit of, say, one or two months. Still, as rapid plates allow of considerable latitude in exposure, and it being almost impossible to determine absolutely correct exposure in the field, slight over-exposure being preferable to under-exposure, it is quite possible that in most cases a sufficient margin may be left to allow the latent image to fade a little without the worker being aware of it.

If, however, the molecular or chemical change brought about in ordinary gelatino-bromide plates by the action of light be permanent, should it not be equally so in the case of gelatino-bromide paper? But that it is not so, as regards the latter, the following incident and experiment will in some measure prove:—

In August last, when enlarging from quarter-plate negatives, I exposed two sheets, 12 × 8, of bromide paper, the subjects being portraits. In each case I used small test pieces of paper for correct exposure, and found them to require respectively thirty and fifty seconds. Circumstances which I need not here relate delayed their development for three weeks, during which time the exposed papers, in a case by themselves, were stored in a drawer where I keep my unexposed paper. On proceeding to develop, and after flowing on the developer, I saw something was wrong; the image was too slow in appearing, and, after coming up in little more than outline, development stopped altogether. The second sheet behaved in the same way, both having the appearance of hopeless under-exposure. Thinking the paper must have been at fault (as I did not imagine the latent image could have so faded), I next day exposed two sheets from the same packet of paper, behind the same negatives (test pieces again indicating about the same exposure), and developed same day. This time the results proved quite satisfactory, and the exposures correct.

In making the second exposure, I exposed an extra test paper same time as one of the largest sheets, and stored it as before for four weeks; and one day, when again enlarging, I took it out and tried to develop it, the result being a mere outline, fainter than those already described.

I next, in order to test whether the paper had become inert, stuck it on to the enlarging easel behind a negative and exposed for about forty seconds, and then reapplied the developer, the first effect of which was to cause the faint image above described to disappear. The newly printed image now developed up regularly and fully, but was quickly followed by the old image coming up, but this time reversed, *i.e.*, in negative.

There is room for speculation and theory as to the cause of these (to me) unexpected results. Has the latent image faded, or has the action of the light been going on all the time in the direction of reversal of the image? Perhaps you, or some one better skilled than I am in the chemistry of photography, may be able to throw some light on the subject.—I am, yours, &c., JOHN LEISK.

Lerwick, November 28, 1891.

THE NEW METHYLATED SPIRIT IN COLLODION.

To the EDITOR.

SIR,—Referring to the experiments described by Mr. W. B. Bolton in your current issue, may I be allowed to say that I think that gentleman has unfortunately wasted his time. The benzoline he employed to add to his methylated spirit is certainly not at all the article indicated by the Excise. He should have used coal-tar naphtha. The ordinary *benzine* would represent it in a refined degree, but the *benzoline* used is a totally different thing. Will he repeat his experiments?—I am, yours, &c.,

Scarborough, December 4, 1891. JOHN WHITFIELD.

THE LANTERN EXPLOSION.

To the EDITOR.

SIR,—In reference to the recent alarming lantern explosions, surely the effect will be to hasten the adoption of the oxycalcium or spirit lamp jet. The extraordinary thing is how it has been so long neglected. It is absolutely safe, and, after a very little practice, easy to manage. But I am bound to write that the usual form as sold by the dealers is certainly not the best to use.—I am, yours, &c., LANTERNIST.

To the EDITOR.

SIR,—For more than two years we have been informed by Mr. A. W. Scott, in articles and advertisements, that ether saturation will not explode, and that herein lies a great advantage in favour of saturator, warm or cold. Now, in last week's JOURNAL Mr. Scott advises a "mixture" of "cotton-wick shreds" and "glycerine" to prevent explosives in saturator. As a matter of fact, the present important question that lanternists require solving is, the cause of the recent limelight explosion; and this has nothing whatever to do with limelight substitutes or minor details of pops in the chambers or tubes.—I am, yours, &c.,

Rock Ferry, December 2, 1891. AN OLD LANTERNIST.

THE LANTERN MICROSCOPE.

To the EDITOR.

SIR,—In reply to Mr. Furnivel, may I say that, if Mr. Chadwick and I contradict one another, it is by both saying precisely the same thing, both alike specifying the four-tenths as the high power referred to? As to the slides, the mounter offered those shown by the one-inch objective to me along with the others shown with the two-inch by Mr. Furnivel. I replied that I could not buy the former because no one could see in them the structure which he had spoken of, and I did not like to blame a mounter for a bad microscope; and, on the other hand, I would not blame a microscope for bad mounting. He replied that "he had been much blamed for trusting the slides to that microscope;" and as he saw he was likely to suffer commercially from what had happened, he asked me to allow him "to have the slides tried in my microscope." An evening was appointed, with the result already described. If the structure named by me was not in them then, and not shown by two-inch or one-inch, it is certainly in them now; and Mr. Flathers, I believe, told us that he had brought all the slides which had failed except one, which he had sold. Those who spoke so well of his exhibition referred not to microscopic structure, but to vegetable organs. I do not see the significance between magnifying the image and magnifying the object, so far as this discussion is concerned. I did not know that any lantern microscope constructed (as my own was in the year 1880) upon Kingsley's principle had been discarded by college authorities, and Mr. Furnivel, having publicly declared that his mode of illumination is different in principle to mine, and it having been affirmed by one of his friends with his own tacit assent that there is nothing in common between us except that we both use an optical lantern, I do not see how he can now turn round and set up a claim to any part of the instrument described in Mr. Chadwick's paper. I leave the rest of his letter to the common sense of the reader, and beg to say again, as Mr. Furnivel knows I have said before, and as the Editor advises, that the hatchet should be buried, and all concerned should work together for the best results which can be obtained with the lantern microscope.

In reply to the Editor's note, I wish to say that I have tried the plain water in the alum trough, and found it to do just as well without alum as with it. We now propose to call the trough the water trough. Mr. Chadwick told me many months since that he had seen water used in this way in America, except that the gentleman who brought this to his notice put a few drops of a solution of sulphate of copper in the water, just to give it a very faint blue tint, to improve the colour of the light, upon the principle that blue is used to improve the colour of limewash. I may say also that I have tried to fit lenses up to accomplish the late Rev. J. B. Reade's suggestion. Pray, dear Mr. Editor, will you say—as I am so old a pupil of yours, having read, I believe, everything you have written on optics during the last thirty-five years—what is the objection to the simple trough? Nothing can be simpler, of less trouble, or so safe and costless. Why, then, abandon it to gain a hypothetical benefit? Here it is light, which is wanted, which all these lens devices waste far more than either alum or water trough. In the case of the polarising prism, which comes between the lantern condenser and the sub-condenser, the trough is absolutely irreplaceable. Here Mr. Reade's suggestion comes to nothing; and, if we are to have our alum or water trough, why complicate matters by having two pieces of apparatus for the same purpose? I know, to my cost, the danger to a prism by using it without protection, as I had a valuable Nicol spoiled by doing so.

Permit me to say that Mr. Fletcher in the course he has taken is acting in a very unfair way towards me. It is usual to hear both sides of a case before giving judgment on it. Why, then, did he not wait until he had read my answer to "Mr. Furnivel's plain and simple defence of himself," which answer, I may say, is not yet more than half completed? The "plain and simple defence" is to my thinking shown by me to be a most misleading statement. I would like to ask Mr. Fletcher who the experts were who so palpably failed in trying my microscope against Mr. Furnivel's. It is quite evident that neither he nor the experts used it to one-half of its capabilities. If he wanted to arrive at "exact results," why did he not ask me to show him how I worked it? I rather think I have seen two of the "experts" twice over, and I have some recollection that I was told they could not do anywhere near as well with it as I did. If this is correct, whose fault was it, theirs or the instrument's? I am afraid I cannot acquit Mr. Fletcher of being biassed in the matter, and a biassed mind generally arrives at the conclusion it seeks for. I do not say that my microscope will show yeast cells on the screen to a large audience, or that it will show circulation of the blood as seen in an ordinary microscope in a frog's foot; or circulation of "sap" in Valisneria; or minute diatoms to such an audience; things of that sort are beyond its powers. But is it useless fer the lecturer or the science teacher on that account, who wishes to exhibit botanical or anatomical microscopic structures, such as that spoken of in my answer to Mr. Furnivel, where his microscope entirely fails, and the micro-structure there referred to is a very small part of what the instrument is capable of doing with "high-

power" objectives? If it cannot do everything, will Mr. Fletcher say what will do everything? Will his blowpipe melt refractory metals and other substances, the same as a furnace or the electric light will? And are such blowpipes to be therefore treated with contempt and abandoned on that account? His dicta about large projection on the screen is all nonsense, as even he must know visual angle is the first step in seeing. No eye can see that which is too small to produce a definite image on the retina. Hence large magnification has to be secured for all fine structure, and, if this is accompanied with sufficient light, it will be seen, but not without. He instances the blowfly's proboscis as a thing which shows as well three feet long as sixteen feet long. I say yes to those who know nothing of its structure beyond its pseudo-trachea but what of its muscles and a dozen other things which large magnification shows, and which the paltry "three feet" can never show to any one unless close to the screen?

In conclusion I would like to ask Mr. Fletcher who the authorities are whom I contradict when I say that a four-tenths objective with amplifier doubling its powers can be effectually used at from twenty to twenty-five feet from the screen, giving a magnification of from 1000 to 1300 diameters? I have always explained when I have used the words "higher powers" that the one inch, half-inch, or four-tenths, with amplifier were the objectives thus referred to; and, if authorities are against me on this point, then, so much worse, not for me, but for the authorities. The "lower powers," so called by me, are the two-inch and the one and a half inch, without amplifier, as any one knows who has read what I have written on this subject; and it is well known that we have been told in Manchester to absolute weariness, that these powers were the only ones that could be used to satisfaction on the screen. Mr. Fletcher, with all his success with Mr. Furnivel's microscope, is evidently governed by the same teaching. Hence his three-feet blowfly's tongue, which, if this is to be the standard of magnification for the other things, makes the lantern microscope indeed into a mere child's toy, showing nothing but structureless "shadows on the wall."

This answer to Mr. Fletcher was written for the *English Mechanic*, but I cannot spare time to write two answers because he has dropped in one several expressions used in the other letter.

This ends my part of this correspondence.—I am, yours, &c.,

36, *Melbourne-street, Broughton, Manchester.* W. Leach.

To the Editor.

Sir,—During the past two weeks I have been too much engaged to concern myself with the remarks of Mr. Furnivel. It is old ground to many of your readers, as it is to myself; and a good deal of what has been said has been prompted by feelings which may be read "between the lines."

In the selection of an instrument, I do not care a straw who invented it, or when. I do not associate with any clique, but use my own judgment, and base that upon *results*.

I certainly would not have entered into this controversy had it not been for the letter of Mr. Fletcher, in which he states that he has, with the assistance of "some experts," tried both Leach's and Furnivel's microscopes, and sums up in favour of the latter.

Now, I have good reason to know that Mr. Fletcher has *not* worked a Leach lantern microscope which has been supplied by me; and I happen to know something of things which were done before I had the handling of this instrument, but about which, for obvious reasons, I have very little to say. And, further, I have it, on Mr. Furnivel's own statement, that he has on several occasions been to give assistance and instruction to Mr. Fletcher in the manipulation and management of the lantern microscope; and, if Mr. Furnivel is one of the experts mentioned by Mr. Fletcher, why, to the unbiassed reader nothing further need be said. But perhaps Mr. Fletcher has also called in the assistance of some other gentlemen (experts) who certainly did purchase a Leach microscope—long before my connexion with it—and who admitted their inexperience and inability to use it. *Apropos*—I quote from my paper—"it is claimed that, by the Leach lantern microscope, all we have said can be done, though to say that anybody can do it perfectly on first trial would be as wild a statement as to say that any body who buys a camera and lens can at once produce beautiful photographs."

Relating to high powers, a table microscope is one thing, and a lantern microscope is another. I have never said anything about, or advocated a higher power than, the four-tenths inch, and I still maintain that this is a high power for a lantern microscope. Again I quote from my original paper, "It is not claimed for the lantern microscope that every object, however delicate, can be shown as perfectly as by the ordinary table microscope, or that photo-micrographs are henceforth unnecessay."

And now about the alum trough. I told Mr. Leach quite eighteen months ago that I did not believe the alum solution was necessary, as I had seen some most successful lantern microscope displays in America, where simply plain water was used instead of alum solution, and, in one case the demonstrator tinged the water very slightly with a dilute solution of sulphate of copper to cut off the yellow rays. Quite recently I have confirmed the statement that alum is unnecessary when a water trough is used, and, as everybody who has studied the polariscope will admit, something must be used to cut off the heat rays when using a Nicol prism (Furnivel's arrangement, good or bad, will not do at all in this case); and, seeing that the Leach lantern microscope is also to be used as a most perfect polariscope, I can see no objection to using the water trough in one case any more than the other, especially after Mr. Fletcher admitting that, by the Furnivel arrangement, there was sufficient heat to damage some slides if left for about two minutes.

In conclusion, I may say that, upon more than one occasion, Mr. Leach has invited Mr. Furnivel to a friendly competition, but this has always been declined.—I am, yours, &c., W. I. Chadwick.

Exchange Column.

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

Wanted, backgrounds and accessories in exchange for magic lantern, four and a half inch condensers.—Address, Bradshaw, Altrincham.

Will exchange 10×8 rapid rectilinear lens for six-inch condenser and limelight blowpipe. Approval each way.—Address, Smith & Co., Photographers, High-street, Yeadon, Yorks.

Griffith's quarter-plate hand camera with three double slides and finder. Will take in exchange plates or chemicals.—Address, E. Buckley, Photographer, Oldham.

Will exchange for studio accessories, four-inch condenser mounted, also cabinet rolling press, hot. card cameo press, and Lancaster 10×8 wide-angle lens.—Address, W., 106, Newport-street, Bolton.

I will exchange two landscape lenses, covering half and whole plates, also quarter-plate Lancaster's Instantograph set (complete), for half-plate camera and double slides, or the two lenses and interior background for backgrounds and studio accessories.—Address, Frederick D. Hurd, Shepton Mallet.

I will exchange quarter-plate tourist camera, three double slides, and rapid rectilinear lens, in leather case, by Watson, with Kennet's sliding tripod, for detective camera by same maker.—Address, W. Walker, Scotholme, Nottingham.

Answers to Correspondents.

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," *2, York-street, Covent Garden, London, W.C.*

Photograph Registered:—

G. P. Abraham, Keswick.—*Photograph of Hall Caine.*

Lux.—None that we are aware of in this country.

Zinco.—Messrs. Waterlow & Sons will supply all that you require.

H Loman.—You will see that we have complied with your request.

Semo.—A mere "storm in a teacup," which one or two are trying to raise to a tempest. The resignation of half a dozen or less members will never break up any healthy society.

Bella.—1. Try the effect of a dilute solution of cyanide of potassium. 2. A pint of silver solution would not be sufficient to cover the bottom of a dish to float a full-sized sheet of paper.

Perplexed.—You, as a professional photographer producing the prints, should be in a better position to form an opinion as to the cause of the spots than we on the meagre data supplied.

J. Faulkner, J. B., Fenian, Professional, and others.—The information you kindly send us with regard to the early history of gelatino-bromide photography is, and has been, known to us all along.

C. Grigg.—If the group were taken by an *employé* and registered in the name of the employer, there is no legal copyright in the picture. Would it, however, be to your credit to pirate a photograph published by a townsman who paid for its execution?

New Zealand.—You can gain admittance to the meetings of any of the London societies by sending your card in to the secretaries, in the event of your not knowing a member to introduce you. All English societies give a hearty welcome to Colonials.

H. Gardiner.—In working collotype, the Albion press, or one of similar type, is usually employed in this country. In Germany and on the Continent presses specially constructed for collotype printing are those generally used. Lithographic presses can be utilised, though they are not particularly well adapted for the work.

Bridport says:—"On page 783 this week's British Journal of Photography, our brother signing himself 'Printer' refers to the packing of bromide papers. If, when taking a sheet of paper from his envelope, he places his finger on the edge of the paper, he will find that the gelatine edge turns in a little towards the prepared side."

Guardian.—If the apprentice is not being taught the business, and is being kept merely to do the work of a junior assistant, you should take proceedings for the recovery of the premium paid and for damages. This was recently done, in the case of an apprentice to an electrical engineer, and damages recovered. That case seems about parallel with your own.

D. STEVENSON asks us to give him formulæ and brief instructions for working the wet-collodion process, which he wishes to employ for lantern slides.—The space at our disposal in this column is far too limited to give working details of processes. Any of the cheap manuals, published a dozen or so years ago, give full working details of the wet-collodion process.

A. W. S. (Leeds).—If a large number of copies are likely to be required, then a process block, which can be printed from in a typographic press, will be the cheapest. If, however, only one or two hundred copies are wanted, then collotype will have the advantage, Woodburytype is scarcely suited to that class of work, and photogravure would, we imagine, be far too costly.

W. KERSHAW writes:—"I have made a batch of emulsion, twenty-five ounces, just to see in how small a quantity of water it could be washed. The three plates sent herewith are from the same emulsion. The quantity of distilled water used to make emulsion and wash the same is 130 ounces, and is all the water used. The emulsion was boiled. I shall be pleased to know your opinion."—The plates were readily developed into strong, bright negatives.

GLATSTONE writes: "Is it necessary to the validity of registration for the photographer to have the written or oral consent of the person photographed, where the person has paid no consideration for sitting, but sat to the request of photographer? 2. If a photograph is registered after copies have been issued, does the registration protect the previous copies (to registration), as well as the copies after registration, from being reproduced by other persons than the owner?"—1. It is not necessary, but it is always desirable. 2. This is rather a vexed point. We have an idea that, some years ago, a case was decided that it did. It must be borne in mind that the copyright is vested in the author of the work—*i.e.*, the original negative.

T. MILLER says: "I beg to call your attention to page 662 in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. There is an article by George W. Valentine, entitled 'An Efficient Hand Camera,' with drawings and descriptions, which said drawings and descriptions are, to all intents and purposes, an exact description of the Adelphi hand camera. I notice Mr. Valentine makes no claim to any part to what he is kind enough to describe as an efficient hand camera, and is perhaps in ignorance that it is a patent. I would, therefore, be obliged if you will furnish me with his address, so that I may acquaint him with the fact, as, in common fairness, I must protect myself."—Perhaps Mr. Valentine will take note of our correspondent's request.

X X. X. asks what is the proper strength for the fixing bath for ordinary silver prints and the proper length of time of immersion. He says different writers on the subject give from one to five ounces of hyposulphite of soda to the pint of water, and the time of immersion from seven or eight minutes to twenty minutes.—The best strength to use is a quarter of a pound of hypo to each pint of water. When a good quantity of solution, in proportion to the prints to be fixed, is used, and the pictures are kept in motion while the are in the bath, a quarter of an hour to twenty minutes will be long enough. One of the principal causes of fading is imperfect fixation—too weak a bath, or too short an immersion. When a comparatively large number of prints are put into a small quantity of solution, they should be treated with a fresh solution of hyposulphite before washing.

F WILCOCKSON writes: Is there any way of taking stains out of some white-paper mounts without injury to the mounts? I have some which were sent to me by rail, and six out of eight are damaged in a similar way. The parcel must have been stood up on edge in a small puddle of water, and there is on each mount a yellowish mark of about five inches by three and a half inches, bordered by a darker line of irregular shape, like a map. I have advised to try a solution of chloride of lime, also muriatic acid. I should be very glad to receive an answer in your next. The mounts are of a very large size, and as they are in the style of plate-paper, with the sunk plate-mark, and the photographs mounted on India tint-paper, it would alter their character to cover them with a cut-out mount.—The stains may be removed by treating them with a solution of chloride of lime, or with Holmes's "ozone bleach."

NORTH LONDON PHOTOGRAPHIC SOCIETY, Wellington Hall, Islington.—December 15, 1891, *Carbon Printing*, by the Secretary (Mr. W. Bishop). Visitors are invited. Commence at quarter-past eight p.m.

MR. A. S. NEWMAN and Mr. J. Guardia have entered into partnership at 71, Farringdon-road for the manufacture of cameras, shutters, &c., under the well-known Newman patents, the exclusive rights for which they hold, and they hope shortly to announce several important novelties. We wish the young firm every success.

PEOPLE'S PALACE PHOTOGRAPHIC CLUB.—Arrangements for winter session, 1891-92:—December 18, *Experiments in Exposure*, Mr. R. Edwards. 1892: January 8, Exhibition of Members' Prints and Slides; 22, *Quality of the Negative as affecting the Tone of Resulting Silver Print.* February 5, Lantern Night; 19, Hand-camera Pictures. March 4, *Hand Cameras;* 18, Lantern Night. April 1, *Touching up Negatives and Prints*, Mr. R. Beckett; 15, Demonstration, Mr. J. Howson.

THE Committee of the Amsterdam Photographic Exhibition write, in reference to a recent "Continental Note," to say that all pictures sent in time were hung in the "most admired order." Only one exhibit, which came a week late, could not be hung, as all the wall space was occupied. We are happy to give publicity to the Committee's denial. Our information was derived from the notes of a correspondent who visited the Exhibition as soon as it was opened

EALING PHOTOGRAPHIC SOCIETY'S CONVERSAZIONE.—The first conversazione in connexion with the Ealing Photographic Society was held at the Municipal Buildings on Thursday evening, December 3. Dr. Common, one of the Vice-Presidents of the Society, kindly lent a series of astronomical photographs, and the interest of the exhibition was further enhanced by the permanent autotype photographs, lent by the Autotype Company, and the exhibits lent by the Platinotype Company, and by Mr. George Davison and Mr. J. B. Wollaston. Although, as we have said, photographs of Ealing scenery were scarce, considerable attention was devoted to one by Mr. Taylor, illustrative of the "village" as it was, and representing the fair formerly held on the Green. Messrs. Mawson & Swan had on view a number of their improved apparatus, including the reflex camera, cantilever enlarging apparatus, magnesium flash lamp, and others. During the evening a series of lantern exhibitions was given, the optical lantern being worked in a highly satisfactory manner by Mr. Simpson and Mr. C. N. Peal. The views derived an added interest from the fact that they were those of photographs by the members. The first were some by Mr. C. Whiting, which gained the prize in the recent competition of the Society, and included Savernake Forest, Torquay, and Portland. They were followed by a series by Mr. Thomas Crisp, which comprised Kew Gardens, Perivale, and points on the Brent. A second exhibition was devoted to a series of photographs illustrative of Shakespeare's early life, taken by Mr. Whiting. These included Stratford-on-Avon, as seen from the Memorial Theatre; aspects of the exterior and interior of Shakespeare's house, showing the parlour, birth-room, and wool-spinning; the Shakesperian Museum; Grammar School, Ann Hathway's house, and an excellent reproduction of the original portrait of Shakespeare, the only one painted during his lifetime; several scenes of Holy Trinity Church, and others.

LEEDS PHOTOGRAPHIC EXHIBITION.—AWARDS.—*Open to Professionals Only:* Class 1, Portraits, whole-plate and over, W. M. Warneuke, silver medal; W. W. Winter, bronze. Class 2, Portraits, under whole-plate, Harold Baker, silver; Jno. E. Shaw, bronze. Class 3, Enlargement Portraits, H. Van der Weyde, silver; Alexander Bros., bronze. Class 4, Enlargement, other than portraits, F. W. Edwards, bronze. *Open to Amateurs Only:* Class 5, Portrait set, Clarence B. Moore, bronze medal. Class 6, Portraits, under whole-plate, W. J. Jenkins, bronze. Class 7, Portrait arrangement, S. H. Barton, bronze. Class 8, Enlargement, other than portrait, J. W. Wade, silver. *Open to Professionals and Amateurs:* Class 9, Landscape, whole-plate and over, John E. Austin, silver medal; J. E. Gibson, bronze; F. M. Sutcliffe, bronze; W. C. Beetham (two pictures), special silver. Class 10, Landscape, under whole-plate, Karl Greger, silver; P. Ennis, bronze. Class 11, Marine and Clouds, F. M. Sutcliffe, silver; A. R. Dresser, bronze. Class 12, Animal Studies, Karl Greger, silver; Jean Halle, bronze. Class 13, Outdoor Groups, Karl Greger, silver; F. M. Sutcliffe, bronze. Class 14, Architectural Interior and Exterior (whole-plate and over), F. W. Edwards, silver; C. Court Cole, bronze. Class 15, Architecture, Interior and Exterior (under whole-plate), Wm. Denham, bronze. Class 17, Flashlight, John Stuart, silver. Class 18, Instantaneous, General Subjects, Lyddell Sawyer, bronze. Class 19, Instantaneous, Yachts in Motion, Sweet & Kinlock, bronze; W. C. Beetham, bronze. Class 20, Instantaneous (Sea and Marine), W. D. Welford, bronze; J. M. Nicholson, bronze; Percy Lewis, bronze. Class 21, Instantaneous, other than Seaside and Marine, Major Lysaght, bronze. Class 22, *Genre*, C. Smerdon Roe, silver; Lyddell Sawyer, bronze; Adam Diston, bronze. Class 23, Microscopic, R. Kidston, bronze. Class 25, Scientific, Cecil V. Shadbolt, bronze. Class 26, Transparencies, F. W. Edwards, silver; J. W. Wade, bronze. Class 27, Lantern Slides (amateur), J. E. Austin, silver; W. Taverner, bronze; B. G. Wilkinson, bronze. Lantern Slides (professional), G. West & Sons, silver; G. E. Thompson, bronze. *Photo-mechanical.*—Class 28, Photogravure, line subjects, W. L. Colls, bronze medal. Class 29, Photogravure, half-line subjects, the Autotype Company, silver; T. & R. Anuan & Sons, bronze. Class 31, Type-high process, R. Gardner & Co., silver. Class 34, Woodburytype, Waterlow & Sons (Limited), bronze; S. B. Bolas & Co., bronze. Class 37, Photo-chromograph, Waterlow & Sons (Limited), silver; Photochrome Engraving Company, bronze. *Champion Class.*—William Crooke, gold medal; special gold medal to H Van der Weyde, for the Misses Dene; special silver medal to Prince Ruffo, for two heads; special commendation to the Leeds Photographic Society for lantern-slide exhibits. In addition to the medals offered by the Fine Art Gallery Committee, the Committee of the Leeds Photographic Society offered special medals for competition among its own members, which have been awarded as follows:—Awards: Lantern Slides, Godfrey Biugley, bronze medal; Herbert Denison, bronze. Landscape—Set, Godfrey Bingley, bronze; Beddgelert, Godfrey Bingley, silver. Figure, William Wright, bronze. Architecture, William Denham, bronze. Instantaneous, A. A. Pearson, bronze. Enlargements, S. A. Warburton, bronze. Special bronze medal to C. E. Spencer for Portraits. The awards were signed by the following judges:—A. Pringle, V. Blanchard, J. Gale, W. England, and F. P. Cembrano.

*** We have again, on account of a very great pressure upon our space, to omit several interesting letters and articles, including one by Mr. William Brooks, on the recent gas explosion at Ilkeston.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1650. Vol. XXXVIII.—DECEMBER 18, 1891.

THE TELEO-PHOTO LENS.

On Thursday evening, last week, the members of the Camera Club were privileged to see and hear an account of the new teleo-photo lens of Mr. T. R. Dallmeyer, and by the agency of cameras of approximate length, placed side by side, one being fitted with the ordinary and the other with the new lens, one had an opportunity of observing how very much larger an image of a gas flame was produced by the latter than by the former.

Without anticipating the publication of Mr. Dallmeyer's paper, which will be in due course, we may say that the objective is essentially the Galilean telescope, with its lenses corrected for photography, a class of lens we many years ago expressed a desire to see introduced.

The objective in question has a plano-convex achromatised front, and a double concave at the eyepiece end of the arrangement, this being corrected by being composed of three lenses cemented in contact. We may probably have more to say on this subject when the paper is published, especially as we have already pointed out that such an objective would be useful for many purposes.

NEGATIVES FOR ENLARGING.

Now that enlarging has become so popular a branch of photographic practice, an increased importance attaches to the quality of the negatives produced in order to obtain the best results. It is a generally accepted fact that a thin negative is the most suitable for the purpose, though even lack of density is not the sole requirement, for it must be accompanied by a true gradation of light and shade. The proper kind of image is that in which the shadows are clean and free from veil, though possessing the delicate shading that just distinguishes them from absolutely clear glass, the half-tones increasing gradually in density until the highest lights are reached; and these, while possessing adequate force to give them printing value, should be sufficiently transparent to allow every detail to be clearly visible.

Every portion of the picture should possess a proportionate value, the thin, flat images resulting from over-exposure or under-development being as unsuitable for the production of first-class results as those that are hard and wanting in gradation from opposite causes. While it is quite true that many negatives that are too thin to print even moderately well in silver, or especially platinum, will give good results when enlarged upon bromide paper, it by no means follows that a perfect negative for enlarging is useless for other purposes. Quite the contrary is the case, for the images which will bear amplification best and give the most perfect results will always answer equally well for silver and other methods of printing, even in most instances for platinotype, which requires a special character of negative.

Professional photographers, as a rule, make their negatives with the more immediate view of direct printing, seldom being called upon to take a picture for the sole purpose of being enlarged. If an order for an enlargement is received, they have to make the best of the negative as it stands, or, as is most frequently the case, leave it to the specialist, who makes a business of that class of work. The shortcomings of the negative are then made up in "finishing" the picture; and how much can be done in that way is plainly demonstrated by a comparison of the untouched print and the finished work.

The amateur, however, occupies a different position in these days of hand cameras, for, if he goes in for enlarging at all, it may be said that all his negatives are taken for that purpose. Setting on one side altogether "snap-shot" pictures, which seldom possess the technical qualities required in a negative for enlarging, there are many amateurs who carry a "hand," or quarter-plate camera, simply on account of the convenience of its small size and weight, and trust to the subsequent operation of amplification, where the quality of the result merits the trouble. At the same time, the small direct prints are useful for scrap-book purposes, or for giving away, and the negative must therefore be suitable for both applications; and here, fortunately, the circumstances surrounding the small negative are eminently favourable.

When properly used—whether for landscape, portraiture, or even instantaneous exposures—the small camera is capable of producing results which, when enlarged, are quite equal to, and in some cases surpass, pictures taken direct of the same dimensions. But this necessitates the employment of the stand and careful focussing. Pictures of the ordinary "snap-shot" class are seldom in perfect focus, and too often exhibit a slight blur from unsteadiness of the instrument; and though, if the subject has been happily chosen, they may pass muster as direct prints, they are totally unfitted for enlargement. The operator, however, who uses the stand and focussing glass is able to produce as technically perfect a negative with a quarter-plate hand camera as if it were a larger size, and the optical qualities of the short-focussed lens render it peculiarly suitable for the production of images for enlargement. Why, then, should not equal care and attention be devoted to the development of the picture, in order to enhance, if possible, the quality of the final result?

The question is, What are the steps to be taken to secure a negative of the quality we have sketched, either suitable for direct printing or for enlargement? The work of selection and focussing having been duly attended to, the first important point is the exposure. Here there must be no trusting to

"latitude" and elasticity of development, but the time must be calculated as closely as the judgment permits. Carelessness in exposure and "dodging" in development inevitably lead to a loss of some of the qualities required; the image is over-dense or the reverse, or is wanting in gradation, and, though it may, with careful printing, make a passable direct picture, will only produce a third-rate enlargement. Let the first care, then, be in the accurate timing of the exposure.

Then we come to development, and here there is certainly plenty of choice of methods, both as regards materials and the way of applying them. Since the introduction of sulphite of soda in conjunction with pyro, and, later, of hydroquinone and eikonogen, the production of clear, stainless, and pretty-looking negatives has become an easy task. Ferrous oxalate, too, gives clean, delicate-looking images of the so-called "wet-plate" character, clean glass shadows, and greyish-black deposit; but mere prettiness is not what is wanted. On the contrary, such negatives are very often the reverse, in use, of what their appearance promises.

Ferrous oxalate, especially, is a disappointing developer. The deposit, though admirable in colour, is of an opaque nature, and, delicate and soft as the gradations may appear to the eye, the result in the printing frame is often anything but satisfactory. For enlarging purposes the want of transparency of the image forbids the use of this developer when others are available, a thin and apparently harmonious negative often resulting in quite a hard print. It is not implied that iron-developed images will *never* enlarge satisfactorily, but that, other things being equal, a better result is obtained with greater ease and certainty by other means.

Pyro, our oldest friend, remains yet, perhaps, the most capable, but requires to be used with care and judgment. For the purpose in view it is almost essential that it be employed in conjunction with sodium sulphite, the slight yellowness almost inseparable from films developed without that addition detracting greatly from the delicacy of the gradations of the image when submitted to enlargement. This is particularly the case in the higher lights, where the slight tinge of colour prevents the "picking out" of the finest details. In resorting to the use of sulphite, however, care must be taken not to go to the opposite extreme, and, by rendering the shadows too clean, robbing them of their finer details in the positive, and producing heaviness. There is, too, we think, a decided preference to be given to ammonia as the alkali, carbonate of soda tending rather to the production of clear glass shadows and feebleness of detail.

Hydroquinone, unless very carefully used, shows an inclination in the same direction, and its capacity for giving density, combined with its remarkable cleanness in working, render it difficult to avoid excessive contrast. When used, the quantity should not be more than one grain to the ounce, and the proportion of sulphite should also be kept at the minimum. Caustic soda yields softer and more harmonious images than the carbonate, but it is difficult in cases of slight error in exposure to control the density. On the whole, hydroquinone is inferior to pyro.

Eikonogen, given a well-chosen exposure, is the ideal developer for our present purpose; but there lies the difficulty. Under-exposure leads to excessive contrast, and a very slight over-exposure makes it almost impossible to get density of any sort without losing gradation. The quality of the image resulting from a correct exposure is, however, all that could be wished—clearness, delicacy of gradation, and a transparent vigour that allows the finest details to be seen in the highest lights. Dr. Andressen's formula, given in the ALMANAC, may be followed, or, if any variation be made, it may be diluted one-third with water.

In order to utilise the good qualities of eikonogen, and, at the same time, deprive it of its *exigeant* character in the matter of accuracy of exposure, it may with advantage be used in conjunction with hydroquinone. Indeed, for general use in the production of negatives for enlargement, we are inclined to think this makes the best developer of any. The hydroquinone counteracts the tendency to flatness from over-exposure, and, at the same time, a slight increase in the proportions of eikonogen gives additional energy under opposite conditions. The proportions we have found most generally useful are: eikonogen, four grains; hydroquinone, two grains; and sulphite of soda, four grains to each ounce of water, mixed in equal parts with a solution of twelve grains of carbonate and twenty of sulphite of soda to the ounce.

EMULSION-MAKING WITH SIMPLE APPLIANCES.

THE recent publication of Mr. A. L. Henderson's new process of gelatine emulsion-making has aroused a desire on the part of many of our amateur readers to attempt the manufacture of their own plates; but there appears to be a widespread feeling, judging from correspondence, that the apparatus, appliances, and dark-room arrangements are of such an elaborate and costly nature as to place it beyond the capabilities of the ordinary amateur.

It is quite true that, for the systematic production of plates regularly, on a large or moderately large scale, a well-equipped laboratory, with special apparatus and fitting, is almost a necessity; but, for the occasional preparation of a few ounces of emulsion, there is scarcely any need for special arrangements or for apparatus that is not to be found in every photographic workroom, or that cannot be obtained at the cost of a shilling or two. The method described by Mr. Henderson is one that is particularly well suited to the requirements of an amateur not possessed of an extensive laboratory outfit, and we propose in the present article to show how it can be worked in any ordinary dark room, or wherever a ruby lantern is available.

We need not here recapitulate the formula or the method in full, but will simply describe how the various operations can be performed with the greatest comfort and the simplest means, referring back to the account of the demonstration for complete details.

The first operation—the precipitation of the silver in the form of carbonate—may be conducted by ordinary gas or lamp-light, though it is perhaps as well not to indulge in too powerful a light, or too much of it of any sort. However, it may be carried out in an ordinary room if the silver salt is protected, as far as possible, from direct light. For the purpose will be required, first of all, a small jug or other lipped vessel, from which the water can be readily drained off the precipitated carbonate without loss of the latter. The most suitable vessel of any would be a conical-shaped precipitating flask or breaker of thin glass, of which the bottom is of wider diameter than the neck or mouth, so that the precipitate falls clear of the sides. These cost only a few pence; but, failing them, a jug will answer every requirement.

The gelatine may be softened in any convenient vessel, shape and size being quite immaterial. The silver having been

ecipitated and the gelatine swelled, the dark room becomes ›cessary, and also a "cooking" or digesting arrangement. nlike what is known as the "boiling process," the new method quires only a low temperature, and therefore no gas jet or her source of heat, with the concomitant trouble of striking f the light from the emulsion, is required. Still, for nvenience sake, it is advisable to provide means for pro-cting the sensitive preparation during the period of cooking. or this purpose nothing is handier than a cyndrical tin boiler ith lid, which, if not obtainable from the kitchen of suitable ze, may be purchased for a few pence; one holding a gallon sts about a shilling.

The boiler being provided, next cut out of a piece of stout al board a circle large enough to drop easily into the boiler, aving a space of, say, half an inch all round; and in the ntre of this cut an aperture of such size as to roughly fit, hen packed with paper or rag, a glazed earthenware jar or m-pot, or, if preferred, a wide-mouthed bottle. Fit the jar or ottle into its wooden collar, so that, when dropped into the oiler in a sufficient depth of water, the arrangement will float ith the major portion of the vessel immersed in the water.

Half fill the boiler with water of the proper temperature, nd, having transferred the precipitated carbonate and the ftened gelatine to the jar, immerse the latter in the boiler, nd stir well until the gelatine is thoroughly liquified and ncorporated with the silver salt, continuing until the latter mulsifies smoothly without granularity. When this occurs, hrow in the bromide of potassium in crystals, and resume tirring until it is dissolved, when the lid must be put on the oiler and the emulsion left for its period of digestion. The tem-erature can be kept up by occasional additions of boiling water, r by suspending the boiler over a spirit lamp or small gas-jet.

When the period of coating is expired, pour off the hot ater and replace it with cold, and again leave the emulsion essel floating until the gelatine has set quite firmly. Then, ith a silver fork, break it up into as small and *uniform* ieces as possible, and scrape the whole out into a piece of nuslin or cambric, and tie up loosely, so that, while the articles cannot escape, the water may have as free access as ossible during washing. Suspend this bag in the boiler, hich should be nearly filled with distilled or boiled and ltered rain water, avoiding as far as possible contact with the netal, replace the lid, and leave it to soak. The water should e changed every one or two hours, until, upon squeezing the ag, it comes away showing no trace of either alkali or bromide pon the application of suitable tests. At each changing of the ater, the bag of emulsion should be kneaded with the fingers or a few moments, and then, wring as dry as possible, the neading being repeated upon putting it into the fresh water.

If, when the emulsion has been freed from soluble salts, it is ound that the gelatine has absorbed too much water, as shown y increase of bulk, wring it as dry as possible, and leave it uspended in the empty boiler for a few hours, repeating the queezing at occasional intervals. If that do not suffice to re-luce it to its proper bulk, the jelly may be returned to the am-pot and covered with methylated spirit, which will rapidly xtract the excess of water, and reduce it to its original bulk. Then pour off the alcohol, and rinse once or twice with water o remove as much as possible of what remains clinging to the elly, and, after a final squeeze, the emulsion is ready for re-melting.

This is done by immersing the jar as before in warm water, nd when thoroughly liquid it should be well stirred and filtered through the cambric into another jar or basin, whence it is transferred to a suitable wide-mouthed bottle for use. If it has been soaked in alcohol, as described, it is most probable that sufficient will remain to make it flow readily; but, if it should show any inclination to flow badly, a little alcohol, about five per cent. of its volume, should be added.

COPYING POSITIVES.

THERE are few photographers who are not called upon, at one time or another, to make a picture out of some poor, faded, but valued, old photograph—positive on glass, Daguerreotype, or paper print of the older photography. Too often the commission is shelved; more frequently it is sent away to the professional enlarger. We would like to say that, if properly taken in hand, no difficulty whatever need attend the operation, and the results attainable are sometimes surprisingly good. The first trouble to meet the photographer would be that connected with apparatus; but here a little thought and a very little help from the cabinet-maker will smooth the way. Most photographers have, at least, one large and one small camera. If the larger one be supplied with an extra movable front, an extra flange for a small portrait lens will be all the additional apparatus needed—an old *carte* lens, the shorter the focus the better, will answer most purposes—and where, as is commonly the case, the head alone is required to be reproduced, the lens can with satisfaction be used with the full aperture. The point to bear in mind is, that, to copy a picture the same size as the original, the camera will need to be extended till lens and ground glass are twice as far apart as the equivalent focus of the lens. Many who are not accustomed to the work, and are unfamiliar with the relative powers of lenses, are, as we have had constant proof, ignorant of this most elementary fact, and, when their largest lens will not focus, give up the attempt to copy, when, by using their shortest-focus lens, they could do all that was needed. Similarly, when enlarging, the extension has to be increased one length of the focus for each one length of the picture. Here we admit that even a very good extensible camera will soon arrive at its limits; but a loose box-front, to fit into the grooves of the ordinary front, need not be at all a costly addition, and could be made to receive the loose front that carries the extra flange for the small lens. If, however, this should be considered a cost not justified by the work in hand, or likely to be received, no difficulty need be experienced.

One of the best enlargements we have seen of this kind was made by a professional photographer without any extra apparatus of any kind. He had to make an enlargement—a head and bust vignette—from a small glass picture, the head of which was only a quarter of an inch long, while the enlargement was required three inches, that is, twelve diameters. His old *carte* lens was one of seven inches focus, hence the distance between lens and ground glass required to be about two yards and a half—rather long for an ordinary studio camera. The way he managed was to take the front out of the camera (which, fortunately, then had a very wide aperture) and place it at one end of a long work bench. Next he took his smaller camera, and, with the *carte* lens in position and the focussing screen removed, placed it in front of the larger one on the same bench, so that the lens was the required distance from the large focussing screen. He elevated the small camera by books till the lens was opposite the centre of the plate, and, the

camera being square, it was quite easy to make them in line. Two broomsticks, one on each side, were supported on some more books, and the whole space between the cameras was carefully covered with two old shawls, so arranged as not to permit any light to enter into the large camera. He found it desirable to have some one to assist him in focussing, for an excessively minute alteration of the distance between lens and picture would necessitate great variations in the distance of the focussing screen. For this work a camera focussing at the back is needful, and, with an assistant to move the picture to and fro, as instructed, the focussing was accomplished with no great difficulty. Naturally a long exposure was required, and the gentleman we allude to, using wet plates, said his only difficulty was to keep the plate from drying. It is, however, obvious that a dry plate would obviate any difficulty on this score. The negative obtained as above was seen by us, and we do not hesitate to say that, with the glass positive in our hands, we should, had we not actually seen the reproduction, have said that it would be impossible to make a good enlargement from it.

We have said that an old *carte* lens will answer most purposes, the class of work where it would be likely to fail being photographs full of detail to the edge, and requiring complete sharpness all over. For this kind of work it will be necessary to have a lens of the rectilinear type, which will give sharpness all over; but in writing these articles we have more particularly in view portrait work. It will be understood that, in enlarging, the new negative is the optical counterpart of the subject under ordinary conditions of use; hence the actual size of the picture required has nothing to do with the size of the picture the lens was originally designed for. This is a very elementary fact, yet we know it is not understood as it ought to be. A small quarter-plate, or a *carte* lens, is quite capable, till sharpness begins to get lost, of taking negatives two, or three, or more feet in diameter. We therefore lay no stress whatever upon optical requirements, merely premising that a diaphragm must be used till the required amount of sharpness is obtained. The next step, therefore, is to consider the arrangement of the picture for copying, and the method of arranging it to best advantage for the purpose, and this we will treat of in a further article.

Whenever a lantern accident occurs, a great deal of alarm is perhaps naturally, disseminated; but no excuse can be found for the absurd and unreasonable exaggeration which is its invariable accompaniment. In his paper on *Gas Bottles and their Safety*, read before the London and Provincial Association the other night, our genial friend, Mr. F. A. Bridge, is justly severe on those ill-advised people whose readiness to jump at false conclusions is only equalled by their lack of appreciation of the mischief which their ill-considered anxiety to rush into print on the smallest provocation is likely to cause. In this case an entirely erroneous and exaggerated account of the accident, in which Mr. Bridge played a part, was supplied to a contemporary by somebody, who we hope will profit by Mr. Bridge's rebuke in the future. At least one outcome of this accident will, we suppose, be an extensive disuse of gauges of the Bourdon type, which, as we inferred last week, are of no real necessity when using compressed oxygen in cylinders.

From the *Camera Club Journal* we learn that Mr. Lyonel Clark has accepted the post of examiner in photography to the City and Guilds of London Institute, a position hitherto held by Captain Abney. The *Journal* also contains an autobiographical sketch of Mr. Ralph Robinson, from which we learn that Mr. Robinson's father insisted on his learning to draw in his early days. Mr. Robinson, jun., admits that he took far more kindly to a pursuit frequently thought to be destructive of art, namely, science, and, more particularly, chemistry. He passed some time in one of the largest centres chemical work—Widnes. Mr. Ralph Robinson seems to have be glad to leave this dismal, if flourishing, place for the purs of what he calls the "hereditary sin"—photography—a step fr which the art, as well as himself, has been the gainer.

We bespeak attention to the letter of Mr. J. Spiller, the Treasu of the Photographers' Benevolent Association, which we print el where. Mr. Spiller mentions that, in response to private appeals, has received several contributions during the last and present mont but probably some intending donors are among those who have n replied. We are happy to second Mr. Spiller's appeal for all ou standing subscriptions, inasmuch as the accounts must soon be clos for audit. At the same time we may direct the attention of o readers interested in the Benevolent Association (and which of the is not?) to a most able appeal by Mr. George Mason on behalf of t Association in the Almanac for 1892.

Much interest centres in Amstutz' system of transmitting phot graphs by means of electricity, of which the following is a bri description. A relief positive on bichromated gelatine is taken in t usual way, over which a stylus is made to travel, just as in a phon graph it passes over the wax cylinder. In this case it rises and fa according to the relief, and, by means of a multiplying lever, is ma to depress a number of keys, by which an electric current is admitt into the line. The number of keys thus closed is in proportion to t rise and fall of the stylus, and so the strength of current in the line varied according to the intensity of light and shade in the desig It is then sent throught an electro-magnet bearing on a graving too which travels over a surface of wax in a path corresponding to th traced by the stylus on the gelatine film. The result is a copy of th relief in the latter, which can be reproduced as a printing surfa by stereotypy. Quite recognisable portraits have thus been tran mitted over twenty miles of wire to different stations. Furth developments of this ingenious process will be awaited with kee interest.

The following is a list of the subscriptions to the Maddox Fun received or promised up to December 14th:—The Britannia Worl Co., 100*l.*; J. Carbutt, 50*l.*; Camera Club list, 27*l.* 16*s.*; R. W Thomas & Co., 25*l.*; The Proprietors of The British Journal o Photography, 10*l.* 10*s.*; The Autotype Co., 10*l.*; Nelson, Dale ar Co., 10*l.* 10*s.*; *Photography*, 10*l.* 10*s.*; J. W. Swan, 5*l.*; F. York, 5*l* A. L. Henderson, 5*l.*; N. Bannatyne, 5*l.*; M. Whiting, 5*l.* 5*s.*; W. Chadwick, 1*l.* 1*s.*; J. B. B. Wellington, 1*l.* 1*s.*; F. Beasley, 1*l.* 1*s* C. Dawson, 1*l.* 1*s.*; Colonel Durnford, 3*l.*; H. Bedford, 2*l.*; H. M Hastings, 1*l.* 1*s.*; Manchester Amateur Photographic Society, 1*l.* 1*s.* H. J. Channon, 2*l.*; F. Hollyer, 1*l.* 1*s.*; R. N. E. College (Devonport Amateur Photographic Society, 10*s.*; West Kent Amateur Phot graphic Society, 1*l.* 6*s.*; F. Lloyd, 5*s.* Per the Editor of The British Journal of Photography:—R. W. T. (Exeter), 2*l.*; F. Sharp, 2*l.*

The foregoing list is probably incomplete, as we believe there a several amounts promised not included, while some of the societi who have commenced the collection of subscriptions do not figure i it. The fund, we are glad to say, is being most energetically take up in America, and we have no doubt that a large sum will be collecte there. The Continental photographic press is also exhibiting gratifying amount of energy in the matter.

It will be remembered that some few weeks ago we directed attentio to the fact that, in the classification of exhibits for the Chicago Exh bition, no provision has been made for photogra phs. We are happ to observe, and we are sure that the photographic world will be glad t know, from a letter on the subject sent us by Sir H. Trueman Woo that the classification has been revised, and that photographs are t have a place in the group devoted to "Instruments of Precisio Experiment, Research, and Photography." The action of Si Henry in the matter entitles him to the thanks of all interested i the due recognition of photography at the Chicago Exhibition.

By the courtesy of the Assistant Secretary of the Photographic Society of Great Britain, we have received an official report of the last meeting of the Society, apparently corrected by the various speakers. There is little, if any, material difference between this and our own report of the proceedings, which we gave in the last number of the JOURNAL. We, however, entirely applaud the action of the Society in taking this course, in order that an opportunity may be given for verifying or correcting the accounts of the recent events in connexion with the exhibition that have appeared in our columns or in those of our contemporaries. Happily, on our part, there is no need for any such verification or correction.

On Wednesday last we were present at the works of the Incandescent Gas Light Company, Westminster, and heard a lecture by Mr. J. Moeller, General Manager of the Company, on the improvements lately effected in the incandescent light. We must defer till next week any account of it, but may say in the meantime that since we last wrote concerning it (three years ago) a very great improvement has been effected, both in the application of the light to domestic purposes, and also, in a special degree, to the lantern.

THE LIMELIGHT.

The sad calamity that has recently occurred at Ilkeston has somewhat upset the general public, which is not to be wondered at. I have had many years' experience with the lantern on the largest scale in some of the public halls in the country, and I am thankful to say that I have never had the slightest hitch in working. I have always made it a practice at every chance to go and see others manipulate, and I must say that most of it is done in the most slipshod and careless manner imaginable. I have often wondered that we have not heard of far more accidents. I remember, some years since, I was at a public institution where a lantern exhibition was being given. It was being carried on in a most reckless manner. I should not have been surprised at a fearful explosion if the operator had been allowed to continue. Being an officer of the society, I at once took it upon myself to stop the operator, and would not let him go on until he complied with my conditions, which he at once did. His reply was that he had always worked in the same way, and that it was all right. This is only one instance of dangerous manipulation; I have seen many others.

In this late accident Mr. Scattergood, the operator, had the reputation of being a very careful man and well up to his work, and I do not wish to suggest anything to the contrary. I have carefully read all the information that has been published in the photographic journals, and there still appears to be a mystery overhanging the matter. I myself have often been blamed for being over-careful and too cautious, but I could never see it. I have made exhaustive experiments with bags and cylinders; both have their advantages and disadvantages. We have yet to learn still more about cylinders. I think it was rather premature for some one to say that bags were more dangerous than cylinders. There are one or two points in using bags that I have never seen touched upon in the journals; one is the dissolver, and I think a great hidden danger exists here; nearly all lanterns are fitted with the so-called star dissolver, which is nothing more nor less than a six-way cock, viz., with two inlets and four outlets. Almost all biunial lanterns are fitted with it. If we carefully examine one of these dissolvers and take out the plug, we find in the barrel six port-holes, and not very far apart, and on the plug will be found two deeply cut grooves, and when in position in the barrel there is scarcely an eighth of an inch between one gas and the other. However tightly and accurately the plug may be ground in when new, the oxygen will soon make it leaky and not gas-tight. Many times have I had to regrind mine in with the finest emery powder, but after a few times it soon gave out again, and at last I was obliged to have a dissolver made on entirely different lines.

When this star-pattern dissolver commences to leak, it means nothing more nor less than the *mixing* of the two gases, and, under such conditions, it is quite possible for an explosion to be caused. I will now relate how I have seen many operators work. The lantern is placed in its proper position, and the bags also in position one on top of the other, in the double-pressure boards as usual, and all connexions made with the inlet tubes of the lantern. The hydrogen is first turned on and lighted for some few minutes to warm the lantern and condensers, and then the centering of the light is gone through in the usual way. All this appears to have been done in the Ilkeston affair, as I read (I presume it had been done before the audience were admitted). The explosion seems to have occurred on the commencement of the exhibition with the turning up of the jets. Now, this is just the point where I wish to call attention. After the centering of the lights, I have often noticed that many operators never turn off the oxygen cock at the bag, having faith that all the other fittings are gas-tight. This, I think, a great mistake. The by-pass of the hydrogen is left burning usually about the size of the flame of a candle, and, if the dissolver is not gas-tight, the by-pass flame will soon not be half the size, owing to a slight leak of oxygen. I have seen this several times, and not only seen it, but have gone home and verified it for my own satisfaction, and, if the dissolver is very unsound, it causes on dissolving the firing of the burner—that is, as soon as dissolving is attempted, the flame passes back into the mixing chamber of the mixed jet and burns within, and the burner soon becomes intensely hot, and, on attempting to turn up again, a fearful hissing and spluttering take place, and nothing short of turning off the jet taps will put it out, and the noise will disturb any audience. I have seen this take place many times during an exhibition. The cause is in the dissolver not shutting off, owing to leakage, and sometimes the flame will pass back and blow off the pipes at the jets with the report as of a pistol. I see there is mention of this kind of report before the explosion.

The experiments I mentioned that I made some years since were by leaving both the cocks fully turned on, and having the weights on the bags, which meant the gases were being pressed on to the plug of the dissolver, and I found, in five minutes only, the gases had diffused and mixed themselves, and the result was an explosive mixture in the tubes and fittings; and, on turning up, the pistol shot was heard, and could be repeated, accompanied with the blowing off of the pipes. This is as far as I thought I dared go; but I still went further, allowing about half an hour to elapse. This time I put out the by-pass lights, as I knew it would be dangerous; I then disconnected the pipes from the cocks of the bags, and fired the pipes leading to lantern inlets and jets, and both were found to be fully charged with an explosive mixture. I then put the lantern aside, and examined the bags—not with a light, oh, dear, no!—but by taking a soda-water bottle, filling it with water, and extemporising a pneumatic trough out of a pail and water. In this way I collected some of the gas out of one bag, and, corking it, I then righted the bottle, removed the cork, and applied a light, and it went off with a pop. I did this two or three times from the one bag, and each time of applying a light the report was less and less, until there was no report. I did the same with the other bag, with the same result. I was then convinced, according to a preconceived idea, that the gases were not diffused immediately throughout the whole contents of the bag. After these experiments I put a dissolver that was perfectly gas-tight without the slightest fear, and all was safe.

Since this Ilkeston explosion, I thought it might be of service to bring these experiments forward, in hopes that they might in some way help to solve the mystery. I should very much have liked to have seen the dissolver used by Mr. Scattergood, and examine it. Having made these experiments, and knowing the result, it is not at all improbable that, when the explosion occurred and the pistol-shot-like sound, that was heard first, was the explosion of the tubes, and the fire travelling down them and entering the bags; and I am under the impression that, if only half a cubic foot of mixed gases was in each bag, it would be quite sufficient to blow everything to atoms, and, on both bags being at the same instant torn asunder, and the flame being in existence, fired the whole, with the result seen, and which is to be deplored.

I should never be surprised to hear of a blow up with those wretched saturators that are being sold. I have every reason to believe that they are highly dangerous, and no notice will be taken until something very serious happens. I have often thought that there ought to be legislation on the matter of limelight, and no one should be permitted to use it unless they had been subjected to a searching examination (of practical men formed into a board of examiners) before they are allowed to manipulate in public. I do not mean a board of the modern technical teachers of the present day, who teach from books, but by men who have had some considerable experience in all forms of limelight. The compressed gas in cylinders will soon find out a leak in the dissolver, and cause, the firing of the jets, even with the reduced pressure after passing through one of Beard's governors.

I have entirely given up the use of the star dissolver for some years, owing to, as I have said before, their so often getting out of order. For a good and effective dissolver every precaution must be taken to keep the two gases entirely separate. The dissolver I am using now I am perfectly satisfied with, and, should it by any means be acted

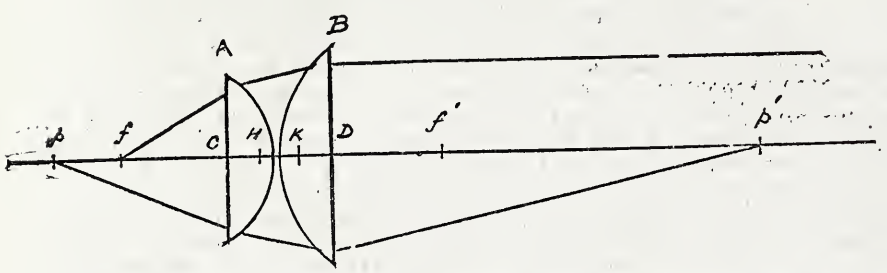
upon by the oxygen, there is a provision made so that, instead of the gases being mixed, they would blow off through a porthole made for that purpose. For the limelight at its best pure hydrogen is used, which is so light that it will pass almost anything.

WILLIAM BROOKS.

CONDENSERS FOR THE OPTICAL LANTERN.

[A Communication to the Lantern Society.]

A QUESTION that is frequently asked is, "What is the focus of a condenser?" Now, as there is the equivalent focus and its back focus as well as the actual focus and its back focus, unless it is understood which of these four foci is meant the question cannot be answered. I believe what is usually meant by the question is the back focus when the condenser is in actual use, *i.e.*, the distance of the lime to the surface of the condenser. By the assistance of a figure I hope to be able to show you, in a few minutes, how any one, by the use of very simple arithmetic, can find out all about it for himself. First separate the lenses, then find the focus of each lens by presenting the *plane* side of the lens to the sun's rays, receiving the image on a card and measuring the distance between the card and the *convex* surface of the lens. We will suppose this done, and that we find the focus of the lens, A (Fig. 1), is five inches, and



of the other, B, six inches. We next measure the thickness of the lenses, and find that they are each one inch thick.

We have now to do a small sum to find what is termed the "equivalent focus." The equivalent focus is the principal focus (*i.e.*, the focus to which parallel rays would be brought) of an ideal single lens, which is the exact optical equivalent of the two actual lenses under consideration. First multiply the foci together, then add them together, then divide the first result by the second; thus, $6\times5=30$; $6+5=11$; $30\div11=2\frac{8}{11}$, say. The question now arises, Where is this equivalent focus of $2\frac{8}{11}$ inches measured from? It is neither a difficult nor a long problem to determine this point accurately, but for all practical purposes in condensers of this kind the following empirical rule will meet the case. The point from which the equivalent focus is to be measured from lies within the lens, distant two-thirds the thickness of the lens from the plane surface, see the points H and K. The equivalent focal points f and f' can be marked off distant $2\frac{8}{11}$ inches from the points H and K, and will be found to be $2\frac{1}{12}$ inches from the plane surfaces C and D; this is the equivalent back focus of the lens. The points H and K are the principal points of the ideal equivalent lens.

The upper half of the figure shows a parallel ray traced through the lenses, cutting the axis in the equivalent focal point f. This is quite diagrammatic, for, in reality, spherical aberration would cause a marginal ray to cut the axis in some point nearer the surface of the lens C. We now require to find the focus of the condenser when in actual use. We will suppose that the projection lens we are using requires the rays to be brought to a focus at p', a distance of eight inches from the condenser; what we require to know is the distance, p, of the line from the surface C.

We first require to find the distance of the conjugate focus p' from the focal point f'. This will be 8 inches less $2\frac{1}{12}$; therefore, dropping the $\frac{1}{12}$, we may call the distance 6 inches. We have now to multiply the equivalent focus by itself, and divide the result by 6, and the dividend will be the distance of the line, p, from the equivalent focus f. Thus, $2\frac{8}{11}\times2\frac{8}{11}=\frac{121}{16}$, which divided by $6=1\frac{1}{4}$. Therefore, the focus is $1\frac{1}{4}$ inches from f, or, in other words, it is $3\frac{1}{3}$ inches from the surface C of the lens, and is the back focus.

The true focal length is the distance pH, which is $\frac{2}{3}$ inch more than the back focus, or 4 inches. This is shown in the lower half of the figure. We have now found the four foci—viz., 1st, the equivalent focus, $2\frac{8}{11}$ inches; 2nd, the back equivalent focus, $2\frac{1}{12}$; 3rd, the actual focus when the condenser is in use, 4 inches; 4th, the actual back focus, $3\frac{1}{3}$ inches.

When the equivalent focus is known, the distance pH may be found in another way, by multiplying the distance $p'k$ by the equivalent focus, and dividing the product by the distance $f'p'$. Thus, $8\frac{2}{3}\times2\frac{8}{11}=24$, which, divided by $6=4$ inches.

I am now going to trouble you with one more example, viz., that of a triple. It is simpler than the preceding because we have not to apply the second formula; the equivalent focus of the two first lenses next the lime being the working focus of the condenser. In triples the two lenses next the lime have both their plane faces towards the lime, and are arranged to give parallel rays, the third being turned the other way, and having a focus to suit the projection lens used. To find the equivalent focus of the first two lenses we must first ascertain the focus of each lens separately, in the same manner as indicated in the previous example, viz., by holding the plane side of the lenses towards the sun. Let us suppose that the first lens has a focus of five inches, and the second one of eight inches, and that the thickness of each lens is one inch. In this case, to find the equivalent focus we must multiply the foci together, and divide the product by their sum less one. Thus, $5\times8=40$; $5+8=13$, less $1=12$; $40\div12=3\frac{1}{3}$ inches. We have now to find the point from where this equivalent focus is measured. This point is inside the first lens, at a distance of one-third of its thickness from the plane surface, which is next the lime. This gives a back focus of three inches for the position of the lime when the condenser is in use. In the case of the triple, we cannot determine the equivalent focus of the three lenses, or empirically fix any point from which the focus is to be measured, without working the whole problem out in its completeness. It is a trifle longer than that of the double, but presents no difficulty.

The next point we come to is spherical aberration. It is important in a condenser that the foot of the lenses be such that the spherical aberration be a minimum. It is the image of the surface of the condenser which practically forms the disc on the sheet. The importance of evenness of illumination in the disc is, of course, apparent to all. Now, spherical aberration is the cause of unevenness in the disc, assuming, of course, that the lime has been placed in its proper position. Practically, evenness of illumination and absence of spherical aberration are synonymous terms; it is therefore important that the condenser should be as free as possible from spherical aberration.

The method of determining the form of minimum aberration in a double combination, under the conditions imposed by a condenser, is long and tedious, and will not yield to as simple an explanation as that for the foci given above. The greater the bending of the rays, the greater will be the aberration; the more lenses that are used in the bending, the less will be the aberration. A quadruple condenser has less aberration than a triple, and a triple than a double. With regard to the computing of a condenser, the quadruple is by far the easiest.

I have already published the method of doing this, and therefore will not repeat; but it is very short and extremely simple. The triple presents greater difficulty—I allude to the three planos mentioned above. The last plano, that next the slide, may be dismissed at once, because its focus is that of the conjugate required. The difficulty lies in the determination of the proper foci of the two lenses next the lime, so that they may yield parallel rays with a minimum of aberration. This I have worked out, and find that with plate glass f' should equal $\frac{5f}{3}$. This is an important result, which you will not find given in any text-book. In other words, if F be the eqivalent focus of the combination, f the focus of the first lens should be $\frac{8F}{5}$; and f' that of the second lens $\frac{8F}{3}$.

EDWARD M. NELSON.

(To be concluded.)

GAS BOTTLES AND THEIR SAFETY.

[A Paper read before the London and Provincial Photographic Association.]

THE use of gas in cylinders has now become so common that the public has ceased to regard it as fraught with any risk; and, considering the immense number of cylinders now filled and emptied every week, the few accidents that have happened certainly justify the confidence hitherto reposed in their safety.

The explosions which have occurred of the cylinders themselves have been very few indeed; and I think I am right in saying that, although, unfortunately, fatal consequences have always ensued, fortunately the cause of the explosion or bursting has been satisfactorily accounted for, and has in every case been due to putting oxygen into a cylinder already containing hydrogen, or *vice versâ*.

As far as I am aware, no case has occurred of the bursting of a cylinder from over-pressure; I mean, of course, in ordinary use, as they are usually tested to double the strength they are supposed to have to withstand. Stories are told of fifteen, and even seventeen, feet of gas having been pressed into a ten-foot bottle; but it has never occurred to me—at least, if it has, the extra has never been charged for; so I am inclined to think it was not there. Accidentally or intentionally, very severe tests have been applied to cylinders by gas compressors, tending to show that the ordinary knocking about they receive is not likely to cause much damage to them. Full cylinders have been known to fall from an upper window on to the stones below without exploding; heavy weights have been dropped upon them from a great height without doing any further harm than spoiling their outward beauty, which, it must be confessed, is not very great. We may therefore say that, so far as the cylinders themselves are concerned, there is not much to fear, as, except accidentally, the ordinary user would never expose them to such tests as they are subjected to by those who make or fill them. We may here say that, during their transit from place to place, cylinders receive a great deal of unnecessary ill usage. Sometimes the gun-metal nozzles and valve pins become damaged in consequence, and stories have been told where they have become so loosened that the effort made to screw up the valve after use has caused the entire nozzle to give way. In one instance it is said that the nozzle of a cylinder in use out of doors for signalling purposes went up so high that it was *several minutes* before it came down again. Whether the man in the moon (had he so desired) could have put out his hand and caught that nozzle was not stated. Only recently, at one of the principal railway stations, a large cylinder was let down suddenly on the nozzle; the result was a waste of eighty feet of oxygen and a general scare among the passengers on the platform. These accidents, however, might have been easily prevented by putting the cylinders in boxes during transit.

What we really have to consider to-night is the bursting of gas regulators and gauges; and our object is to find out, if possible, the cause of these accidents, and so, by taking due precautions, endeavour to make them as rare as possible.

First, then, the regulators. There are not many worthy of the name, the best, to my mind, being those made by our friend Mr. Beard. The principal fault with other makes I have seen tried is, either that they *don't regulate*, or, if they do, their action is so erratic as to make them unreliable. As to gauges, the simplest form is known as "Suiter's Patent." Here you have no glass, and the worst that can happen is the blowing out the end of the tube, and waste of the gas. The well-known Bourdon gauge is much used, and is very useful, because it can be kept attached to the cylinder, and it is easy, by its means, to see from time to time how the gas is going. I need scarcely say it is not safe to use one of these for oxygen which has been used for any other gas; very serious accidents have occurred through this having been done.

Not many days since (as you are, of course, aware) an exhaustive inquiry was held to ascertain the cause of the bursting of both a gauge and a regulator, and this is really the reason the subject of "Gas Bottles and their Safety" was chosen for our consideration to-night.

On Monday last I received from an old friend a letter commencing thus: "Dear Bridge,—Did we not waste an evening on Wednesday discussing the cause of the accident, and then only come to an erroneous conclusion? Had we waited another day, we should have seen the note in *Photography* giving us the true cause." Now, I need scarcely say that this was what the late Artemus Ward calls "rote sarkastik." The paragraph alluded to is as follows: "The inquiry into a recent fatal explosion of a gas bag has barely concluded when an explosion which might have been serious has taken place in connexion with the use of cylinders. The explosion, however, was more due to the way the cylinder was handled than to any inherent-in-itself tendency to create disaster. At the meeting of one of the London clubs last week a new cylinder was about to be tested with a view to ascertaining its contents. The pressure gauge was screwed on, and then the tap was turned fully on too suddenly, the result being that the gauge was blown out and fixed itself in the ceiling, considerably startling those who were present. Had it come in contact with the persons of either of the operators it would, doubtless, have been a serious matter to them. This accident need not, however, alarm cylinder-users, but simply impress upon them the necessity of taking the precaution to allow the gas to enter the pressure gauge slowly, when no fear of such an untoward occurrence need be entertained."

If this paragraph is intended to refer to the explosion of a gauge and regulator in my hands at a recent photographic meeting, the communications of the gentleman to whom the editor is indebted for this unofficial information should in future be taken with a much larger quantity of salt than appears to have been used on the present occasion. I say *un*-official, because the meeting at which the accident happened was a private one, and any official communication must have passed through my hands. My opinion is, however, that my friend's sarcasm has been thrown away, and that the paragraph does not refer to us at all, but to some similar accident which has occurred elsewhere, and of which we shall perhaps hear more anon; because, in my case, the cylinder was not a new one, the tap was not turned fully on too suddenly, no portion of the gauge fixed itself in the ceiling, there was only one operator, and the accident could not have been due to the way the cylinder was handled, because the advice so kindly given in the concluding sentence was most carefully observed. I may here perhaps be allowed to remark that several absurd and exaggerated accounts of this accident are floating about. One gentleman has stated that he was blown *several feet* by the explosion. Now, I must confess that those in the immediate vicinity of the little dark room in which the accident happened did retire with great alacrity, and may have been even humming the old refrain, "We left him alone in his glory" for aught I know, but the sudden withdrawal was not due to gas, but *fright*. The upward pressure, as I shall show you, was for the moment very great, but the lateral expansion was not sufficient to disturb either the scores of little things on the shelves of that small dark room or the folders that rested so gracefully on my nose. No doubt they speedily found themselves several feet away, but the instinct of self-preservation is strong, and possibly Mrs. Partington's son Ike was quite right when he said, "In railway accidents and suchlike, absence of body is better than presence of mind."

I am getting rather tired of repeating the story of the explosion. It seems to me as if every other photographer I have met during the last fortnight has asked for details, and I have been bound to tell him the truth, and the whole truth. However, as I have to open the discussion this evening, and the subject has been selected in consequence of the accident, I will tell you as briefly as possible exactly how it happened.

Wishing to know whether a cylinder was full or empty, I removed the gauge and regulator from the one just exhausted, and firmly screwed it into the cylinder, the contents of which I was anxious to ascertain. Turning the gas slowly on, the gauge immediately responded. I then turned the gas off again, and, calling a friend (Mr. H. M. Hastings), I repeated the operation of turning on the gas. The needle of the gauge rapidly registered 120, went past that number, and, before I could turn the gas off again, the explosion occurred. I still held on to the cylinder, and endeavoured to stop the waste of gas. The valve, however, would not act, and, after inhaling more oxygen than was good for me in one dose, I came out of the dark room (the way was quite clear). After a few breaths of air as fresh as I could obtain in a room full of tobacco-smoke, I went back and had another try; but it was of no use. When all the oxygen had escaped I went into the dark room again, lit the gas, which had been extinguished by the explosion, and looked around. The gauge had snapped short off at the stem, and was lying on the floor. The dial was missing, and the glass of course blown to atoms. The top of the regulator was embedded in the ceiling, and the cover of the regulator case was missing.

On examining the connexions, it was found that the cone fitting the interior of the bull-nosed nozzle of the cylinder was partially melted, so was the neck of the cylinder itself; the end of the valve-pin was also melted away. The oxygen had evidently fired in the neck of the cylinder. The end of the Bourdon in the gauge, unable to sustain the immense pressure, had burst, bulging the side of the case, forcing out the dial, and, as I said before, smashing the cover-glass to atoms. The fire had travelled partly along the tube leading to the gauge, but had not entered the gauge itself. It had travelled mainly in an upward direction, forcing itself up one side of the regulator; impinged upon the side of the case, burst the indiarubber bellows, blew away the top, partly melted the solder at the top of the cover, and scorched the lacquer outside.

We now come to ask the cause of all this, and the answer undoubtedly is: Oil in the neck of the cylinder. Chemists tell us that oxygen at high pressure, brought into contact with oil, more especially oil which has become gelatinous or glutinous, will immediately fire. In the early part of the present year an article appeared in the *Nineteenth Century* bearing upon this very subject in connexion with gas bottles, and describing almost exactly what occurred in the present instance. How came the oil there? that is the question. We have been informed that at one time these kinds of pressure-gauges were tested with oil, and this may have been one from which it had only imperfectly been removed; but the gauge had been in use quite

two years, and, as I said before, there was no trace of fire in the gauge itself. Oxygen compressors tell us they never use oil to lubricate the valves of cylinders, but the portion of the valve pin when withdrawn from this cylinder was covered with black oil, and the same thing was found in the aperture from which it had been taken. Curiously enough, too, I have taken the pins out of two other cylinders, and these are both greasy.

I will not trespass further upon your patience. I only hope the discussion which follows will tend to clear up the question. The conclusion arrived at a week ago, when this matter was under consideration, was: Oil in the valve, but how it came there there is no evidence to show.

Several men of great ability and experience have been consulted on the subject, including Mr. Adolphe M. Levy, Mr. Newton, Mr. Newton, jun., Mr. T. Ottway, Mr. T. E. Freshwater, Mr. R. R. Beard, Mr. G. R. Baker, Mr. Murray (Brin's Oxygen Company), and Mr. T. North. As you know, I have had a good deal to do with oxygen in bags, gasholders, and bottles, and have been using the limelight almost daily for many years. The consensus of opinion is, as I have said before, oil in the valve.

Gentlemen, what happened to me may at any time happen to you; let us, therefore, endeavour to find out where this oil comes from, and we shall have done something towards preventing accidents.

In conclusion, I should like, if you'll allow me, to give you a few words of caution. When turning on or off gas in cylinders, always hold them at arm's length; I invariably take this precaution. The top of the regulator in this instance passed within two or three inches of my head, and embedded itself in the ceiling. Had it not been for the precaution I have alluded to, it might have found a softer spot, and in that case I should not have had the pleasure of opening the discussion this evening.

F. A. BRIDGE.

THE MEASUREMENT OF LENSES.*

VI.—Method of Obliquity of Rays.

(*t*) *Moser's*† *Method.*—This method is based on the principle that any ray which on entrance passes through the first Gauss point at any given obliquity with respect to the principal axis, emerges with unchanged obliquity, but displaced, as if it had passed through the second Gauss point. To determine these points, the experimental process consists in a series of approximations derived from measurement made of the magnification.

Of the various methods thus briefly reviewed, only those of Pendlebury, Meyerstein, MacGillavry, and Cornu fulfil the conditions of values of both f and κ without determining the double adjustments. Doubtless, each has its advantages for particular cases. Yet it seemed worth while to follow out another method which seemed to possess some advantages over any yet suggested.

A New Focometric Method.

In the new method of focometry which the author has devised, direct methods of measurement of lengths only are used; and double adjustments are avoided. The method consists in the direct determination, *firstly*, of the two principal foci by placing a transparent micrometric screen at each; and, *secondly*, when these have been found, the two symmetric points, by moving the two screens by a double screw motion through equal distances until each is the image of the other. The true focal length (f) and the distance (κ) between the Gauss points are therefore given by simple subtraction of scale readings.

Choice of the Symmetric Points.

It is easy to show that, in any determination of focal lengths, the most favourable position for an experimental measure of any two conjugate points is when these occupy the symmetric points; provided the experimental determination, the two conjugated foci, is assumed to be of equal difficulty.

Let p and $-q$ be the respective distances of the point-object and point-image from the two corresponding principal foci. Then, by Newton's rule, we shall have $f^2 = pq$ (1) where f is the true principal focal length.

If in the determination of the lengths p and q we make errors of measurement, respectively $\triangle p$ and $\triangle q$, there will result an error of $\triangle f$ in the calculation of the focal length, having a value determined by the equation $(f+\triangle f)^2=(p+\triangle p)\ (q+\triangle q)$ (2);

$$\text{or, } f^2+2f\triangle f+\triangle^2 f=pq+p\triangle q+q\triangle p+\triangle p\triangle q \text{ (3).}$$

Subtracting (1) from (3), and neglecting small quantities of the second order, we have $2f\triangle f=p\triangle q+q\triangle p$ (4).

Hence, divided by $f^2=q$ we get—

$$\frac{\triangle f}{f}=\tfrac{1}{2}\frac{\triangle q}{q}+\frac{\triangle p}{q}\ (5),$$

or the percentage error in f is the mean of the percentage errors in p a q. Hence, since $\triangle p$ and $\triangle q$ are obviously of the same order of magn tude, if we write $\triangle m$ for the arithmetical mean of them, and assu that each of them is equal to this value, we get from (4)—

$$\triangle f=\tfrac{1}{2}\frac{p+q}{f}\ \triangle m \text{ .....} ($$

which shows that for a given mean error $\triangle m$ and a given focal lengt the error made in determining this focal length will be proportional $p+q$. Hence those values of p and q which make $p+q$ a minimum wi make the error $\triangle f$ a minimum. And, as $pq=f_2$ is a constant for a give lens, it is obvious that the case of minimum value of $p+q$ is when $p=q$ this being the case when the conjugate points are at the symmetr points.

The assumption made above that the experimental difficulty of dete mining the position of a conjugate focus is equal for conjugate foci in an position is, however, hardly justified in practice, for in all laborator experience it is admitted that it is more difficult to ascertain with pr cision the position of an image (real) which is remote from a lens tha that of one near the lens. In fact, the experimental location of th image is mainly delimited by the sharpness of the crossing of the ray and the tangent of the angle at which the extreme rays cross is inversel proportional to their distance from the lens. The aperture of the len then, limits the accuracy of determination of foci at great distances. Th larger the aperture the more accurately (assuming spherical aberratio above) will be the delimitation of the foci; but, the larger the aperture the greater do spherical aberrations become. The error in determining may arise at either end of the measurement; it is more likely to occur a the end most distant from the lens than at the principal focus. If it b assumed that the probable magnitude of an error $\triangle q$, made in estimatin the value of q^- is proportional to the distance of this focus from the lens then we may write $\triangle q$ as proportional to $q+f$, and similarly $\triangle p$ as pro portional to $p+f$. Substituting these values in (4), we get—

$$2f\triangle f\propto p\ (q+f)+q\ (p+f),$$

and, dividing by f and collecting, we get—$\triangle f\propto f+\tfrac{1}{2}\ (p+q^-)$. This is still a minimum (for positive values of p and q) when $p=q$, or when the conjugate foci are taken at the symmetric points.

Principle of Focometer for Determining the Focal Planes and Principal Planes of any given Positive Optical Combination, such as a Microscope Objective, or other Lens.

The abstract principle of this focometer was described as follows by the author two years ago, in a memorandum accompanying an application made to the Royal Society for a grant in aid of the construction of the apparatus:—

"Let A B (Fig. 7) be the objective (or lens); H_1 H_2 its principal points;

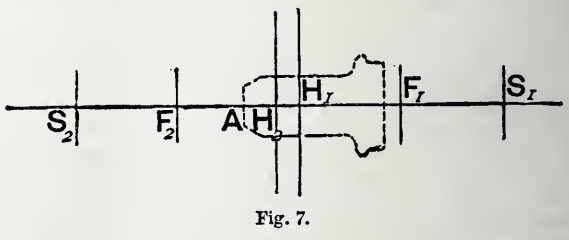


Fig. 7.

F_1 F_2 its principal foci; and S_1 S_2 the two symmetric points, situate each at double the focal distance from the respective principal points; S_1 S_2 are conjugate points, and the planes through them are planes of unit magnification.

"Suppose a parallel beam to be sent—from a lamp provided with a reticle in front of it and a collimating lens, all placed in air at some convenient distance away—through A B from left to right. An image will be formed at F_1, thus determining that point. Then, with the same source removed to a distant point on the right, send a parallel beam from right to left, thus determining F_2. Small glass plates, having micrometers cut on surfaces (respectively) nearest to H_1 H_2, and each provided with a reading lens behind, should be used to receive these images, and to ascertain their precise position in space. The said micrometers should be mounted on supports sliding along a suitable bench, over the middle of which the objective has been clamped in a special support. The micrometers, or, at least, one of them, should be so arranged that they can be thrown out of the axis laterally when not wanted. They should be pro-

* Continued from page 792.

† Moser: "Methode die Brennweite und optischen Hauptpunkte von Linsen zu bestimmen."—*Pogg. Annalen*, lxiii., 1884, p. 39.

vided with verniers to read off their positions on the bench. They should also be furnished with clamps, which, after each has been once set at its principal focus, will permit it to be clamped to a screw below on the bench. The distance from F_1 to F_2 is equal to $2f+x$ (where f is the true focal length and x the unknown distance between the two principal planes).

"Now, let there be a gearing, such as a right and left-handed screw, which will enable the observer to move the two micrometers from F_1 and F_2 at exactly equal rates outwards. When one of them arrives at S_1 the other will at the same moment arrive at S_2, and this will be known by observing through the reading lens attached to one micrometer the inverted image of the other, coincident, but reversed in position (exactly as in Silbermann's old form of focometer). The equality of object and image in size—known by the fitting of the micrometer scales—will serve to check the correctness of the observation. The distance from S_1 to $S_2 = 4f + k$. Hence $k = {}_2F_1\,F_2 - S_1\,S_2$: and $f = F_1\,S_2 = F_1\,S_2$. By measuring off backwards from F_1 a distance equal to $S_1\,F_2$, the point H_2 is arrived at. Similarly H_1 is arrived at, and these points can be marked off on the outside of the tube of the objective."

Description of the Instrument.

In accordance with the foregoing project, the author designed an instrument which he terms a focometer. It was constructed by Messrs. Nalder Brothers, of Clerkenwell, to whom the author is indebted for many useful suggestions embodied in the apparatus. The construction is shown in the accompanying figures.

The support for the lens, or combination of lenses to be examined, is fixed at the middle of a bench made of two parallel girders of gun-metal, each 670 millimetres in length, placed vertically above one another, and secured together both at their ends and at the middle. The highest and lowest faces of this double girder are bevelled at 45°, and a scale of millimetres is divided along the front face at the upper edge. This girder frame is shown from the back in Fig. 8, in end view in Fig. 9. The support for the lens can be raised by a dovetail slide worked by a rack, or moved horizontally transversely to the bench by another dovetail slide furnished with a screw motion, as shown in Figs. 8 and 9.

The travelling supports for the micrometers are two solid pieces of brass, which fit over the bevelled edges of the girders and slide without any looseness of motion along the frame. Each bears a vernier to read off its position on the bench, and each is furnished at its upper point, as shown in Fig. 8, with a horizontal slide for fine adjustment, worked by means of a screw of fine pitch; the position of the horizontal slide being read off by means of a vernier against a short scale cut upon the face of the support. Except when the clamps described below are applied, each of these supports is so far free that it can be pushed along the bench by hand, but it is fitted to slide so accurately that it cannot be shifted by any chance touch.

Between the parallel girders, running from end to end of the apparatus, is a double screw, the two halves being respectively right and left-handed, each accurately of a pitch of two millimetres. This screw, the function of which is to shift the two supports for the micrometers, is furnished a each end with a large milled head, and with a driving handle. The screw is of steel. It was constructed in two separate parts, which were then united by being securely riveted into a short cylinder of steel of larger diameter. This cylinder runs through a bearing in the central piece of the frame of the instrument, and is secured in position between two fixed collars of steel, which are seen edgeways in Fig. 8. These collars are screwed up sufficiently tightly to prevent any end play. At the two outer ends the screw passes through two bearings in the end supports, which admit of longitudinal play so as to allow for any difference of expansion between the screw and the frame of the instrument.

The manner in which the driving motion is communicated from the screw to the two travelling supports is peculiar. A device was needed, which would admit of the travelling supports being independently moved to any positions when not clamped to the screw, and of being clamped in any position to the screw, so as to be driven by it without back-lash. These conditions were finally fulfilled in the following manner. Upon each half of the screw is placed a massive gun-metal nut, about fifty millimetres long, and of square section twenty-five millimetres in the side. The lower face of this nut slides upon the upper face of the lower girder, and prevents it from turning; it is also prevented from turning by the interposition, between its upper face and the lower face of the upper girder, of a long slotted rectangular flange of brass which constitutes part of a clamping bar. Each nut is bored out with a short cylindrical cavity. Within this are inserted a spiral spring of steel wire, and a second nut, which, though capable of longitudinal play, is prevented from turning by the insertion of a key into a key-way. The introduction of this second nut, with a strong spring between it and the main nut, is a mechanical device originally due to Sir William Thompson, P.R.S., for preventing back-lash. The slotted clamping bars mentioned above are of brass, each 176 millimetres long. Each is, as may be seen from Figs. 8 and 9, of L-shaped section, fitting over, and in front of the

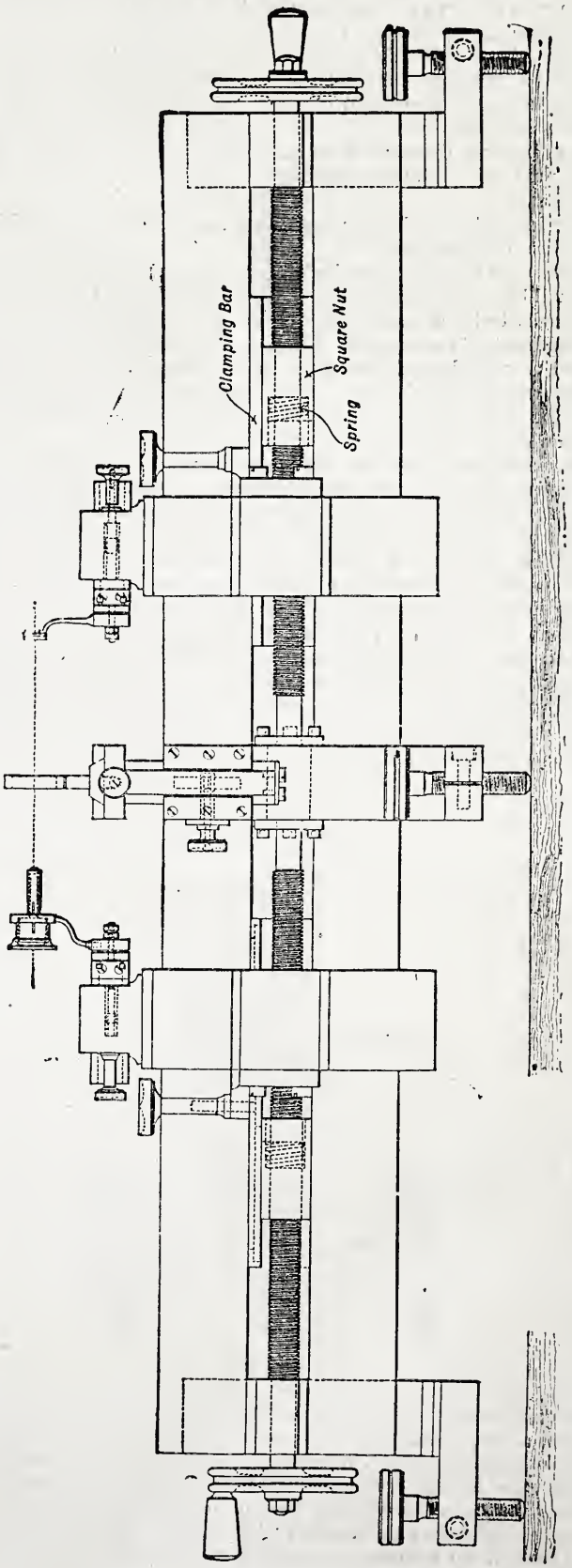


Fig 8

square nut. The upper horizontal flange which comes between the top of the nut and the under side of the higher girder is of accurate fit, and is slotted out to receive beneath it the head of a clamping pin. This pin, passing vertically through a projecting lug of the travelling support enters the threaded shaft of a clamp screw, which bears at its top a milled head. When this is turned, the head of the clamping pin is

raised and clamps the slotted bar to the lug of the travelling support. The vertically situated flange of each of the L-shaped clamping bars fits accurately into the space between the upper and lower girders, and it also is slotted to admit through it a clamping pin which projects horizontally from the square nut. A clamping screw with milled head screws on to this pin, and clamps the slotted bar to the square nut. It is shown in Fig. 2 projecting to the left. In order that the turning of the long screw may drive the two travelling supports, it is requisite that each should b clamped to its slotted bar, and that each slotted bar should be clamped to the square nut. The object of using such long clamping bars instead of mere short pieces is to enable the travelling supports to be clamped when at unequal distances from the centre of the apparatus, the two square nuts being always situated symmetrically at equal distances from the centre.

The micrometers and other appliances for receiving the focal images are of three different kinds.

The first kind is shown on the left-hand support of Fig. 8. It consists of a small bevel-edged disk of glass, fixed in the end of a narrow tube and provided with a reading lens, or positive eyepiece, of about thirty-eight millimetres' focal length. Upon the outer surface of the glass disk is ruled a scale divided into fifths of millimetres. This micrometric arrangement is convenient for receiving a focal image, as formed at the back of a microscopic objective, at a point at some distance down the tube in which the objective is mounted.

The second kind, shown in Fig. 8, on the right-hand support, consists of a rather larger disk of glass, mounted in a metal rim, which is cut away at two places. Upon the front face of this disk a micrometer scale in fifths of millimetres is also ruled, and one-half the disk is silvered over. This arrangement is convenient for use with larger lenses, and for service as an object, in which case it is illuminated from behind. When making determinations of microscopic objectives, it is found convenient to use one micrometer of the second kind opposite the front of the objective, and one of the first kind at the back of the objective, the pieces being mounted as shown in Fig. 8. Each of the micrometers can be shifted laterally out of the line of the lens under measurement, the arm which carries the micrometer being fastened to a collar furnished with a small handle, as shown in Figs. 8 and 9. This collar is guided to move in a

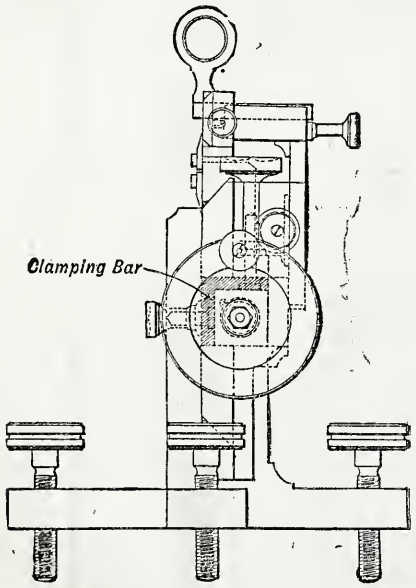


Fig. 9.

plane orthogenally to the optical axis of the apparatus by an adjustment of three abutting screws. These three abutting screws are indicated by three dotted circles in Fig. 9, and the heads of two of them are shown in profile twice in Fig. 8, being situated behind the collar bearing, which receives the curved supporting stem of each of the two micrometers. These bearing collars are provided with stops to enable the micrometers to be brought up accurately to their former position after having been thrown out laterally.

A third arrangement, not shown in Fig. 8, is used only for large lenses, and consists of a grooved metallic ring, mounted on a curved arm upon the top of the travelling support. Over this grooved ring is stretched a piece of thin paper, which, after having a millimetre scale marked upon it, is rendered nearly transparent by the application of varnish. Two such micrometers are used—one at either end—when measurements are to be made upon camera lenses and other lenses having a focal length of several centimetres.

The holder, fitted upon the central support, as shown in Figs. 8 and 9, for carrying the lens, is cut with the Royal Microscopical Society's standard screw, so as to receive any microscopic objective. For other small lenses, an adapter, provided with the same screw, is used, and the lens is temporarily fitted into the adapter by means of a cork ring. For large lenses a V-shaped appliance is substituted for the screw holder.

In order to know the position of the lens itself with respect to its focal and principal points, it is necessary to ascertain the scale-reading corresponding to some fixed point on the lens, or on its attached mounting. This might be done by end-measurement, by bringing one of the micrometics up into actual contact with one end face of the lens; but such a mode of proceeding is inadvisable for several reasons. It was, therefore, decided, when the instrument was being designed, to adopt such a construction as would permit of direct determinations by means of a delicate plumb-line. With this object, the general form of double girder was adopted, so that the scale might be engraved on the front of the vertical face. By reference to the end elevation in Fig. 9, it will be seen that the optical axis of the apparatus is arranged to be in the same vertical plane. Moreover, the micrometers are so arranged that in each case a plumb-line can be hung directly against the actual face of glass or paper upon which the micrometer is engraved. As plumb-line, a thin silk thread with a small leaden sphere at the end of it is used. When the instrument is properly levelled, the plumb-line can be applied to read off directly on the scale the actual position of any of the micrometers; and so, by comparison with the readings of the verniers of the travelling supports, is obtained the zero reading for use in future measurements.

It was consequently necessary to furnish the instrument with levelling screws. There, however, arose a small mechanical difficulty; for an instrument of this shape would not be very stable if provided with one foot at one end, and two near together at the other. It was therefore provided with four levelling screws, one at each end, and two at the two ends of the central support. In practice, this arrangement is quite workable; and it is found convenient first to adjust the level of the girders lengthways by the end screws, then to adjust transversely by the other screws. The frame is so solidly made that there is no fear of racking it by unequal weight upon the four screws; the wooden top of a strong laboratory table is not so rigid as to make any fine adjustment necessary.

Silvanus P. Thompson, D.Sc., F.R.S.

—*Journal of the Society of Arts.*

(To be continued.)

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The third annual exhibition of the members' work of this Society was held on Monday evening last, December 14. The collection comprised rather more than two hundred pictures, and, taking it as a whole, the character of the work shown exhibited very distinct advances upon that of the last exhibition. In a display of this kind, confined exclusively to members, small pictures naturally predominated. On this occasion these betrayed a most commendable level of excellence, both in artistic selection and technical treatment, which makes it difficult, if not invidious, for us to bestow praise upon any one exhibit. In Class 1 (for landscape and architecture) Mr. J. C. S. Mummery, for (26) *The Wayfarer* (on Fry's roughest paper) and (142) *The Road to the Farm* (Eastman bromide); Mr. J. McIntosh (69) *Moulsey* (alpha paper); F. Cherry (39) *The Ember, Moulsey;* and S. E. Wall (70) *On the Avon, Tewkesbury* (silver print), well merited their respective certificates, which is no disparagement to the unsuccessful competitors. In Class 2 (portraiture and figure studies) Mr. C. Beadle (93), with *Janet*, a fine gelatino-chloride study of a head, and Mr. C. Gill (83), a charming platinotype portrait of a lady, secured the awards. Mr. Gill's portrait, both in lighting and posing, was one of the gems of the exhibition. Some of Mr. Mummery's pictures were too small for the rough surface on which they were printed. This kind of paper is only suitable for large pictures. In Class 4 Mr. C. Beadle, with *In an Old Village*—a 12×10 bromide enlargement from half-plate—received the certificate. Mr. W. Taylor headed the Lantern Slide Competition. The competition lantern slides were subsequently exhibited on the screen, and brought a most pleasant evening to a close. We congratulate the North Middlesex upon a most successful little function, and only regret that the heavy demands on our space preclude us from giving a more detailed criticism of the exhibits.

DEATH OF MR. EDWARD VILES.

We are sorry to have to record the death of Mr. Edward Viles, who although but little heard of in photographic circles at the present time, was some years ago very well known indeed as a contributor to our Almanac and this Journal, and also as an exhibitor at the Photographic Society of Great Britain, where he once obtained the medal for the best photo-micrographic enlargement. Mr. Viles was an intimate friend of the late Dr. Van Monckhoven, and, when the talented doctor was last over in this country, we have a vivid recollection of a pleasant evening which, with the late Mr. J. H. Dallmeyer and the two gentlemen named, we spent together, when among the subjects of conversation was the invention of the Steinheil aplanatic lens, which had been suggested by Dr. Monckhoven, and had independently, although rather later, been invented by Mr. Dallmeyer. Mr. Viles's interest in photography partook, in a large measure, of its optics, and he possessed a very fine collection of optical instruments. He was proprietor of one of our popular journals devoted to the interests of young ladies, and a few years since, on the death of the acting manager of his establishment, he gave up his photographic pursuits, and removed to London, where he has since been closely devoting himself to literary and journalistic avocations. Mr. Viles was a man of varied attainments, and a noted collector of the early editions of Shakespeare and other classical writers. He died on the 8th inst., of typhoid fever, aged 50.

Our Editorial Table.

Improvement in Film-carriers.

Mr. Gotz, of 19, Buckingham-street, Strand, has sent us a specimen of his new film-carrier for the ordinary dark slide.

The folding of these carriers is accomplished by special tools, designed by Mr. Gotz, by the means of which that extreme neatness, flatness, and accuracy is obtained which has hitherto been lacking in film-carriers generally, and no doubt acted against their general adoption, as well as that of the films themselves for out-door work. The chief improvement in the construction of the carriers consists in a fold made so as to form a spring, which keeps the film in register in the slide.

The carrier may be used in the book form of double back, as well as in the solid form. The division plate is dispensed with in both cases; but, should the latter be hinged to the slide, it need not be in the way, for the carriers in that case have two spring-folds, one at each end.

The carriers consist of thin sheet iron, exceedingly tough and light, and the weight of a double-back loaded with carriers and films is practically that of an empty slide. Nothing will help to make films popular for out-door work but a handy, reliable carrier, and that Mr. Gotz has produced in a very satisfactory manner.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 21,381.—"An Improvement in the Manufacture of Photographic Plates and Films, or other Sensitive Media." J. T. Sandell.—*Dated December* 7, 1891.

No. 21,418,—"Improvements in, and connected with, Magazine or Hand Photographic Cameras." F. Miall.—*Dated December* 8, 1891.

No. 21,497.—"Improvements connected with Colouring Photographic Impressions, and in the Mixing and Preparing of the Colours used therewith." J. J. E. Mayall.—*Dated December* 9, 1891.

No. 21,553.—"Improvements in, or relating to, Hand Cameras." S. W. Rouch.—*Dated December* 9, 1891.

No. 21,605.—"Improvements in Photographic Cameras with Plate Exchange in the Exposition Chamber." Complete specification. R. Stirn.—*Dated December* 10, 1891.

No. 21,644.—"Improvements in Photographic Cameras." A. Young.—*Dated December* 10, 1891.

No. 21,716.—"Improvements in, and relating to, Photographic Apparatus." E. Franck-Valery and P. Franck-Valery.—*Dated December* 11, 1891.

No. 21,789.—"Improvements in, or connected with, Means and Apparatus for Illuminating Objects for Photographic purposes." R. Slingsby.—*Dated December* 12, 1891.

The West London Photographic Society will hold a *conversazione* and exhibition of members' work on January 8 and 9, 1892, at the Lecture Hall, Broadway, Hammersmith. Mr. H. P. Robinson, Mr. Valentine Blanchard, and Mr. G. E. Cooke will act as judges.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 21 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 22 ...	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 23 ...	Sheffield Camera Club	The Rooms, New Surrey-street.
,, 23 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 24 ...	Burton-on-Trent	The Institute, Union-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

December 10,—Mr. S. J. B. Wollaston in the chair.

Mr. J. Stevens was unanimously elected a member of the Association.

It was decided that, as next Thursday, the 24th, was Christmas Eve, no meeting should be held.

A question from the box was, "What strength of potassium bichromate is best for restoring plates that have been exposed to light?"

Mr. A. Cowan said a solution of from three to five per cent., and the plates well washed afterwards.

A second question referred to a combined toning and fixing bath containing acetate of soda, ammonium sulpho-cyanide, gold chloride, and hypo.

The Chairman did not think it was intended for albumenised paper as the querist supposed. When using a similar bath for albumen paper, he had got great degradations of the whites.

Mr. W. E. Debenham said that he sometimes got the most beautiful tones with a sulpho-cyanide bath, but could not depend upon it.

Mr. Cowan had developed some lantern plates with the para-amidophenol developer recently distributed. He found it work very quickly, and was very powerful in a highly dilute solution. It appeared to him to give more detail than pyro.

Mr. Debenham had found a small quantity of bromide advantageous with the developer, as it was very quick in action. The last portion of the developer he used gave peculiar spots over the whole of the plate.

Mr. F. A. Bridge then read a paper on *Gas Bottles and their Safety*. [See p. 806.]

Mr. T. E. Freshwater said that a great many explosions were, no doubt, due to the use of gauges. Oxygen had a strong affinity for hydro-carbons, and the question was, how did the oil find its way into the cylinders? Even with beeswax used as a lubricant they would probably get some particles of a hydro-carbon, which, if driven round and round in a minute state of subdivision by the gas, would cause an explosion. Recently he knew of a serious explosion where there was no gauge in the bottle—simply a regulator. A gentleman had a bottle of oxygen, which he tested and found full. He took off the gauge and screwed on the regulator, and found, when he went to turn on the oxygen, that something had happened to the valve so that he could not turn the screw. He sent for a man, who managed to unscrew the valve, but the moment he turned the screw the whole of the neck of the bottle blew off. Fortunately, no one was hurt. He thought that with the lantern there was no necessity for gauges. For ascertaining the amount of oxygen in a bottle the simplest process was weighing. He advised all who used gas bottles not to have anything to do with gauges.

Mr. Spurge, by the aid of the blackboard, described Clarkson's safety gauge, in which the tube of the ordinary Bourdon gauge is charged with glycerine, and also demonstrated it in action.

Mr. G. W. Atkins said that, with regard to oil getting into the gauge, steel tubes were tempered with oil, and it was possible that a portion of the oil got into the gauge that way, and found its way little by little down to the pin of the valve. In this manner one gauge might soil many valves.

Mr. R. R. Beard said the gauge which had burst had undoubtedly been tested with oil. The cause of the fire was that the oxygen had been turned on too suddenly. In connecting up for use the tightening of the joints would cause oil to percolate round the threads. With dried leather no joint could be got, and a certain quantity of grease was necessary. By the use of beeswax one could get a tight joint. The gauges which were first used were all tested with oil, and it was only by these explosions that they became aware of the danger. The oxygen created sufficient heat to carbonise the oil and explode the gauge tube. Remarking that it was difficult to light steel spring, he said it was a question whether steel had not a greater affinity for oxygen than other metals, because in many of his valves, which were made of bell-metal, he had never known one of them to fuse, although the valve of the cylinder has fused itself. Fire did not attack the metal like steel. The tube in the Bourdon gauge was steel, and in these explosions they generally found a piece blown out, and sometimes fused, where the steel has not such an affinity for oxygen on account of the tubes being made of some other metal. He had tested 2000 regulators, each three times to 120 atmospheres, some to 150, and more than that, and never met with an explosion. He, however, always took care when turning the gas on.

Mr. A. Haddon observed that those who had attended lectures on chemistry knew that it was possible to burn steel in oxygen, and in order to do this it was absolutely necessary that the steel spring should be tipped with a substance which is ignited before the steel was plunged into the oxygen. Oil did get to the valve, and by the sudden pressure of the valve combined with the oil fires. Thus there were the necessary conditions. It did not require very high pressure to ignite certain substances. He proved this by demonstrating that sudden atmospheric pressure was sufficient to ignite tinder. He was of opinion that this explosion was entirely due to the presence of oil in the valve. It was a question whether phosphor bronze could not be used instead of steel; it would be far preferable, as it would not have the same likelihood of firing.

Mr. J. Hay Taylor mentioned that he had recently received a letter from a lanternist, who asked him if it was not safe to pour a little oil into the cylinder.

Mr. G. R. Baker remarked that only the day previously he had found the

valve of a cylinder very hard to open, and had to use considerable force ; as it got hot, he very quickly turned off the valve. He thought that in the connexion of the gauge to the cylinder it should never be screwed up tight, and they would not have accidents. He suggested ratchet keys for the regulators. Compressors should be more careful, and not screw up the connexions so tight.

The meeting then adjourned.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 15,—Mr. J. Traill Taylor in the chair.

Mr. J. D. Slater and Mr. W. Walker were elected members of the Society.

Mr. W. BISHOP (the Hon. Secretary) in introducing the subject of carbon printing, said that he was glad to have the opportunity of doing so, as he believed amateur photographers did not give the attention to this beautiful process which it deserved. Whether for the beauty and variety of its results, the simplicity of its operation, or the permanency of its prints, the process of carbon or pigment printing had much to recommend it; while the fact that almost all the working could be carried on in daylight, or full gaslight, was a great comfort and convenience. The action of bichromate of potash on gelatine was then described, and a brief history given of the process, with reference to the original experiments of Poitevin and others, followed by the discoveries of Swan in 1867, Johnson in 1868, and Sawyer in 1874, as well as to the work of Woodbury and the Autotype Company in popularising the system. The various operations of sensitising the tissue, printing, developing, and transferring to the final support were in turn spoken of, and the use of the actinometer in judging exposure explained. The lecture completed, the demonstration followed, a number of prints which had been exposed during the day being mounted and developed, some on glass as transparencies, some on single transfer, and others on the temporary support, the final support being then attached to be stripped when dry. For the purpose of completing the demonstration, some prints which had been developed and attached to the final support the previous day, and were now dry, were stripped from the temporary support, and the result shown ready for mounting. In one case a negative film of celluloid had been used as a temporary support.

A collection of specimens of pigment printing showing the various colours available had been kindly lent by the Autotype Company as illustrations, and were much admired. The lecture and demonstration gave great interest to a well-attended meeting, and a cordial vote of thanks was passed at its close.

It should be mentioned that Mr. Bishop's own specimens as brought completed by him included a proportion of failures, the causes and cure of which were explained for the information of beginners at the work. The apparatus used was of the simplest character, being mainly a number of tin dishes for holding water, and a porcelain developing dish for alum. A glass slab for mounting, a squeegee, some blotting boards, and a kettle of hot water, completed the outfit.

In the conversation which followed the CHAIRMAN referred to his carbon experiences in the early days, and cordially recommended the process, which, he said, he could never write or speak of without enthusiasm.

Questions were asked from the question box as to the cause of muddiness in a ferrous oxalate developer, and it was generally considered that it was caused by insufficient acid; and next, as to the preparation of a lead intensifier, which the Chairman promised to take an opportunity of answering.

Mr. MACKIE announced the affiliation scheme of the Photographic Society of Great Britain as in course of completion, and stated that a notice referring to that scheme would shortly be received.

CAMERA CLUB.

DECEMBER 10.—Mr. T. R. Dallmeyer gave a description of his new telephotographic lens. Mr. Francis Cobb occupied the chair. Mr. DALLMEYER, in the course of his description, referred to diagrams on the board. The object is to make possible the production of very large images of distant objects without cumbersome or extensive apparatus. This is most perfectly accomplished, as was shown by some wonderful comparative examples of objects photographed respectively by a 10×8 rapid rectilinear lens of thirteen inches focus, and by the new lens with the same extension of camera, the images by the "tele" lens being five times the size of those obtained by the ordinary instrument.

Some remarks were afterwards made by Messrs. Traill Taylor, Elder, Hayman, and by Dr. Fison and Dr. Lindsay Johnson.

Dr. A. H. FISON then followed with his subject, *The Application of the Optical Lantern to Scientific Illustration*, Mr. H. E. Davis being in the chair. Dr. Fison showed how, by means of the lantern, beautiful and valuable experiments could be made easily visible to a large audience in a way unattainable by other methods. His practical illustrations included some excellent photographs of scientific apparatus and a series of experiments illustrating the subject of magnetism and electricity.

At the conclusion of the meeting, votes of thanks to Mr. Dallmeyer and Dr. Fison were carried by acclamation.

HOLBORN CAMERA CLUB.

DECEMBER 11.—Mr. Alfred Hodges in the chair.

Mr. A. J. GOLDING gave a lecture on *Composition and Selection of Subject.* [This will appear in a future number.]

Messrs. Rennie, Brocas, Stevens, Raphael, and other members took part in the discussion which followed.

HACKNEY PHOTOGRAPHIC SOCIETY.

DECEMBER 10,—Mr. John Reynolds in the chair.

Mr. W. H. SMITH gave a paper and demonstration of a new paper the Platinotype Company are about to bring out in about six weeks' time. It was three or four times as rapid as the silver paper, and could be developed in a cold bath with biphosphate oxalate of potash, using the usual hydrochloric bath as a clearer. The cost would be about three halfpence for four half-plates, and the results would be certain. He demonstrated the printing on this paper by artificial light, using powdered magnesium and oxyhydrogen light. Giving an exposure of fifty seconds with this light on negative, a fair print was obtained on development. The rough way in which he handled the paper, creasing it and then developing it without least trace of line or mark, caused considerable astonishment.

Messrs. T. Byrne and J. Badcock were nominated for membership.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 7,—Mr. F. W. Edwards (president) in the chair.

Mr. HENRY CROUCH delivered a lecture on *Lenses.* The causes of spherical and chromatic aberrations, and the means of correcting these defects were fully explained, as were also the conditions affecting depth of focus and flatness of field. The lecturer stated that true perspective was obtained with a wide-angle, *i.e.*, short-focus, lens and spoke very favourably of single lenses. Specimens of Jena, crown, and flint glass were exhibited, and their properties discussed.

BRIXTON AND CLAPHAM CAMERA CLUB.

THIS Club held a reception on Saturday last, the 12th inst., to inaugurate the opening of its new quarters at the Clarence Rooms, 376, Cold Harbour-lane, Brixton, when some 150 members and friends were present. This large company met in the drawing-room, on the walls of which were hung a number of pictures taken by members of the Club. There were also some portfolios containing bromide enlargements by Mr. Dresser, which attracted much attention. At about eight o'clock those present adjourned to the new meeting room, which had been arranged for a lantern exhibition. The Club lantern, which was manipulated by Messrs. Sevett (the hon. secretary) and Bevins, was used on this occasion.

RICHMOND CAMERA CLUB.

DECEMBER 11,—The President (Mr. Cembrano) in the chair.

The first business was the decision, by vote, of the "Outing Competition," that is, for the best picture from a negative taken at one of the Club outings during the past summer. About two dozen prints were entered, and the first place was secured by the Hon. Secretary, Mr. P. Ennis, with a charming little view of Kew Bridge, one of the set of four which has just gained a medal at the Leeds Exhibition. The next function was the inauguration of the new Club lantern, an excellent instrument by Ottway, the selection of which had been judiciously entrusted to the President. This having been, more or less, solemnly dedicated to the use of the Club, the evening was brought to a close by the exhibition of a few slides by members, including an interesting portrait of Niépce, reproduced by Mr. Ramsay from a woodcut in an old French work of forty years ago.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

DECEMBER 10,—Mr. F. S. Goode in the chair.

M. J. H. PICKARD gave a paper *On Enlarging.* In the course of his remarks he strongly advised members to carefully read the article "On Enlarging" written by Mr. Traill Taylor, which was published in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC of 1888. He also referred to the excellent paper recently read by Mr. Chadwick at Manchester; the method described by Mr. Chadwick was very similar to that adopted by himself. Mr. Pickard then showed the method of operating. He first used a Griffiths enlarging camera, one 10×8 fixed focus, and a second 12×10 adjusting focus, using Ilford rapid paper and a Hibbert's flash lamp. Some good results were obtained and shown. Afterwards with an Eastman lantern and their new rapid paper, replacing their oil-lamp by magnesium ribbon on account of time. He produced from a quarter-plate negative a 15×12 enlargement; the ribbon used was about sixteen inches of ordinary gauge. Mr. Pickard toned with uranium, and satisfactory results were obtained.

DECEMBER 11.—The lantern slides sent by the California Camera Club was shown before a large meeting by Messrs. Harrison and Jacques, the latter operating the lantern. Many of the slides were of great technical merit and interest, being taken chiefly in the Yosemite Valley. Mr. W. Lowe suitably acknowledged the obligations of the Society to the California Camera Club.

The Warwickshire Survey Section of the Society has lately been busy organizing the work to be done during next season; the results so far obtained have given much satisfaction to the members who initiated the movement.

MANCHESTER PHOTOGRAPHIC SOCIETY.

DECEMBER 10,—Mr. Abel Heywood, jun., presided.

Mr. Charles Lord was elected a member, and the Rev. Canon Beechey, one of the oldest members of the Society, was elected an honorary member as a token of the respect and esteem of his fellow members.

The remainder of the evening was spent in the inspection of a large number of prints and transparencies contributed by Messrs. Coote, Cobley, Edwards, Thompstone, Wolff, and Wood. A collection of lantern slides, chiefly members' work during the past summer, was exhibited.

ROTHERHAM PHOTOGRAPHIC SOCIETY.

DECEMBER 8,—Mr. E. I. Hubbard (Vice-President), in the chair.

The TREASURER (Mr. James Leadbeater), read a paper entitled, *A Peep into Nature through the Microscope Lantern.* The various objects on the microscope slides were projected on a screen, having a disc eight feet in diameter. The lantern attachment, to enable this operation to be successfully performed, had been designed by Mr. Leadbeater himself. By its means several objectives can be in readiness for service, and a single movement is all that is necessary to

bring any one of them into operation. Provision is also made for quick centering and focussing by rack and pinion. Not the least interesting part of the proceedings was the exhibition of the specimens of insects, &c., under various powers.

The photographic portion of the evening consisted of the examination of negatives sent in to the Society's annual competition.

DERBY PHOTOGRAPHIC SOCIETY.

DECEMBER 8,—Mr. R. L. Warham in the chair.

Mr. THOMAS SCOTTON was called upon to give a paper entitled *A Trip to the Isle of Man*, illustrated with the lantern. This gentleman very graphically described the journey, as the slides were placed on the sheet, *vid* Barrow-in-Furness, returning by Liverpool and the well-known Derbyshire scenery. A series of "Isle of Man" slides were also shown by R. L. Warham, and miscellaneous sets by Messrs. Rowney and Smith. A set of "Hand-camera" prize pictures were also exhibited. Mr. J. A. Panton was elected a member.

IPSWICH PHOTOGRAPHIC SOCIETY.

DECEMBER 9.—Demonstration by Mr. Howson, of the Britannia Works Company, Ilford, of the Company's new printing-out paper, and special lantern slides.

Mr. HOWSON proceeded to exhibit a number of beautiful prints showing the varied tones and degrees of gloss of which the papers are capable. He then toned a number of prints before the meeting, after which he proceeded to make and develop four lantern slides (from a negative lent by one of the members) giving them exposures of very different lengths; one of them, indeed, he produced by the light of a wax match, and succeeded in making excellent slides of them all, a feat the value of which will be appreciated by all practical photographers.

Correspondence

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

THE PHOTOGRAPHIC SOCIETY.

To the EDITOR.

SIR,—I doubt whether any good can result to the Photographic Society from the decision, apparently authorised by a Council meeting, to have the unfortunate incidents connected with the recent Exhibition discussed in open meeting and publicly reported. As, however, the authorities have thought well to court further declaration of the mismanagement and internal dissensions of the Society, and as my action has been freely commented upon, I feel compelled to ask you to kindly allow me to correct some of the very partial statements which have been officially made.

In regard to the removal of my pictures from the Exhibition, I wish to state in reply (1) that I was induced to send in my photographs, although late, by an invitation which came from one or more of the Exhibition Committee through a Vice-President of the Society. (2) That they were accepted and hung by the Committee, not by any mistake, but on the distinct understanding that they were "for competition." (3) That, with this definite understanding, they were kept upon the walls *more than six days* (until even the judging was nearly complete). (4) That at least two out of the four active members of the Exhibition Committee actually signified their approval and satisfaction at their being hung without restriction. (5) That their removal from the walls was not carried out by the Exhibition Committee at all, but was due to the admittedly arbitrary interference of Captain Mantell, who had absolutely no jurisdiction whatever, and (6) that this was done in spite of the standing order (printed by the Executive as a Bye-law) that pictures once hung by a member of the Hanging Committee are not to be moved by any other member.

It now appears, from the admissions made by the Assistant Secretary, that, in consequence of his inexperience, he made the mistake of supposing that there were only two days for the hanging of the pictures instead of six, and so he rejected, apparently on his own responsibility, and to the detriment of the Exhibition, the work which came a bit late from several prominent members. As the Exhibition Committee did not remove my photographs, he, at the instigation of one member of the Committee, wrote to Captain Mantell, who was in Devonshire. Captain Mantell, instead of declining to interfere with the Committee's work, judged it right to defer the whole matter for *four or five days* until it was convenient for him to come to town.

I think the narrative speaks for itself as an unfortunate picture of confusion and want of tact.

I intend no personal complaint of my friend Captain Mantell, save as to his judgment. He is always the perfection of courtesy and firmness; but may I suggest that military methods have possibly spoilt him for the delicate task of exhibition management?

It ought, perhaps, also to be stated that the cause of the resignations of Messrs Robinson, Blanchard, myself, and, I believe, others, was not only the irregularity of the proceedings of the Assistant Secretary, but also his inability, shown in several instances, to perform his duties without undue assumption and offence, and, further, the refusal of the Council and chief officers to take any notice of these very general grounds of complaint.—I am, yours, &c., G. DAVISON.

December 14, 1891.

To the EDITOR.

SIR—The condensed report in your last issue of my remarks at the meeting of the Photographic Society of Great Britain being liable to misconstruction, perhaps you will insert the enclosed, taken from the official report, which is nearly *verbatim*.

"Mr. W. E. Debenham said he should like the minutes of the Council referred to. He had no remembrance of any promise or offer of assistance on the part of Mr. Robinson. Certainly Mr. Robinson was requested to act, and he declined to do so. He did not think that the Council would, by any means, all have acquiesced in some one being present at the hanging without its being known to the members."

Two justifications have been offered for Mr. Robinson's insistance upon remaining at the hanging after a request from the Committee to retire; one by Mr. Robinson himself, who says that he was present "in the gallery by right, as a vice-president, a right provided for by the bye-laws of the Society." The so-called bye-law, which only inferentially gave all members of Council a right to be present, has been declared by the President to be expired with the Council that years since passed it; so dead, indeed, that he refused to allow a motion for its repeal to be put, and only permitted the putting of a resolution in the altered form, that the Council recognised that that and other "bye-laws" were expired, and of no effect.

The other justification was put forward by Mr. Chapman Jones, who said that Mr. Robinson had promised the Council that, if he could, he would "lend a hand." This implied acquiescence by the Council in an irregular addition to the Hanging Committee, without the sanction or knowledge of the other members, or of the public, was what I considered had not been given, and as the minutes on being searched made no reference to any such offer on the part of Mr. Robinson, and as other members of Council who had been present also repudiated any knowledge of it, it may be inferred that any such promise was in the nature of a private one to Mr. Chapman Jones, and not to the Society or Council generally.—I am, yours, &c., W. E. DEBENHAM.

December 14, 1891.

To the EDITOR.

SIR,—On reading your report of the last meeting of the Photographic Society, and your one-sided leader thereon, I do not see anything to which I need reply, except the following from the latter. Minor emphasised inaccuracies, such as that "I entirely failed to remind the official" that I was within my rights, are of little consequence.

You say that "certain allegations have been made imputing the most unwarrantable 'farming' of the places of honour on the walls of the Exhibition, which we should be glad to see refuted," and you add, rather venomously, "if it is possible to answer them." This certainly calls for some reply from me. No picture was placed or positions definitely settled while I was present; but, assisting the Hanging Committee, as I was doing, by invitation of the only member of any experience, the acquiescence of the other, and according to my promise to the Council to help unofficially, I, of course, had a preliminary talk with the two present as to where the pictures should be hung. That I favoured my friends by my suggestions—I had no other power—except in the sense that all good photographs are, I hope, my friends, I very emphatically deny.

As to my own pictures, that is a very simple matter. I had three only, of moderate size. As far as I recollect, as I was about to leave in the evening, after working apparently very amicably with the two members the whole day, one of them said something about where my frames were to go. I replied, lightly, "Oh, anywhere about the old spot; I always like that wall." I cannot say these were the exact words, but it was something to that effect. But when Mr. Mackie quotes me, as he does, to say, "*This* has always been considered the place of honour in the Gallery, and I should like my pictures placed there," he says that which is not only not true, but would not be believed of me by any reasonable people if true. The sentence confutes itself, and must have been due to that inventive power which Mr. Chapman Jones, who was an eye and ear-witness, suggests has been brought to bear on this matter. I am the more confirmed in this because I remember that early in the day I pointed out to Mr. Mackie, as a new and inexperienced member, which were technically the points of the room; but I knew him, by reputation, too well to give myself away to him by using such a sentence; and that Mr. Lawrance should ascribe to me something like the same words suggests an agreement as to what should be said that is not very creditable.

Permit me to say, in conclusion, that this is the end of my thirtieth year on the Council. During that long period I have conscientiously done all that was in me for the good of photography, and I am not ashamed of the record. In the Society I have chiefly concerned myself with the Exhibition, and I think it will be admitted by all that, until the

ast, it has been the best thing the Society has had to point to as a justification of its existence. If I ever again had anything to do with the management of an exhibition, I would admit the press freely before and after the doors were opened. An exhibition cannot be too much advertised, and, perhaps, admitting *all* the journalists without distinction would tend to remove or ameliorate those petty journalistic jealousies which have been at the bottom, more or less, of all the dissensions that have occurred in the Society from the beginning. I have not been anxious to mention it, but it now comes out in Mr. Mackie's statement that yet another photographic editor came into the Gallery, and complained to Mr. Mackie of the presence of the other. Of course, as journalists, neither had any business there except by the courtesy of the Committee. The one with me was there with the acquiescence of the only member of the Committee present when he came in, not as a journalist, but on other business; the other, who complained, was *the Editor of* THE BRITISH JOURNAL OF PHOTOGRAPHY.—I am, yours, &c., H. P. ROBINSON.

Tunbridge Wells, December 12, 1891.

[Holding in view the practically unanimous vote of the meeting in endorsing the action of the Council in supporting both Secretaries in doing their best to uphold the rules of the Society, as well as the fact that Mr. Bird's resolution of regret was withdrawn without being put, our equanimity at Mr. Robinson's charge of one-sidedness remains undisturbed, and we are quite willing to bear it without further argument until he disproves the evidence against him which was adduced at the meeting. Mr. Robinson says he promised the Council to help, unofficially, at the hanging. The minutes of the Council contain no mention of such a promise, and individual members of the Council then present have no recollection of it. To whom, then, did Mr. Robinson give the promise? Mr. Robinson further stigmatises as "venomous" our action in questioning the possibility of his answering a charge, made, it is true, by those opposed to him, but strangely, nay, fatally, corroborated by Mr. Robinson's own chosen authority and supporter, Mr. H. Chapman Jones. If this is what Mr. Robinson considers "venomous," we welcome the imputation. But Mr. Robinson asserts that Mr. Mackie's statement is untrue. Why, then, does he not dispute the accuracy of Mr. Jones's memory? Why, too, rely on his own, when he cannot say the exact words he used? We shall be glad to have Mr. Robinson's reply to these questions. Again, Mr. Robinson says that the Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY lodged a complaint against the presence, at the hanging, of a journalist who was there "on other business." Exactly; but the journalist in question was accompanied by two other journalists—namely, Mr. Maskell and Mr. Robinson himself—both of whom are, or are supposed to be, members of his staff. Under such circumstances, we should hope that any self-respecting journalist in the then position of the editor of THE BRITISH JOURNAL OF PHOTOGRAPHY would not fail to complain immediately of what undoubtedly appeared to be a piece of gross favouritism on somebody's part. Mr. Robinson incidentally informs us that "petty journalistic jealousies have been at the bottom, more or less, of all the dissensions that have occurred in the Society from the beginning." Possibly; but, without following Mr. Robinson back to the beginning, it is a source of regret to us that, as a journalist himself, Mr. Robinson should in latter days so nearly incur the accusation of being the means of instigating the very jealousies which he now deplores.—ED.]

THE LANTERN MICROSCOPE.

To the EDITOR.

SIR,—Mr. Chadwick is not quite so straightforward as he might be. Mr. Furnivel never gave me any instruction in the manipulation of the lantern microscope further than an explanation when I bought one from him. Mr. Furnivel is *not* one of the experts referred to by me. It is, of course, easy to twist about and confuse meanings, but Mr. Chadwick cannot alter the fact that, in a careful trial, there was no doubt that Leach's came out second best. As Mr. Leach has made it a personal matter, and is indulging in what Mrs. Gamp calls "langwidge," I have nothing to say to him. I get the best results with Furnivel's arrangement; this is quite sufficient for me, and is all I intended to convey in my letter, and all I intend to say on the subject.—I am, yours, &c.,

Warrington, December 14, 1891. THOMAS FLETCHER.

To the EDITOR.

SIR,—Mr. Leach and Mr. Chadwick have now come to the same conclusion which I have contended for in my previous letters, that *high* powers cannot be used to the lantern microscope with anything like success, and where high powers are required for science teachers it entirely fails. And, again, I assert, with the authority of the mounter of the section, that the structure which Mr. Leach contends is in the section is not to be found in any vegetable section. If this authority is not sufficient, will Mr. Leach, being by profession a photographer, and Mr. Chadwick an expert in photography, take a photograph of the section, and show to us the structure in question? This ends my remark on Mr. Leach. The assertion of Mr. Chadwick's, that he has it on my own statement that I have been several times to Mr. Fletcher to instruct him in the working of the lantern microscope is erroneous. I have not been down to Mr. Fletcher's to show him how to work the microscope. I was commissioned by Mr. Fletcher to go and illustrate his lecture given at Warrington.

If Mr. Leach can get the Council of the Manchester Microscopical Society to devote an evening to the test of what lantern microscopes will do, I am prepared to show, side by side with either Mr. Leach or Mr. W. I. Chadwick, the results, to be published, by your permission, in your valuable JOURNAL.—I am, yours, &c., J. A. FURNIVEL.

Manchester, December 14, 1891.

[We have also received a letter from Mr. A. Flatters, who prepared the object or objects to which allusion has been made, in which he says that Mr. Furnivel, during his exhibition, acted under his directions as to what power to use, that the exhibition was not for the purpose of showing special vegetable structure, but for illustrating his (Mr. Flatters') paper *On Cutting and Staining Vegetable Tissue*, and he says that he was delighted with the result, which was perfectly satisfactory. This correspondence here terminates.—ED.]

GAS EXPLOSION.

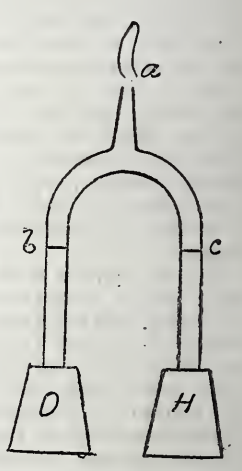
To the EDITOR.

SIR,—"Another Gas Explosion" is a fitting comment upon the lopsided evidence of Mr. Jackson, of the Manchester Oxygen Company, at the coroner's inquest upon the Ilkeston disaster, when he stated that, owing to the frequency of such accidents with bags, cylinders only should be used. Has he forgotten that the foreman of the Scotch Oxygen Company was killed when the cylinder was not even in use, and that another party got several hundred pounds compensation for the loss of his eye in using cylinders? It is a pity the coroner was so much impressed with this gentleman's evidence as to recommend the use of cylinders only in future. Considering the time they have been in use, there may have been quite as many accidents with cylinders as with bags. A cylinder of gas, packed to a pressure of 125 atmospheres, may be regarded as a bomb, if there is any structural weakness or flaw in the metal work; the contents went out into cosmic space by the path of least resistance.

In filling gas bags at large institutions, care should be taken to see that all the air in, it may be, a long and thick tube, is first expelled.

Old bags are said to yield a decomposition product of sulphur, or a compound of it. A very new bag might yield up vapour of benzol or mineral naphtha. These would be innocuous in the hydrogen bag, but might be dangerous in the oxygen bag.

Now, I wish to ask if any of your readers have ever tried to make an explosion with properly filled gas bags through properly made burners, proper connexions, and properly made dissolvers, but by varying the pressures to what is considered a dangerous extent?



I will try to show that an explosion cannot be produced in this way. Diagrams will show what I mean, and I am open to correction.

When all is right the two gases burn steadily at *a*. Now, suppose the pressure upon O pushed the H back to C, leaving only oxygen at *a*, which, not being a combustible gas in air, the flame would go out, would it not?

Again, suppose the pressure upon H prevailed so as to push O back to *b*, there would either be a snap of the jet tubeful, extinguishing the light also, or there would be a hydrogen flame only at *a*, which tap open full at O could not improve. No doubt, if this were allowed to go on, the mixture might become dangerous, but it is inconceivable that an accident could happen when everything is correct to start with.

I have removed and changed weights with an open mixing jet burning without an explosion taking place; one of my assistants had a weight tumble off without causing trouble, and I have had ten to twelve gas bags in use all at once, connected by T-pieces, so that each pair supplied two or three burners, when all went well.

For experimental work in this line I would suggest the use of mercury manometers, to show whether pairs of bags or cylinders were working under similar or different pressures.

I do think the time has come when some restriction should be put upon *any one* using the limelight.—I am, yours, &c., ARTHUR SEET.

DOES THE LATENT IMAGE FADE BETWEEN DEVELOPMENT AND EXPOSURE?

To the EDITOR.

SIR,—I was much interested in Mr. Leisk's letter, also your remarks which appeared in your last impression, especially as it bears out my experiments made some years ago which I exhibited at the London and Provincial Photographic Association. Your readers may remember that I took some plates to the Association; they were initialed by several members in a strong gaslight. At the following meeting I exhibited perfect negatives on the identical plates. I was induced to make the experiment more "by chance than good guiding." At a previous meeting of the Association I exhibited some delicate sensitometer tests; the details were such that, had they been fixed, the fine and most delicate gradations would not have been visible by gaslight in order to stop the action of the developer (ferrous oxalate). I flooded the plate with a solution of bromide of potassium acidulated with nitric acid. This answered the purpose admirably; but, judge of my surprise when, on opening the box a few days after, to find that the metallic image had disappeared showing a re-conversion of the reduced silver also. I am quite sure that your explanation is correct. Emulsion for coating paper does not require (and it is better without) so much washing as for plates; but there is the danger, if damp, of the image disappearing more or less.—I am yours, &c.,

A. L. HENDERSON.

Argyle Mansion, Brighton, December 13, 1891.

THE NEW METHYLATED SPIRIT IN COLLODION.

To the EDITOR.

SIR,—In your last issue Mr. J. Whitfield, F.C.S., opines that I have wasted my time in the experiments recorded in my article the week previous, and suggests that I should repeat them with benzine or coal-tar naphtha. The excise order referring to the "new" methylated spirit does not mention *coal-tar* naphtha, but "*mineral* naphtha of a specific gravity of not less than ·800;" and, as Mr. Whitfield must be aware, that term is synonymous with "petroleum" or "rock-oil." Boghead or Bathgate naphtha—*alias* "paraffin oil"—may, equally with coal-tar naphtha, be classed as "mineral," if he chooses; but while benzoline is petroleum, as a rule (though, I believe, sometimes certain grades of shale or paraffin oil are sold under that name), I am pretty confident that benzine is (to quote him) "certainly not at all the article indicated by the Excise," for the following very cogent reason: A pharmaceutical chemist, it is true, in compounding the new spirit, would, no doubt, employ the purest specimen of naphtha obtainable, and charge for it as he would in dispensing an ounce of Epsom salts and eight ounces of water; but it must be remembered that the methylator has to use something that he can afford to sell at about *fourpence the pint. Ergo*, I imagine benzoline is far more likely to be the chosen article than "benzol rect."

Though Mr. Whitfield has been somewhat hasty in putting pen to paper in this matter, I may inform him that I had already "repeated" the experiments for the sake of comparison, using Hopkin & Williams's "purified benzole No. 1" (price, I think, eighteenpence or two shillings per pint), but without any material difference in result.—I am, yours, &c.,

December 14, 1891. W. B. BOLTON.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITOR.

SIR,—Will you permit me to say that, in response to private appeals, I have been favoured with several contributions during the last and present months; but I feel sure that some intending donors are amongst those who have not yet replied, and, by your favour, I should like to remind them that the accounts must be closed for audit at the end of the year, so that the Hon. Sec., Mr. H. J. Beasley, of 65, Chancery-lane, and myself are most anxious to get in all donations and outstanding subscriptions during the next fortnight.

Thanking you in anticipation for your kind insertion of this letter,—I am, yours, &c., JOHN SPILLER, *Treasurer, P.B.A.*

2, *St. Mary's-road, Canonbury, N., December* 16, 1891.

THE CHICAGO EXHIBITION.

To the EDITOR.

SIR,—Some little time ago my attention was drawn to the fact that the classification for the Chicago Exhibition did not provide for the exhibition of photographs. I wrote on the subject to the Director General, and he now informs me that the classification has recently been revised and is now in process of publication. Photographs will be included in the group devoted to "Instruments of Precision, Experiment, Research, and Photography." They will thus be included in the Department of Liberal Art, and not as at Philadelphia, in 1876, in the Department of Fine Arts.—I am, yours, &c., H. T. WOOD, *Secretary.*

Society of Arts, John-street, Adelphi, London, W.C.,
December 14, 1891.

THE PHOTOGRAPHIC CLUB.—Wednesday, December 23, *Washing Prints.* 30, Monthly Lantern Meeting.

Exchange Column.

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

Wanted, a 12×10 and whole-plate cameras in exchange for valuable accessories.—Address, B. BENNETT, Taylor's-hill, Galway, Ireland.

Wanted, first-class studio camera, 10×8 or whole-plate, in exchange for nine-carat gold albert and seal. Approval each way.—Address, J. H. BLACKBURN, Granville-street, Colne, Lancashire.

Wanted, whole-plate camera complete, or larger, in exchange for pair of blue Pouters and pair of Carriers. Cost 10*l.*—Address, J. D. MCCRAE, 7, Sandringham-terrace, West Green-road, Tottenham.

Will exchange fine-toned violoncello and bow, good condition, for 10×8 or whole-plate camera, lens, or what offers photographic apparatus?—Address, J. H., 23, Chadwick-street, Wallsend-on-Tyne.

Wanted, a safety bicycle in exchange for half-plate long-focus camera, all latest movements, equal to new, two double backs, new front for lens, suitable for studio or field.—Address, H. M., 26, Arlesford-road, Stockwell, S.W.

Wanted, 12×10 modern landscape camera in exchange for Marion's "Empire" pattern eight and a half inch square studio camera, perfectly new. Cash difference (if any) adjusted.—Address, CHARLES JOHNSON, Photographer, Gillingham, Dorset.

Wanted, a whole-plate or 10×8 camera. Will give in exchange an American combination accessory, almost new, endless variety of changes, cost 9*l.* 10*s.*; or will give a card self-inking platen printing machine and type, &c., almost new, cost 3*l.* 10*s.*—Address, STRINGER, 73, North-street, Colchester, Essex.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:—
W. H. Fischer, Withington, near Manchester.—*Photograph of Bust of Sir Charles Halle, Knight.*
R. C. Phillips, Manchester.—*Portrait of Miss H. E. Colenso.*

JOHN HARMER, and others.—Received.

H. I. KNIGHT.—Thanks for the correction.

W. A. P.—See short article in last week's JOURNAL.

A CONSTANT READER and A. W.—Send your names and addresses.

MICHIGAN.—1 and 2. Not to our knowledge. 3. Carbonate of soda.

GILBERT STRINGER.—Send the photograph and 1*s.* 6*d.* to our publishers, who will register it for you.

F. A. B.—Mr. J. R. Gotz, of 19, Buckingham-street, Strand, publishes a small book on Conjugate Foci.

ROLAND WHITE.—1. There is a formula in the current ALMANAC, which is as good as any. 2. A solution of ferrous sulphate.

E. MORRALL.—1. Ground rice may be obtained at any grocer's. 2. Caramel is burnt sugar. Put a little sugar in an iron ladle, and apply heat.

W. H. HAYLES.—There are many firms in London that do photo-mechanical printing. Consult our advertising columns and those of the ALMANAC.

R. W. T. and F. C. Sharp are thanked for their subscriptions to the Maddox Fund, which have been passed on to Mr. Francis Cobb, the Hon. Treasurer.

J. THOMAS.—Thanks for the photograph of the storm; the effect is curious. However, the photography is too imperfect to be of any value from a pictorial point of view.

S. A. C.—Yes; it is quite possible to make an aqueous solution of shellac. To do so, boil the lac in water, in which borax has been dissolved, in the proportion of two ounces to the pound of lac.

C. PIPER.—The only way we can suggest for you finding a customer for the negatives is to advertise them for sale in the columns devoted to that purpose, at the same time giving some idea of their character.

JAMES BRIGHTWELL.—There is no work on vitrified enamels published. Our volumes for 1883 and 1885 contain a great deal of information on the subject, and there is also a series of articles in the JOURNAL a few months ago which treats of it fully.

NORTH LONDONER.—The formula for the lead intensifier is: Nitrate of lead, 2 drachms; ferridcyanide of potassium, 3 drachms; water, 12 ounces; glacial acetic acid, 1½ ounce. The subsequent treatment is with a solution of permanganate of potash, or, if a less degree of density is wanted, with bichromate of potash or chloride of copper.

J. NASH.—Although you may have got a "perfect silver surface" on the mirror, that is not all that is necessary for taking sharp reversed negatives. The glass itself is a prime factor in the case. It must have a plane surface, or it is of no use. Hence your trouble. Lenses sometimes have been condemned through the imperfections of the mirror.

W. NEWTON writes: "I thank you for the article in last week's JOURNAL *re Spots on Prints.* The cause there assigned for them fully accounts for an immense deal of trouble I have experienced during the last two months, and which I was much perplexed with last winter, while I was free from it during the summer months. I use a slow-combustion stove, burning coke, in the work-room.

L. MONTAGUE writes: "I shall be greatly obliged if you will inform me (1) what quantity of collodio-bromide emulsion will cover a plate $6\frac{1}{2} \times 3\frac{1}{4}$; and (2) the most convenient article to measure with."—1. It will depend upon the viscosity of the emulsion. 2. No measuring is required. Simply pour on the emulsion, and then drain it off slowly; sufficient will then be left on the plate.

ANDREW W. (Edinburgh) asks whether electric light from a battery is possible for portraiture. He says he has a Bunsen battery of fifty cells, but is told that for portraiture, even in an amateur way, a battery is of no use.—Our correspondent is misinformed. The light evolved from a battery is quite as good as that from a dynamo, provided it be of equal power. A fifty-cell Bunsen battery will evolve a light that will enable good portraits to be taken, if it be judiciously employed.

PROVINCIAL puts the following query: "Can any one who supplies mounts, guaranteeing them to have no injurious action on the pictures, be proceeded against for damages provided that the mounts do cause fading within a few months, and the reputation of the photographer suffers thereby?"—If the mounts which are guaranteed inert cause fading, our correspondent has good ground for action. Of course, he will have to produce conclusive evidence from experts, when the case comes into Court, that the mounts are the cause of the fading.

MR. A. MASKELL writes: "My attention has been called to the report in your columns of a meeting of the Photographic Society of Great Britain, at which some incidents relating to a recent exhibition at the Society's gallery were discussed. I shall only say that, so far as the introduction of my name is concerned, the account given by the Assistant Secretary is not accurate. The matter, however, does not trouble me in the least, and I certainly do not intend to enter into any controversy on the subject."—We are at a loss to see the *cui bono* of this communication.

MR. P. H. NEWMAN writes: "As blisters in prints seem to be a prevailing epidemic, and all sorts of theories as to their origin are followed by all sorts of specifics for their remedy, I should like to be allowed to say that my experience is practically the same in all respects as that of Mr. C. Burton Barber. During twenty years I have never been troubled but on one occasion by blistered prints, and that was when I omitted to lay them in salt and water before fixing. Perhaps Mr. Barber, like myself, does not buy paper that is cheap and, in more senses than one, nasty.

MOTHER asks if we consider two hundred and fifty pounds a reasonable sum to pay with the apprenticeship of her son, aged eighteen, to a portrait photographer for three years, he receiving five, ten, and fifteen shillings a week for the first, second, and third year?—In reply, we should say that many first-rate portrait photographers would be glad of apprentices for such a sum and their labour. Unless the establishment be one of a very exceptional character, we doubt very much if, according to the present state of the labour market, the apprentice will receive anything like a *quid pro quo*.

CESTRIAN writes: "Mr. Sylvester Parry, in his letter published in your JOURNAL of December 4, maligns the good people of Cheshire when he infers 'they are so timid that they no longer care to go to lantern exhibitions, and if they do go they sit as far away from the lantern as possible.' At a lantern exhibition, held a few days ago in the lecture theatre of the Grosvenor Museum in this city, in connexion with the University extension lectures, the room was crowded to the doors, the audience being mostly composed of ladies, and the lantern operator complained that the crowd around him was so great that he had some difficulty in manipulating the lantern."

J. N. writes: "I notice in your columns last week a recommendation to printers to pour boiling water into sensitising dish in cold weather. Doubtless it's a good plan; but I do not know what kind of dish would stand that treatment. I use a glass-bottomed dish, which would certainly not bear water at nearly boiling point. A printer of mine tried the hot-water plan on a porcelain dish I had once, and that immediately cracked at all four corners. A thick, glass-bottomed dish, used for fixing, he also broke by pouring a very hot solution of hypo into it. Having this experience, may I be allowed to warn any who would like to try the hot-water method to pause and consider if the dish will stand it, as a destruction of a large porcelain dish is no joke."

T. H. TURNER puts the following queries: "1. What is the best way of dealing with over-exposed or thin negatives? Intensifying with mercury I have found unsatisfactory. Is there any other way of printing so that better results could be got from them? 2. What method of so-called *permanent* printing would you advise an amateur to take up—I mean what would be the *simplest* method to give good results? 3. Is there any method of mechanical printing an amateur could conveniently manage? I publish a parish magazine monthly, and should like to illustrate it with my photographs."—1. Mercurial intensification is good and the most simple. If the negatives are weak, vigorous prints can be obtained on bromide paper. 2. The carbon process and platinotype will yield permanent prints. 3. We should recommend collotype processes as being the most suitable for an amateur.

J. E. F. LEWIS writes: "I quite agree with Mr. F. G. Smith in his letter on the subject of blisters. I have tried the method he speaks of myself, but without avail. After my prints had been treated in the manner he describes, the blisters were much worse than before; in fact, 'their name was legion.' I should like Mr. Clarke and Mr. Bishop to explain the cause of this if what they hold up is a sure preventive. It may be in their hands, but it certainly is not in mine. There are many makers of sensitised paper who advertise their make as non-blistering. I myself have tried several of these makes, and have found them blister all the same. I do not think it at all fair to us that makers should gull people into buying their paper by advertising it what it is not. I would advise Mr. Smith to try the paper sensitised by Messrs. Mucklow & Co., of 2, Turle-road, N. It is a good reliable paper. It prints very quickly, and tones admirably with a borax bath, and is very free from blistering. If Mr. Smith tries this make of paper, I do not think he will have cause to complain of blisters after."

INQUIRER writes: "I, and probably some other workers, would be very glad if 'Lanternist' would say what new form of oxy-calcium jet he considers the best, as there are several mentioned in the papers, but not in any advertisements I can find."

ARTHUR E. KING writes: "Seeing the many disadvantages attending the use of the pressure gauge for ascertaining the quantity of oxygen in a cylinder, I venture to suggest the method of measuring the volume of gas by its weight. This plan is in general use by dentists to gauge the amount of N_2O in their cylinders, and I see no reason why it should not be just as useful to lanternists, although, owing to the much larger cylinders used for the storage of oxygen, it would be a little more difficult to determine a small difference in the weight. The practical application of this suggestion would be for every manufacturer of stored oxygen to stamp on, or otherwise affix, to each cylinder its exact weight when filled with air (or better, oxygen) at atmospheric pressure, and from these data it would be easy to ascertain very closely the amount of gas in the cylinder when in use. All that has to be done is to weigh the cylinder of gas as accurately as possible, and from this deduct the weight of the empty bottle, which gives the actual weight of the contained gas. This is then reduced to cube feet by dividing by 1·42 (the weight in ounces avoirdupois of one cube foot of 0). I need hardly add that the weight of the gas must be expressed in ounces avoirdupois before dividing."

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—December 24, No meeting; 31, *Warm Tones in Lantern Slides*. January 7, a paper by Mr. P. H. Newman on *Some Recent Exhibitions*. Visitors invited.

ERRATA.—A correspondent directs our notice to the fact that on p. 711 of the ALMANAC for 1892, in the "Elementary Chapters for Beginners," we advise the addition of the oxalate of potash solution to the iron. It should, of course, be *vice versâ*.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—Mr. C. H. Oakden, of 51, Melbourne-grove, East Dulwich, S.E., has been appointed Honorary Secretary (*pro tem.*) of the South London Photographic Society, in the place of Mr. S. W. Gardner, who has resigned.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.—The proceedings of the Council of this Association on November 9 and 10, 1891, at Anderton's Hotel, Fleet-street, were duly reported on November 20, 1891. A decision was then come to by the Council, and members of the profession, to deal only with those firms of "enlargers" who issued a "trade list," not putting the promiscuous public and amateurs on the same terms as the professional photographers, but protecting the latter in a fair and business-like manner. The profession will be pleased to learn that already the following firms have complied with the respectfully urged request of the Council, viz., Messrs. Elliot & Son, Barnet; Marion & Co., Soho-square; Autotype Company, New Oxford-street; Eastman Co., Oxford-street; Illingworth & Co., Sherin-road. The Council will be glad to receive the additional consent of all respectable firms, to be added to the above list. The Secretary urges upon all professional photographers the importance of becoming members of this Association (formed for the defence of their own interests), and that they should speedily communicate with him for that purpose.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN LECTURES.—In reference to the lectures which have already been announced, the Assistant Secretary of the Photographic Society of Great Britain writes us as follows:—"It has been arranged that during the present winter a series of lectures shall be delivered under the auspices of the Photographic Society of Great Britain upon subjects of interest to photographers with a view to the development of a scheme of photographic technical instruction of a more advanced character than that provided by elementary schools. Should the present experiment prove sufficiently successful to show that further efforts are likely to result in material benefit to the photographic community, without unduly taxing the resources of the Society, it is intended to consider the details during the summer in order to elaborate a more complete programme for next winter than is now possible. It is not, perhaps, too much to hope that the present movement may prove a modest beginning of a national photographic institute. The lectures now arranged will be delivered at the Photographic Society's Rooms, 50, Great Russell-street, on Tuesday, January 5, 1892, by Mr. T. Bolas, F.I.C., F.C.S., on *The Relations of Photography to the Industrial Arts;* on Tuesday, January 19, by Mr. Chapman Jones, F.I.C., F.C.S., on *The Distortion of Outline in Photography;* and on Tuesday, February 2, by Professor R. Meldola, F.R.S., &c., on *Photography as a Branch of Technology.* Admission will be by ticket, to be obtained on application to the Assistant Secretary of the Society. The number issued will be necessarily limited on account of the small space available, and preference will be given to applicants who are members of the Society or of affiliated societies, any surplus will be given to other applicants in order of application. A stamped, directed envelope should be enclosed. Further particulars will be duly announced."

*** As Christmas Day falls on next Friday, we shall go to press a day earlier than usual. All matter intended for the body of the JOURNAL should be received by us not later than Monday evening.

*** *We are very reluctantly compelled to hold over some Editorial Table matter, several Articles, Societies' Reports, and Letters.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1651. Vol. XXXVIII.—DECEMBER 24, 1891.

URANIUM TONING MODIFIED.

Some of our American friends are at great pains to point out that the method of toning bromide prints with uranium, which Mr. J. Weir Brown has repeatedly brought before the photographic world during the past year, is not new, either in the constituents of the formula employed or in the manner of its use; and they, therefore, put themselves to considerable trouble in denying the credit of the idea to the gentleman named. Uranium toning, as we remarked several weeks ago, has decidedly "caught on" with American photographers, and the attention it has received from experimentalists and practical workers has provoked the inevitable discussion on the historical aspect of the matter to which we are now alluding.

To the best of our knowledge, Mr. Weir Brown makes no claim for originality or priority in the application of uranium toning to developed bromide prints, and therefore the strictures of his American critics are somewhat beside the mark. It is quite true that a mixture of potassium ferricyanide, uranium nitrate, and acetic acid has been used years ago for intensifying negatives and toning glass positives, and we have no doubt Mr. Weir Brown was aware of the fact when he set himself to improve the tones of bromide prints by similar agency.

But, if Mr. Weir Brown is unable to appropriate the honour of being the "discoverer" of uranium toning, there is, undoubtedly, one respect in which we think all unprejudiced people will cheerfully concede him credit. This is, in having by his experiments in uranium toning, as well as his writings on the subject, and the many practical demonstrations of the value of the method which he has given, successfully called photographers' attention to the matter, and helped forward the movement in the direction of a reform in favour of warm tones on positive pictures. The revulsion from cold black and greys to sepias and warmer colours in photographic prints, which has recently taken place, has had great assistance from Mr. Weir Brown's work in perfecting the uranium toning process, and on this ground he is entitled to just as much praise as that of which it is superfluously sought to deprive him. We are happy, indeed, at knowing that the old-world race of experimentalists, who gratuitously enriched photography with the fruits of their labours and researches, is not by any means extinct.

Of the usual plan of first intensifying the developed image with uranium nitrate and potassium ferridcyanide and then "reducing down" to the desired depth, Mr. Weir Brown, at the last meeting of the London and Provincial Photographic Association, mentioned a modification which places a new power in our hands for toning bromide prints. The print, in the first place, instead of being left at the weak brown stage given by long exposure and a dilute developer, is fully and strongly developed, until on completion it presents a somewhat fogged and heavy appearance. It is then toned as far as the action of the toning solution will proceed, which converts the image into a deep reddish black deposit. After the image is washed free of the toning solution, it is flooded with a solution of Farmer's reducer (sodium hyposulphite and potassium ferridcyanide), which dissolves out the silver of the image and leaves a picture in uranium ferrocyanide.

The tone of picture so obtained is a Bartolozzi red, than which nothing can be more artistic or agreeable. As the silver is entirely removed, a complete substitution of one element for another takes place. Of the completeness of the removal there can be little doubt, since the heavy fogged deposit, originally produced by development, is entirely taken away by the reducer, leaving an image of uranium, quite free from either heaviness or fog. Mr. Weir Brown informs us that chemists, to whom he has described the latest modification of his toning method, agree in regarding the pictures as permanent, and from this view we ourselves see no reason to dissent.

For a special class of subjects, such as portrait enlargements, the method above described should be welcome to many professional photographers, as the results, if not open to any variation, are beautiful in the highest degree.

PHOTO-MECHANICAL PRINTING IN COLOURS.

England has frequently been reproached for being behind the Continent in the matter of photo-mechanical work. That it has been slow in applying it commercially cannot be denied, although the majority of the processes now in common use here and abroad owe their origin to this country. Notably is this the case with photo etching, for the method now so universally employed for intaglio plates differs but little from that of Fox Talbot, introduced between thirty and forty years ago. Photogravure, too, had its origin in this country; so also had Woodburytype and process blocks. Now, all these and other processes, it must be admitted, are worked to a larger extent, and often to greater perfection, abroad than here. Is this to be the case with photo-chromography?

It would almost appear like it, seeing so little, if anything, seems to be done commercially here with this class of work. One has only to glance at any of the railway bookstalls just now, where the presentation pictures given with the Christmas numbers of the various journals are shown, to realise how wide is the field for photo-mechanical printing in colours.

It will be remembered that some months back the Photographic Society of Great Britain, with the laudable desire to stimulate experiments in this direction, got together for exhibition a highly representative and excellent collection of photo-

mechanical prints in colours from different parts of the Continent, and capital pictures the majority of them were. At that time we knew several London houses expressed their intention of taking up the subject as a matter of business, and yet, up to the present time, we have not seen any results at all comparable with most of those shown at the exhibition. We are quite aware that some colour work has been done in London, but, though promising, it has left much to be desired. Some of it was said to be done by taking different negatives on plates specially sensitised for the particular colour required, the exposures being made through coloured screens, so that one negative represented, say, the blues; another the yellows, and so on. Then, from these negatives, separate collotype plates, or process blocks, were prepared and printed from in turns, after the usual method of colour printing.

In the examples published, the difficulties in this method of working were very manifest, though some of the specimens shown at the exhibition just referred to, made on the Continent, and said to be produced in a similar way, were very satisfactory. Some persons, however, expressed a doubt as to whether that was really the method employed, unless the plates were considerably supplemented by hand work. Although perhaps theoretically this system of working should be right, it is a little doubtful if in practice it will prove superior to that of taking several negatives, and then masking out in each all portions except those representing the particular colour required, and then making a printing matrix from each, collotype, lithographic, or block. By this plan it was generally understood the most successful of the pictures shown at the Society's rooms were obtained.

Some of the specimens, however, were produced from intaglio plates at a single printing. In this case coloured inks are applied locally where required, but it is manifest that by this system of working some artistic knowledge, and considerable skill, on the part of the printer is requisite in order to produce really good work. Amongst the examples shown from intaglio plates were some which bore evidence that they were printed from several different plates, one for each colour.

One of the principal difficulties in colour printing of any description is that of getting accurate registration in the various printings, particularly is this the case when moisture is present either in the paper or the printing plate. In copper-plate printing the paper has to be damped beforehand, which causes it to expand. Hence it will be seen that when several printings have to be done, and the paper damped afresh for each as it becomes partially dried, by the heat of the plate, there is great difficulty in obtaining perfect registration for the various colours, and, unless this is secured, the result will be imperfect. In lithography, although the paper is used dry, the stone is moist, so that in working the paper becomes damp, and consequently expands. However, lithographic papers are now made of such a character that trouble from this source is reduced to a minimum. In collotype, again, the paper is employed dry, but the plate is moist, indeed moister than the lithographic stone; therefore there is even a greater risk of variation in this process than in lithography, particularly when it is considered that the papers used in collotype are not usually of the hard kind employed in lithography.

In the matter of registration it would seem that a process that did not require the presence of moisture would be the simplest for experimentalists in photo-chromography to practise. This we have in typographic printing, for in this the paper can be worked dry. Although process block printing may, perhaps, not be capable of yielding quite such high-class chromo work as some of the other methods mentioned, it has the advantage of being the cheapest, and for this reason it is the better adapted to commercial purposes. Furthermore, should the printing matrices require hand work upon them, it is not so costly as that for intaglio plates.

It was not the purpose of the present article to describe fully the working of any of the different methods by which photo-mechanical prints in colours can be produced, but simply to direct attention to a valuable branch of photographic industry that is, apparently, being neglected in this country, as well as to indicate some of the processes by which it may be worked.

THE TEMPERATURE OF DEVELOPING SOLUTIONS.

It is a common practice, and by no means a bad one, during the continuance of such weather as has been experienced during the last week or more, to pay attention to the temperature of the developing solutions, with a view of counteracting the "slowing" influence of the intense cold; but, in adopting this very salutary precaution, it is always well to avoid overdoing it, or other troubles may ensue, as in a case that came under our notice a day or two back.

No one can fail to recognise the fact that in cold weather development is far more protracted than when the temperature is milder, and that in frosty weather it often seems to be entirely arrested; but, as we showed in a leader some few years back, the effect is only one of retardation, and, if a sufficient time be given, as much may be got out of a given exposure by the cold developer as by one at what may be termed the normal temperature. The image produced by the former will also have the advantage of being clearer in the shadows and freer from veil than that produced at the higher temperature.

On one of the bright days of the present frost a photographer of our acquaintance, a generally careful worker, was struck by the apparently increased value of the light as regards actinism, his last exposure being much in excess of what they ought to have been and the plates thin and veiled. The time was steadily decreased until exposures equal to those given under the most favourable summer conditions were reached, and still the thinness and veil continued, but accompanied by an absence of detail in the shadows of his pictures. In doubt as to the cause of this curious result, for it began to be clear that it was not over-exposure, his suspicions fell upon the plates, but these were of a tried and trusted brand, and portion of a large batch of the same make. However, another plate was tried, only to secure precisely the same kind of image.

Doubt was then cast upon the developer, which happened to be eikonogen, and from a stock solution, and diluted for use as required. This was changed for hydroquinone, which had been put on one side on the advent of cold weather as being too slow in action; and this behaved in a curiously opposite manner to the eikonogen. With the shorter exposures given with the latter, hydroquinone produced an image in which the details in the shadows were entirely absent, the high lights and stronger half-tones taking considerable density, and developing with ordinary rapidity, though no prolongation of the action would produce detail. When the exposure was increased to what had been commenced with, the development was in every way satisfactory, and the image properly exposed and full of gradations. In fact, it seemed that the fault lay entirely with the eikonogen.

However, an accident occurred to set matters right, and to

relieve the unjustly charged agent from the wrong done it. The water-tank, from which the supply was taken for development, ran out, from some reason or other, and a supply had to be brought into the dark room from another source. Now it became the turn of the hydroquinone to fail in working; not only was it excessively slow in starting its duties, but it utterly failed, even with a greatly increased exposure, to give anything but an extremely harsh image. A suspicion of the truth now dawned upon the operator's mind, and recourse was had once more to the rejected eikonogen, with the result that, except for a slight slowness in action, its behaviour with the normal exposure was all that could be desired.

The explanation of the mystery, so far as can be decided, is as follows: The tank containing the usual water supply, and containing, possibly, twelve or fifteen gallons when full, was fixed on brackets in the dark room itself. During extremely cold weather, provision was made by means of a small gas-jet to take the chill off the water, the jet turned very low, and placed at a distance from the tank that trials had shown kept the contents at a temperature of about sixty degrees. Of course, as the quantity of water in the cistern varied, so would its temperature; but, as under ordinary circumstances the volume of water never sank below a certain point at which the heating effect of the gas-jet was not over-powerful, no trouble had been experienced in that direction. On the present occasion, however, the stock of water had sunk below the usual mark, and, in consequence, its temperature increased proportionately, with the result, as we have seen, in the case of eikonogen, that its energy, so far as reducing is concerned, was pushed to the stage of fog, while the real developing power remained unchanged.

In the case of hydroquinone, on the other hand, the extra heat was beneficial in overcoming the sluggishness of its action while it was insufficient to produce any abnormal reduction And here the peculiarities of the two developers are brought into prominence, the one being little affected by cold, the other almost thrown out of working; while a slight increase of temperature practically doubles the first, and proves of actual benefit to the other.

Since hearing the details of this case we have made a few experiments in our own laboratory, which appear to fully confirm the accuracy of the above explanation. Three plates exposed similarly were treated respectively with eikonogen, pyro, and hydroquinone, and gave results, when developed at the then existing temperature of the water (35° Fahr.), the quality of which was in the order given, the first being the only one that showed full detail within a reasonable time, hydroquinone being entirely "out of it." Three more plates were similarly exposed, and developed at a temperature of 76°, when eikonogen gave hopeless fog, pyro was not much better, and hydroquinone seemed quite "in its element."

This would point to a new phase in the character of eikonogen as a developer specially suited to cold weather, while hydroquinone, on the other hand, may be more safely reserved for the "dog-days." In the case of eikonogen, even when employed at the abnormally low temperature mentioned, the prolongation of the action, or slowing, was comparatively little.

Since carbon printing has once more been receiving attention at the hands of amateurs, we have had several letters on the subject of the alleged injurious action of the bichromate of potash on the skin. When a demonstration of the working of the carbon process is given before any of the societies, a question on the subject is generally put to the demonstrator. This evidently shows that there is a little misgiving in the matter on the part of some persons. There is no question that many persons have suffered severely from the effects of the salt, but this has only been the case when the process is worked on a large scale, and the hands are almost continually in the warm developing waters. We have no hesitation in saying that those working on an amateur scale have nothing whatever to fear in carbon printing. In no case that has come under our notice has any inconvenience been experienced except after many months—in some instances years—of, as just mentioned, continuous working. However, it is always a good plan to well rinse the hands under the tap as soon as the work is concluded.

Silver printing is being continually reproached on account of the fugitiveness of its results. What, however, must be said of some of the presentation pictures with the Christmas numbers of the illustrated periodicals? The two or three weeks' exposure to light at many of the railway bookstalls has wrought a far greater change upon them than it would have done on ordinary silver prints under similar conditions. One would almost have imagined, when the large sums expended on the production of these presentation pictures is considered, that tolerably permanent inks would be secured.

Why do portrait lenses deteriorate by use? was the query put to us when calling on a professional portraitist a few days ago. Our friend told us he had a cabinet and *carte* lens by a leading optician that used to give good pictures with the full aperture; now neither would unless it was considerably stopped down. On focussing the lenses on the ground glass, the definition was perfect with each. On examining the camera, however, the cause of the trouble was at once seen. This apparatus, of excellent workmanship, was of the old-fashioned type, made in the wet-collodion days, and the dark slides were fitted with carriers having silver wire corners. By constant abrasion by the sharp edges of the plates the wire had become much worn away, and then, by its thinness, bent. Careful measurement showed that the sensitive plate was sufficiently out of register with the focussing screen to throw any well-corrected lens, when worked with its full aperture, quite out of focus, though not sufficient to do so when tolerably well stopped down. This is not the first time that we have known lenses to be suspected of deterioration, when the camera has been unsuspectingly at fault, even by experienced workers.

A few months ago, it will be remembered, we directed attention to a recent enactment with reference to the law on trade marks which would make it more stringent than before, inasmuch as prosecutions would be undertaken by the Board of Trade. Last week a steel and file maker was at Sheffield charged, at the instance of the Board of Trade, with selling as "hand-cut" files that were cut by machinery. He was mulcted in a penalty of ten guineas, and a similar amount for costs. We very much fear that the Trade Marks Act is frequently infringed with regard to photographic apparatus and chemicals. However, after all, the consumer is very little the worse, as foreign chemicals are, as a rule, quite equal to those of home manufacture, and competition is now so keen that he is pretty sure of getting full value for his money. Still, the seller runs considerable risk in vending an article implied as being of home manufacture, while it was really produced abroad.

A novel and ingenious method of estimating the strength of solutions is published in the *German Journal of Practical Chemistry*, by Herr O. G. Ellinger, and it would, if it could be produced in a simple form, be a capital instrument for testing the strength of silver solutions. It depends neither upon specific gravity nor volumetric testing, but simply upon the refraction of light by the solution to be examined. The apparatus consists essentially of a hollow prism, surrounded by a glass cell with parallel sides, itself surrounded by a similar cell, into which warm water can be placed, to raise the temperature. A ray of light passes through the apparatus, and is received on to a glass scale, divided into one hundred parts, forty to the right and sixty to the left of the zero. The scale is movable by a fine adjustment. The cells are filled with distilled water, and the scale moved, the edge of the

dark space lies at the zero. Then the solution to be tested is put in the prism, and, according to the density, the dark space will move to the right or left of the zero. Each substance requires to be tested, and an arbitrary table formed, from which the strength is ascertained by simply multiplying the scale indications by the ascertained factors.

The new mode of rendering alcohol impotable by the use of mineral naphtha is arousing a great amount of feeling in many quarters. The editor of the *Chemical News* says: "It fills photographers and many chemical manufacturers with dismay. . . . . The hope that it will not be drunk is fallacious. We have known of hands at chemical works—seasoned topers—who would even toss off a 'tot' or *petit verre* of the coal naphtha itself! If the heads of the Revenue really wished to make the spirit undrinkable, they should have prescribed the addition of Dippel's animal oil. A mere trace of this liquid, without interfering with the legitimate uses of the spirit, renders it so loathsome to smell and taste that no one would dream of drinking it. This is no untried experiment; it is one of the legalised additions used in Germany for 'denaturising' alcohol."

In our last issue we mentioned that the Treasurer of the Photographers' Benevolent Association, Mr. John Spiller, F.C.S., made an earnest appeal for subscriptions and donations towards its funds. For some years past the Photographic Society of Great Britain has devoted an evening during its Exhibition, for the benefit of the Association. Last season the Photographic Club inaugurated a lantern entertainment and concert, which enabled it to hand over about ten guineas to the fund. These two, amongst the two or three hundred photographic societies existing throughout the kingdom, are, we believe, the only ones that have recognised this deserving institution. If every society were to follow the example set annually, it would, no doubt, result in considerably more than doubling the income of the Association, at the same time providing a very enjoyable evening for themselves. Amateur photography has been charged, and not without cause, with injuring the profession; therefore it might gracefully aid the Association established to afford relief to its distressed members.

BLISTERS.

In the discussion on "blisters" that has been going on for some time no allusion appears to have been made (except by Mr. E. Dunmore at page 741, and that in a disparaging way) to what I have found to be a perfect remedy, or, rather, preventive, namely, the use of a weak fixing bath. I do not think I have seen—in my own practice—a single blister on albumenised paper, certainly I have never been troubled with them during a period of fifteen or sixteen years.

Soon after the introduction of highly albumenised papers I obtained a quire, and an amateur friend at the same time also purchased a supply, the two lots coming out of the same ream. I was worried almost to death with blisters, while my friend never saw one, and, indeed, had nothing but praise for the new paper. So intense was my own trouble, that it was the easiest matter in the world to lift the albumen film from the paper, as the prints floated in the water, and I made several transfers in that manner to opal glass and other supports.

The difference in the behaviour of this paper in the hands of my friend and myself was the more remarkable, since we drew our supplies of chemicals from the same source: our water supply was the same, we employed the same strength of bath for sensitising, and both used the acetate toning, yet the result was "blisters," or worse, in one case, and none at all in the other. Eventually, to get at the bottom of the mystery, I took a sheet from my portion of the paper to my friend's house, sensitised it in his bath, and he printed, toned, fixed, and washed without obtaining a blister. Then we reversed the order, and he brought a sheet of his paper to me, and we repeated the trial. But, when it came to the fixing stage, I turned out a couple of handfuls of hypo into the dish preparatory to pouring on some hot water, as was my wont in those days. I was met by the remark, "You are going to have your fixing bath strong enough." This raised the question as to whether that could be the cause of the blisters; so, to test it, some of the prints were fixed in my "strong" bath with the usual result—blisters of all sizes up to that of a shilling, and the rest in the same solution diluted with an equal volume of water, when not a blister, or even "pimple," made its appearance.

The result was very conclusive, and since then I have always been very careful to use weak hypo solution, and plenty of it, giving at least half an hour's immersion, and, as I have stated, I never see a blister. The strength I use is three ounces to the pint of water, or very often, with samples of paper that lose their tone much in fixing only two ounces. I suppose during the period I have named I have used some dozens of different samples of paper, both ready-sensitised and otherwise, and my experience has been the exact reverse of that of a correspondent in last week's Journal, who has tried so many different makers' papers, and finds them *all* blister. Perhaps the fault lies in his method rather than in the papers.

Mr. Dunmore condemns the weak fixing bath on the score that it does not thoroughly remove the silver compounds, and that the prints subsequently turn yellow. I have, at the present time, prints ten years old, fixed with the bath of the strength I have named, that show no such signs, but I use *plenty* of solution. My rule is to increase the quantity of water, not to decrease that of hypo.

W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

The following subscriptions towards the Maddox Fund have been received by the editor of the *Revue de Photographie*:—Direction de la *Revue de Photographie*, 100 francs; MM. A. Lumière et fils, fabricants, Lyon, 100 francs; A. Attout Tailfer, fabricant, Paris 100 francs; A. Davanne, Vice-Président de la Société Française de Photographie, Paris, 25 francs; Madame Veuve D. Van Monckhoven, fabricant, Gand, 500 frans; M. M. E. M. Genève, 5 francs; Demaria, fabricant, Paris, 20 francs; H. Martin, fabricant, Paris, 10 francs; Darlot, opticien, Paris, 100 francs; Bernard Watchtl, fabricant, Vienne, 20 francs; H. Mackenstein, fabricant, Paris, 20 francs.

We are sorry to hear of the death of Professor Stas, the distinguished Belgian chemist. To photographers in general it is probable that Stas' name is not very well known; but by photo-chemists he will be remembered as an arduous investigator of the atomic weights of many of the elements.

Writing in the *Photographic Archiv*, Herr E. Liesegang, in recommending a combined toning and fixing bath containing hypo, alum nitrate of lead, ammonium, sulpho-cyanide, and gold, says that, thanks to the presence of the lead salt, only a small portion of gold need be employed; and, further, that it would be possible to tone without any gold at all. But, if, as we always thought, the permanency of silver prints depended, in a large degree, upon the quantity of gold present in the toning bath, this advice seems to us to partake of the penny-wise and pound-foolish character. Whatever else it may contain or lack, a toning bath should not be "starved" of gold, as is, unfortunately, too often the case nowadays. Can this be the reason, or at least one of the reasons, why complaints of the fugacity of modern silver prints are so frequent?

At the last meeting of the Société Française de Photographie M. Guerot exhibited some paper coated with gelatine containing a vitrifiable powder for enamel purposes. As to an objection that gelatine on a plate would be incombustible, it was said by M. Guerot that he could impart to it a property allied to that possessed by gum or sugar which would cause it to disappear in the firing. It was understood that the sensitising bath (bichromate of potash) also underwent special treatment, which, however, was not divulged. The process appears to have not yet passed out of the experimental stage.

Dr. Eder recommends the following formula for a para-amidophenol developer of exceptional energy:—Thirty parts of potassium metabisulphite are dissolved in 500 parts of boiling water, and to the solution ten parts of para-amidophenol chlorhydrate are added. To this mixture as much caustic soda as will redissolve the precipitate formed is next introduced. For use, one part of the developer is diluted with fifty

mes its bulk of water. 100 c.c. of the mother-solution would make ve litres of developer equal in energy to the best developer known.

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anybody has the misfortune to be ignorant of the developer he is sing—hydroquinone, pyro, eikonogen, or hydroxylamine, and with ommercial ready-made solutions, such ignorance is not only pardonable, ut inevitable—Dr. Schnauss informs us that a solution of acetate of opper will enlighten him on the point. If two or three drops of this ibstance are added to the developer, and the latter turns yellow, it hydroquinone; if blue-green, eikonogen; hydroxylamine becomes olourless; and pyro gives a precipitate.

CONDENSERS FOR THE OPTICAL LANTERN.*

VE now come to the double; here we find many kinds. One of he most common is that adapted from Herschel's "doublet of no berration," which is given in all the text-books. It ought to be orne in mind that Herschel's form was intended for parallel rays, nd to adapt it to converging rays is only to make matters worse. The doublet so used is not even of minimum aberration, and far less ught it to be called of no aberration. It would be better to make t do duty for the first two lenses of a triple; but the defect in the ormula is that it throws too much work of the bending on the bi-onvex. The art in planning a double condenser is to distribute the vhole of the refraction more equally between the two lenses.

It will be seen that, in the case of a wide-angled condenser, the ngle through which the extreme rays have to be bent is enormous, nd consequently the aberration will be great even when a minimum ias been obtained.

Let us take an imaginary case with a single lens condenser, and let is suppose that the lime is required to be twelve inches from the lens, nd the conjugate has to be twelve inches on the other side of the ens; an equi-convex will be the proper form for minimum aberration; ut, if we split the lens in half, and place the convex sides together, ve shall, by that means, diminish the spherical aberration to about half. Here you will notice that both the lime and the conjugate oint are at the principal foci of the lenses, therefore the rays between he lenses are parallel.

In practice, however, we require the lime to be near the front lens f the condenser, in order to secure a large angle of illumination. Then if we shorten the focus of the front lens, so that the lime is still t its principal focus, we soon will have a hemispherical lens for a ront lens, which is highly objectionable in more ways than one. One reason, and that a weighty one, against this plan is that rays striking the periphery of the lens will be totally reflected by the nterior convex surface, and will never pass out of the lens; another eason against it is that it leaves too much of the total refraction to be performed by the front lens, thereby increasing the spherical aberration.

The next plan is to throw more of the refraction on the back lens, the one next the slide, by shortening its focus, the lime being placed within the principal focus of the front lens. Thus, if we try two equi-planos, we shall find that we have much more satisfactory conditions. But then we have seen that the equi-planos are the form for minimum aberration for equi-focal points, *i.e.*, for equal distances of lime and conjugate point; but, when we place the lime within the principal focus of the front lens, we disturb the conditions, and no longer obtain a form of minimum aberration. In order, then, to restore the combination to a condition of minimum aberration, we must shorten the focus of the front lens. In short, in order that the combination may have a minimum of spherical aberration, or, if you prefer the term, a more evenly illuminated disc, a different ratio of foci must be employed with different conjugate focal lengths; in other words, each projection lens requires its own form of condenser.

Theoretically, the best form would be that of two crossed lenses, instead of planos; but the gain is so very trifling that it does not counterbalance the disadvantages incurred by the alteration.

The shorter the conjugate focus, the greater will be the spherical aberration, assuming, of course, condensers of equal angle. With a conjugate of twelve inches, one of my double condensers of 80° has somewhat less than half an inch of aberration.

It will be noticed that the front lens need not be so large in diameter as the back lens, because the lime being placed within the principal focus of the front lens the rays emerging from that lens still diverge. The proper method in designing a condenser is to trace a marginal ray from the back conjugate focus, and make the diameter of the front lens in accordance. An easy way of practically determining the diameter of the front lens is accomplished by placing a light at the back conjugate, and, by holding a card in the position occupied by the front lens, the circle of light on the card will indicate the proper diameter of the lens. In the first two lenses of the triple the same method may be employed; only the sun should be used instead of the light, because the rays are parallel.

Freedom from spherical aberration means greater concentration of light, as well as greater evenness of illumination; it is therefore by all means desirable to obtain it. It is just as cheap to grind the lenses with curves, which will give a minimum of aberration as those which will not, and I fail altogether to see any advantage to be obtained by putting spherical aberration into lantern condensers.

The next point is the illuminating power of condensers. As my former communication to the Society was on this subject, I will not now discuss it again at length. On that occasion we saw that the illuminating power of a condenser was in proportion to the square of the sine of half the angular aperture. But what lanternists are most concerned about is not the total light condensed, but the light per unit of area. An example will be of interest. Required the light per unit of area in a four-inch condenser of 80°. Half the angular aperture is 40°; sine 40° = ·6428, this squared = ·413 = the illuminating power; but a four-inch condenser has 12·56 square inches of surface, therefore the illuminating power per unit of surface is ·413 divided by 12·56, or ·0328.

The illuminating power per unit of area of a four-and-a-half-inch condenser of 90° is ·0314. This is less than before; therefore we see that a slight increase in diameter must be compensated for by a large increase in angle, and that in an ever-increasing ratio, because the sines of large angles only increase slowly.

One word on achromatism before closing. It is simply impossible to obtain achromatism, or anything like it, under the conditions imposed, viz., with the employment of converging lenses. Taking the upper half of two converging lenses, they are simply prisms with their bases towards the same side. Light which in passing through the first prism is dispersed will suffer greater dispersion in passing through the second. The case would be entirely different if one of the lenses was a concave, because the prism would then have its base turned the other way and the dispersion neutralised. The employment of a concave in a lantern condenser is, of course, out of the question, where so great an amount of convergence is needed. I have mentioned these facts because it is thought that achromatism can be secured by lens distancing, but such is not the case. I will now, with your permission, proceed to test the following four condensers.

An ordinary commercial double, 4-inch.
A plate glass double on my new formula, 4¼-inch.
A plate glass three plano triple, 4¼-inch.
A flint glass quadruple, also 4¼-inch.

Captain Gladstone has kindly rigged up a most ingenious lantern, with a slide which holds all the four condensers, so that any condenser may be pushed into position without altering the jet or any of the adjustments.

After you have examined the condensers, a selection of views will be shown with a new lantern, the projection lens of which is a very rapid Petzval portrait lens of 9½-inches focus.

EDWARD M. NELSON.

THE MEASUREMENT OF LENSES.*

MODE OF USING THE FOCOMETER.

THE mode of procedure in using the instrument is as follows:—The lens to be measured having been secured in the central support, it is then adjusted in position so as to be accurately in the axial line between the two micrometers. The clamps of the two travelling supports are left loose, being only applied when required. One of the micrometers (in practice, that shown on the right in Fig. 8) is then thrown out laterally, and a beam of parallel light is thrown through the lens (from left to right, as seen in Fig. 1), so as to form an image at the first principal focus. In practice, this is done as follows:—A compound lens, which is to be used as a collimator, is placed in direct sunlight, and at the focal point, where the image is formed, is placed a piece of ground glass, coarsely ruled with black lines. When this reticle is set in its exact position with respect to the collimating lens, the combination is placed at one end of a long room, about forty feet long, with a paraffin lamp behind the reticle to illuminate it. The parallel beam thus issuing from the collimating lens is received on the focometer about twenty feet away.

The travelling support on the right (Fig. 8) is then brought up by hand

* Concluded from page 806.

* Concluded from page 810.

and adjusted so that the micrometer is approximately at the principal focus. It is then clamped to the screw, and, using a positive eyepiece to aid the vision, the micrometer is accurately adjusted to the focus, either by turning the main screw, or by the fine-motion screw on the travelling support. This first adjustment having been made, the clamps are then unfastened, and the micrometer is thrown out laterally.

A parallel beam is then thrown in a similar fashion in the reverse direction through the lens, and the second micrometer is thrown into line, and is brought by a similar process to the second principal focus.

The plumb-line is then applied to ascertain the position of some fixed point of the lens, and to read off the positions of the micrometers, which are replaced in their axial positions; or, if the zero readings of these are known, their positions are ascertained from the readings of their respective verniers.

These three readings having been made, both the travelling supports are clamped to their respective nuts on the main screw. The screw is turned so as to cause the micrometers to travel outwards. The observer, looking into the eyepiece of the micrometer on the left, sees an inverted image of the other micrometer come into view, and, as the screw is turned, the micrometers reach a certain position when both sets of dividing lines are in focus in the same field without any parallax. This position can be very accurately ascertained by shifting the eye slightly from side to side of the lens. The two micrometers now occupy the two symmetric points, and their positions are observed either by plumb-line, or by the readings of their respective verniers.

The simple method of calculating the true focal length, f, and the distance between the two Gauss points, has been given above.

Results of Measurements made with the Focometer.

The following examples are given of measurements made on lenses. In all cases here recorded a light red was used, a ruby glass being interposed.

(1.) *Small Hemispherical Lens*, 12 millims. aperture, by Cook & Sons.—Front of hemispherical face taken as point of reference, A. Thickness of lens—millims. Preliminary experiments with plumb-line showed that F_2 is 76·1 millims. behind zero of vernier Z_2, and F_1 is 49·6 millims. in front of zero vernier Z_1.

Readings of verniers for principal foci are:—

Z_1 =	356·55	Z_2 =	199·20
	−76·10		+49·60
F_1 =	280·45	F_2 =	248·60

Readings of verniers for symmetric points are:—

Z'_1 =	371·52	Z'_2 =	184·17
	−76·10		+49·60
S_1 =	295·42	S_2 =	237·77

$$f = \text{mean of } F_2 - S_2 \text{ and } S_1 - F_1 = \frac{15{\cdot}03 + 14{\cdot}97}{2}$$

f=15·0 millims.; $\mathfrak{F}$=66·6 dioptrics.

$\kappa = 2(F_1 - F_2) - S_1 - S_2)$

=2·05 millims.

H_2 is at 263·6; H_1 at 265·55 of scale.

A is plumbed at 262·65. Hence first principal point is 0·95 millim. within the front of the hemispherical surface.

(2.) *Substage Condenser* (single lens), by Beck.—Flat upper face of lens taken as point of reference A:—

A =	251·8		
Z_1 =	356·32;	Z_2 =	196·5
	−76·1		+49·6
F_1 =	280·22	F_2 =	246·1
Z'_1 =	370·54	Z'_2 =	182·17

f=mean of $Z'_1 - Z_1$ and $Z_2 - Z'_2$=14·28 millims.

$\mathfrak{F}$=65·4 dioptrics.

$H_1 = F_1 - f$=265·94

$H_2 = F_2 + f$=260·38

$\kappa = H_1 - H_1$=5·56 millims.

(3.) *Coddington Lens*, reputed one-inch focal length.—Summit of one curved face taken as point of reference:—

A =265·8

B =280·9

F_1=299·3; F_2=247·2

S_1=325·6; S_2=220·8

f=(mean of $S_1 - F_1$ and $F_2 - S_2$)=26·35

$\mathfrak{F}$=37·95 dioptrics.

$H_1 = F_1 - f$=272·95

$H_2 = F_2 + f$=273·55

$\kappa = H_1 - H_2$= −0·60 millims.

The Gauss points are crossed, and close together.

(4.) *Objective one inch*, by R. and J. Beck.

A (front of lens) at 248·2

F_1=279·88

F_2=241·98

S_1=300·09

S_2=221·75

f=60·22 millims.

$\mathfrak{F}$=49·46 dioptrics.

H_1=259·67

H_2=262·21

$\kappa = H_1 - H_2$= −2·54 (Gauss points crossed).

(5.) *Objective quarter-inch*, by R. and J. Beck.—Back focus too deep in tube to use ordinary micrometer; used a one-and-a-half-inch objective instead, to explore focus.

A (front of lens) at 252·4

F_1=274·88

F_2=252·14

S_1=281·20

S_2=246·2

f=6·13 millims.

$\mathfrak{F}$=163.1 dioptrics.

H_1=268.75

H_2=258·27

$\kappa = H^1 - H_2$=10·48 millims.

(6.) *Objective reputed sixteen millimetres*, by Zeiss ("apochromatic"). (Used auxiliary lens as in preceding for back focus.)

A =242

F_1=258·61

F_2=239·2

S_1=275·04

S_2=222·67

f=16·43 millims.

$\mathfrak{F}$=60·86 dioptrics.

H_1=242·18

H_2=255·63

κ= −13·45 millims (Gauss points crossed).

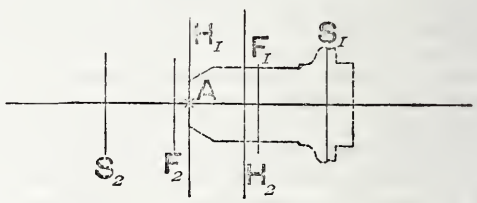

Fig. 10.

(7.) *Objective reputed eight millimetres* by Reichert.

A =251·35

F_1=256·72

F_2=250·85

S_1=263·78

S_2=243·79

f=7·06 millims.

$\mathfrak{F}$=141·6 dioptrics.

H_1=249·66

H_2=257·91

κ= −8·25 millims (Gauss points crossed, and lie outside focal planes).

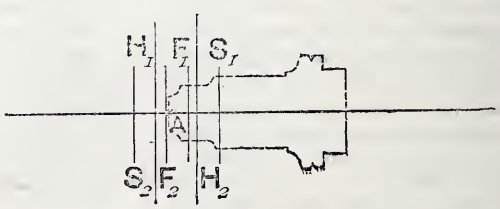

Fig. 11.

(8.) *Camera Lens* (landscape), maker unknown.—A. taken at ront of mount. All measures plumbed direct.

A =233·9

F_1=417·8

$F_2 = 151{\cdot}0$
$S_1 = 547{\cdot}7$
$S_2 = 20{\cdot}45$
$f = 130{\cdot}22$ millims.
$\mathfrak{F} = 7{\cdot}68$ dioptrics.
$H_1 = 287{\cdot}58$
$H_2 = 281{\cdot}22$
$\kappa = 6{\cdot}36$ millims.

(9.) *Aplanatic Condenser for Lantern*, constructed by R. and J. Beck on Herschel's formula.—A. taken at front of mount on concave side.

$A = 237{\cdot}5$
$F_1 = 365{\cdot}5$
$F_2 = 193{\cdot}3$
$S_1 = 435{\cdot}7$
$S_2 = 121{\cdot}8$
$f = 71{\cdot}0$ millims.
$\mathfrak{F} = 14{\cdot}8$ dioptrics.
$H_1 = 294{\cdot}2$
$H_2 = 264{\cdot}3$
$\kappa = 29{\cdot}9$ millims.

(10.) *Camera Lens* (small landscape), maker unknown.—A. taken at rise of mount at front end.

$A = 247{\cdot}2$
$F_1 + 416{\cdot}2$
$F_2 = 136{\cdot}7$
$S_1 = 534{\cdot}2$
$S_2 = -1{\cdot}3$
$f = 138$ millims.
$\mathfrak{F} = 7{\cdot}248$ dioptrics.
$H_1 = 278{\cdot}2$
$H_2 = 274{\cdot}7$
$\kappa = 3{\cdot}5$ millims.

No complete examination of any lens for rays of different colours has yet been made, but it has been found that lens No. 4, examined above for red light, gives with green light a different value for κ, though the lens is sensibly achromatic at the principal focus.

The most interesting results obtained so far are the facts that in so many compound lenses the Gauss points are crossed, the first point being beyond the second. And, in the case of one lens (No. 7), a Reichert's objective, the distance between these two points is found to exceed the distance between the two principal foci. It seems to be a necessity with all wide-angled compound lenses that the aberrations can only be reduced to a minimum by widely separating the constituent lenses, with the result that the optical centres of the combined lens are considerably displaced past one another.

Since the bulk of the foregoing investigations were carried out, the authorities of the Kew Observatory have decided upon undertaking the testing of camera lenses, and issuing certificates of merit. In this work they have had the benefit of the advice of Captain Abney, F.R.S., than whom no one is better able to advise as to what is desired for photographic purposes. This is an excellent beginning, but it is curious that in neither of the certificates issued is any information given as to the position of the optical centres, nor their distance apart. The "differences in focal length" for red and violet rays is given, but whether this means difference in true focal length, or difference in position of focal plane, is not stated. What a photographer wants is not agreement in focal length, but in focal plane, which is a very different matter. Also, in the "A" certificate issued from Kew, it is proposed to state the optical distortion at 25° from the axis, "including astigmatism." But whether this means that the test is to include one for cylindricity, so as to give the direction of the axis of astigmatism in the focal plane, or whether this term is being misused to denote spherical aberration, does not appear. Certainly no really astigmatic lens could be tolerated for an instant in photography, as it would result in all vertical lines being out of focus when all horizontal lines were in focus, or some similar defect.

I notice in a recent most admirable article on photographic lenses in *Nature*, by Mr. A. Mallock, the term astigmatism is also used for the distance between the primary and secondary foci as produced by oblique rays. But this is not astigmatism at all, and has nothing to do with the cylindricity of the lens, the defect which produces astigmatism. What Mr. Mallock applies this term to is spherical aberration pure and simple.

I pointed out in 1889, in my article in the *Philosophical Magazine*, how the focal power of a lens is the product of a number depending only on the properties of the material into the sum of the two curvatures of its faces, or, in the case of thick lenses, of a more complex quantity depending on the thickness of the lens as well as its curvatures. And, in order to facilitate calculations, I devised a special form of spherometer—the *dioptric spheron eter* (Fig. 12), which measures the curvatures of the surfaces directly in dioptrics. This was also constructed for me by

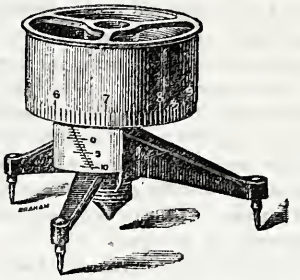

Fig. 12.

Messrs. Nalder Brothers. To apply this to any simple lens, one simply takes the two readings, adds them, and multiplies by a constant* which depends only on the material. For crown-glass the constant is 0·54, and for flint-glass varies from 0·64 to 0·78 according to density. Since I published this, a still more handy device has been brought out by the Geneva Optical Company, of whom Messrs. Botwright & Grey are agents in this country. It is known as a "Lens-measurer," and is depicted in Fig. 13. It is the invention of Mr. Brayton, and consists of a simple

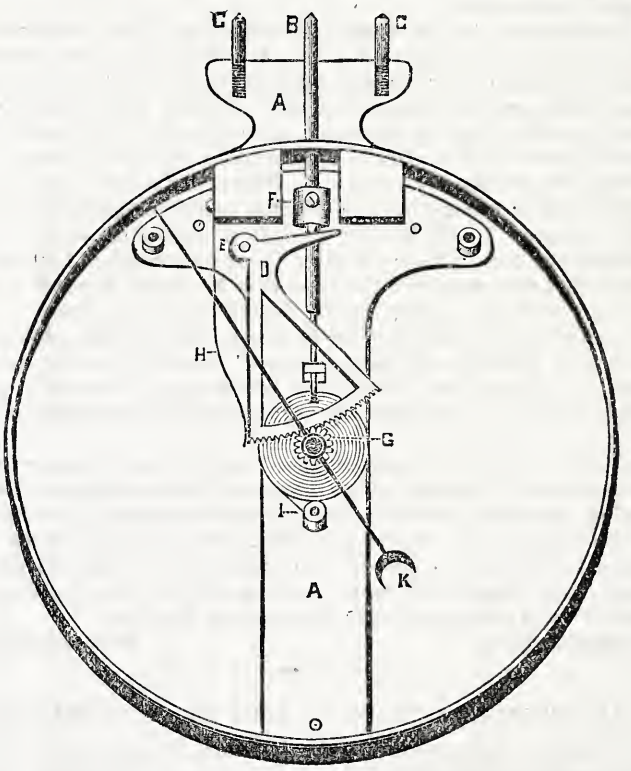

Fig. 13.

form of spherometer with a multiplying hand to read off the curvature on a dial. But the latter, instead of reading off the mere curvature of the surface, has the readings of its dimensions already multiplied by the proper constant for crown-glass—namely, 0·54; so that the dioptrics of a lens are found simply by adding the reading of the two sides.

I will conclude by expressing my satisfaction that the British Association has seen its way to appoint a committee on the subject of the measurement of lenses. With Professor Carey-Foster as chairman, and with Captain Abney, of South Kensington, and Mr. Whipple, of Kew, as members, such a committee ought to be in a position to effect some real progress in the spread of scientific methods, and so help forward the industry.

SILVANUS P. THOMPSON D.Sc., F.R.S.

—*Journal of the Society of Arts.*

"ALLOTROPIC" SILVER.

My attention has just been directed to the communication on this subject by Mr. Carey Lea, called forth by some remarks of mine in the Cantor Lectures delivered last spring before the Society of Arts. I should be extremely sorry if Mr. Carey Lea imagines—as would appear from the

* This is equal $\mu - 1$, where μ is the refractive index; or $(1-h) \div h$, where h is the velocity-constant (relatively to air).

tone of his communication—that I desired in any way to detract from the value of his most interesting observations. He is labouring under a complete misapprehension if he supposes that I intended to call in question the existence of the coloured compounds or modifications of silver with which he has made us familiar. He is, moreover, inaccurate in stating that my strictures were not based on any "adequate study of the subject," and that "no experimental support of any sort is given." If he will do me the favour of turning to the lectures in question, he will find that my statement was: "After carefully considering the conditions of formation, *and after repeating some of the experiments*, I must say that there appears to me to be no sufficient evidence that these coloured forms consist of the pure metal. On the contrary, all the evidence goes to show that some impurity is present," &c. I may add that, following Mr. Carey Lea's instructions, I have not had the slightest difficulty in preparing the gold-coloured product; with the soluble or colloidal silver I have not been so successful. I freely confess, however, that my experiments have not been numerous in this direction. But, since other investigators have succeeded in preparing the "soluble silver," I must attribute my own failure to hurried work or to some violation of Mr. Carey Lea's instructions. I may state also that I am not singular in this failure to produce the "soluble" form, as several other and more experienced operators have met with the same negative results. Mr. Carey Lea would be conferring a boon upon large numbers of chemists in this country who are interested in his work if he would favour us with more explicit instructions.

The facts are, that Mr. Carey Lea, by reducing silver salts under certain conditions, has produced certain coloured products, which contain a large percentage of silver and a small percentage of other substances. None of the evidence goes beyond this—not even the most recent contribution to the subject by Schneider, which appears in the number of the *Berichte* just received. One of these products is soluble in water.

Now, I never called in question the existence of these compounds; I did not even bring forward my own and other experimenters' failures as negative evidence. I only thought it right to caution my audience against applying the term "allotropic silver" to these products. I venture to reiterate that caution now in the hope that Mr. Carey Lea will admit its justice. Allotropy I understand to denote "the appearance of *one and the same substance* (italics mine) in several different states, distinguished from each other by different properties" *Watt's Dictionary*, Morley and Muir, Vol. I. page 128). How, then, can we apply this term to products which have not yet been shown to be "one and the same substance," viz., silver?

If Mr. Carey Lea will prepare specimens of his gold-coloured silver or colloidal silver possessing all the properties of these substances, and containing 100 per cent. of silver, I will admit the applicability of his term. In the meantime I consider the designation "allotropic silver" to be premature and apt to mislead. In other words, I must remain, and I think other chemists will remain with me, in the same position as that which I felt it necessary to take in the Cantor Lectures.

—*Chemical News.* RAPHAEL MELDOLA.

AN OPTICAL LANTERN FACTORY AT CHRISTMAS-TIDE.

IT is rather a mistake to imagine, as some do, that, because of the intimate relations which exist between lanterns and Christmas, therefore the lantern factories must be working at break-neck speed during this season. The truth is that the energies of manufacturing have now relaxed and been transferred to the warehousing department, by which the productions are scattered broadcast over the world, and we seized this time of relaxation to pay a visit to the factory department of Messrs. Perken, Son, & Rayment, who are credited with turning out Optimus lanterns in quantities little suspected by the outer world.

Commencing our tour of observation where we possibly ought to have terminated it, we noticed incidentally the shelves of the elegant warehouse in Hatton Garden laden with cameras in vast numbers, and of an efficiency in construction and finish of which we have had occasion to speak more than once. Here were, in addition to the numerous things kept in a large optical establishment, such as lenses, telescopes, microscopes, opera and field glasses, barometers, stereoscopes, theodolites, &c., the various goods incident to the season of the year. Here we were shown numerous specimens of lantern slides of foreign scenes, these being seemingly of Parisian production; at any rate, they bore a marked similarity to those transparencies with which the now-little-known names of Ferrier and Soulier were once so intimately associated, and concerning which the entire details of fabrication have never yet been published. Here, too, we were shown the latest adaptation to the lantern by the firm, viz., the diagonal-mirror attachment. This, a simple but most useful thing, permits the image to be thrown down on a sheet of paper upon table, which must prove handy when one desires to make a tracing o drawing on a slightly enlarged scale of any photograph placed in th lantern; or, in temporary absence of a screen, to throw the image upo the ceiling of the room, where one can examine it at leisure when lollin in his couch or easy-chair. This appliance is calculated to prove usefu to lanternists.

The basement is used as a stock and packing room. Although we sa there some hundreds of lanterns, all of a high class, standing packed an in readiness for sending out at short notice, yet were we assured by Mr Rayment, our cicerone, that, contrasted with the stock they had in han only a few months ago, it might now be considered as empty, so grea had been the sale during the past quarter of the year. It was imperative he said, to keep a heavy stock, for their customers throughout the country who supplied photographers and the public, were usually so urgent in their requirements, especially as Christmas approached, that they had t supply large orders on the same day on which they were received "Why, then, don't you employ machinery?" we asked. "Wait a little," he replied. Ascending to some workshops at the base of the premises, w were ushered into a busy hive of industry, where, sure enough, we saw machines *ad libitum*, and soon realised how lanterns could be made in quantity, in absolute identity, and in a degree of perfection quite un attainable by hand work, no matter how skilful. Taking up one from a large stock of sheets of Russian iron, it was placed by a workman upon the bed of a large die, a handle of a screw like a coining press was turned, and there lay before us a mansard or cupola-shaped top of a lantern as beautiful and perfect as if an artistic mechanician had spent hours over it. This system of cutting out everything, even the tin oil-lamps, by dies pervaded every department of the structure of a lantern. In putting the various pieces together, the junctions of the body, which do not admit of soldering on account of the heat, are overlapped by ingeniously contrived machinery. Various kinds of iron had been tried for making the bodies, but the balance of advantages had been found so strongly in favour of Russian iron that it was determined to confine themselves to it exclusively.

The presses for stamping out the metal are of a costly description They are mostly of French manufacture, and their power is such as to admit of five millimetres of steel being operated on at a time.

The average dimensions of lanterns known to be for photographic projection is that with four-inch condenser; but some, to be used exclusively for enlarging, have condensers of sixteen inches in diameter, with object-glasses to match. The great majority of the lanterns supplied solely for projecting photographs on the screen have external mahogany bodies.

In another portion of the building we witnessed with some interest the process of grinding and finishing lenses of the rapid rectilinear and euryscope type for camera work. A considerable staff of *employés* were engaged in this work under a competent manager. In this department there are thirty-four lathes besides the polishing posts. In the mounting room the Iris diaphragm seemed to be in the ascendant; at any rate, at the time of our visit, which was *impromptu*, we saw quite a regiment of mounts with the "iris," standing in readiness to have their lenses inserted. Had this been a chapter on lens-making we could have added many interesting details of what we saw in this department. We have spoken of iris diaphragms; but, if we were to judge by numerous long strips of brass out of which had been punched, by an attendant screw die machine, numerous Waterhouse diaphragms, it would seem that the demand for these must still be somewhat lively.

At their extensive workshops in Saffron Hill, Messrs. Perken, Son, and Rayment have a large number of men engaged in the manufacture of photographic cameras, large and small, as well as single, biunial, and triple optical lanterns with mahogany bodies. Here, again, the modern idea of machinery plays an important *rôle* by doing much of the most laborious work, producing the parts of wood and brass, shaped as well as accurately gauged to the necessary proportions, and ready for skilful hands to frame and form into elaborate and precise instruments.

Sawing, planing, grooving, moulding, rack-cutting, and other machines create a music scarcely calculated to calm the nerves of a stranger; but we are told one grows so accustomed to these sounds, that on their cessation something is missed which has become a necessary accompaniment to the hours of work.

Our Editorial Table.

SPRING AT THE ITALIAN LAKES.

By GEORGE E. THOMPSON. London and Liverpool: James Cornish & Sons.

MR. THOMPSON, the well-known photographer of Church-street, Liverpool, is a clever *littérateur* as well as a good artist. This work

is a pleasantly written account of an outing made with a camera in the spring of the present year, the Italian lakes being his happy hunting-ground. Opening with a well-writen description of the scenery discovered as the train is moving slowly up Mount Cenis, and incidentally of the great tunnel, seven and three quarter miles long, and through which it takes the train half an hour to pass, he describes the "Sacro Monte" of Varallo, concerning which we wrote some time ago when noticing the *Ex Voto* of Mr. S. Butler, and which Mr. Thompson urges all lovers of art and all who wish to see how near sculpture can approach to real life to visit. Lake Orta is the next place visited, then follow in succession Lakes Maggiore, Lugano, Como, Iseo, Garda, and others. Although there are only eight pictures given (well printed by the Photophane Company), the author's camera was kept busily employed; indeed, the visits to these lakes were made in search of the artistic and picturesque from a photographer's point of view, and scattered throughout the book are many excellent suggestions as to places best worth visiting, with useful hints to those who are fond of wandering through foreign climes with the camera. Many of these hints are truly admirable. The apparatus employed was quarter-plate size with a reversible back, twelve double dark slides, and a red umbrella, by the aid of which plates may be changed with safety, as many hotels have glass lights over the doors of the rooms. His great enemies seemed to be boys, whose persistent attentions had to be allayed by the exercise of much tact and the occasional distribution of a few halfpence.

The book is an excellent and racy one, and peripatetic photographers should secure a copy for their libraries.

The *Figaro Illustré* (Boussod, Valadon, & Co.), as is usual at this time of year, presents its Christmas number. Notwithstanding the endless variety of Christmas numbers, the one under notice succeeds in sustaining the well-earned reputation of past years. Taken as a whole, there is not a work to beat it, either for the beauty and delicacy of its coloured plates or its many phototype impressions. We can recommend an attentive study of the illustrations to "The Holy Fear." If the effect of this should be too powerful, let the sufferer examine the history of a kite, as illustrated by M. Caran d'Ache. There are three coloured plates well worthy of mention, as they are remarkable for effective colouring and fine delicacy of detail, *The Tryst*, *The Swing*, and *At Bay*. The first represents a loving couple on horseback in a forest lane, vowing eternal love and fidelity, and sealing the contract with a kiss. The second is a brilliant picture of a lady in a swing. We must take exception to the costume worn by the lady as being most improbable, but we have nothing but praise for the way it has been reproduced. The third is a fine, stirring picture, full of colour and go, from the original by Paul Grolleron. It represents a group of French soldiers making a last stand. It is a most effective and successful specimen of this firm's chromotypogravure.

The "Spot" Mask.

The Fry Manufacturing Company have issued matts for lantern slides in which the two white dots recommended by the Photographic Club, and now generally adopted as a means of determining the right from the wrong side of the slide have been printed on the mask. These spot masks will prove useful.

The Photographic Reporter.

Hazell, Watson, & Viney.

The *Reporter* for this month contains several pictures of inland scenery, and, as a frontispiece, an excellent Woodbury gravure, from a negative by Mr. J. Oswell Bury, of a Welsh hill-side scene. From a publisher's announcement we learn that it has been decided to discontinue this publication with the present number.

Eastman's Extra Rapid Bromide Paper.

We have received samples of this new paper of the Eastman Photographic Materials Company, 115, Oxford-street, London. It is issued both in cut sheets and in twenty-five-feet rolls, the width of the latter ranging from ten inches to forty inches, and of three qualities—A, B, and C—representing respectively "smooth surface thin," "smooth surface heavy," and "rough surface heavy." With the ordinary ferrous-oxalate developer, it gives pictures possessing great brilliance with rich tones and pure whites, some enlargements we made with it by a three-wick oil lamp, and an exposure of only two minutes, being good enough to frame without the necessity being experienced of giving a single touch to them.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 28 ...	North Middlesex Society	Jubilee Hall, Hornsey Rise, N.
,, 30 ...	Burnley	Bank Chambers, Hargreaves-stree et
,, 30 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C
,, 31 ...	Halifax Photographic Club	Mechanics' Hall.
,, 31 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 31 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
January 1.....	Bristol and W. of Eng. Amateur	Bristl. Literary & Philosophical Club
,, 1.....	CroydonMicro.Club(Photo.Sec.)	Public Hall, George-street, Croydon

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

December 17,—Mr. G. W. Atkins in the chair.

Mr. J. Hay Taylor was unanimously elected a member of the Association.

By the courtesy of Messrs. R. W. Greeff & Co. some samples of "Rodinal," the new developing fluid, were distributed among the members.

Mr. J. Weir Brown described a modification in his uranium toning process for bromide prints, by which, in addition to the range of colours hitherto obtained, a new colour was to be had. The reds so far were perhaps not satisfactory, but now a chalk-red colour, approximating to a Bartolozzi tone, was obtained by developing the image until it reached the stage of fog. The full deposit of silver obtained in this manner is treated with the usual toning bath, and the action carried on until a deep red-black image resulted. It was then washed thoroughly free of the toning solution, and afterwards treated with Farmer's reducing solution (potassium ferridcyanide and hypo), which took the whole of the silver out of the print, and left an image of uranium ferrocyanide of a most agreeable Bartolozzi red character. This deposit was considered to be permanent by Mr. A. M. Levy, who had studied the chemistry of the reactions. Mr. Weir Brown also exhibited what he termed a photograph in unnatural colours, produced by flooding a kallitype print with the uranium toning solution. He said that it was well known the last traces of iron could not be removed from kallitype prints, and the action of the ferricyanide on the iron formed a bluish-grey colour in the half-tones of the picture.

Mr. Poole, of the Incandescent Gas Light Company, exhibited the aerocarbon apparatus, which produces a pure white light of great candle power. A foot blower presses air into an indiarubber ball, and it then passes into a carburetting chamber containing a liquid hydro-carbon. The air takes up a quantity of the volatile hydro-carbon, and, passing through a burner, impinges upon an incandescent mantle, and gives a most intense light. A number of slides were shown on the screen by the aid of the light, which, however, was perceptibly inferior to the oxyhydrogen light.

Mr. J. Traill Taylor said that in 1887, when he tried the light, he found it deficient in penetrative power and intensity. The quality was excellent, but it was rather too ghostly. These drawbacks were now in a large manner overcome. He was present at the Company's demonstration on the previous day, and he conclnded that the light would be useful for photographic purposes in two or three ways. First of all, a battery of four lights, three grouped as the primary light, and the other one placed on the shadow side, would admirably suffice for portraits with a moderate exposure. He was struck with the idea that it was now a very intense light, and was an excellent substitute for ordinary daylight. The second application of the light was for enlargements. The shape of the flame was circular, which, contrasted with the oil light, which caused dark vertical lines to be often apparent on the screen, would show a perfectly uniform light. They had had the third application of the light that night, namely, for projection, and he thought it might supplant the oil lamps completely for that purpose. It was admirable for domestic purposes. He noticed that while the lamp was shown the assistant had to keep pumping, which he thought might be got over by using gas bags.

Mr. Poole said that by having an arrangement of gas bags they would do away with portability.

Mr. Taylor said that the present light was certainly more intense and pleasing than the one brought out in 1887.

Mr. Poole said for lantern purposes the light had a power of from 150 to 180 candles. He said that one great advantage of using the light was its absolute safety, as there was no danger from back suction. The light was easily manipulated, and little knowledge was required to enable anybody to use it.

Mr. Taylor, in moving a vote of thanks to the Company and to Mr. Poole, said he welcomed a new light, and also was satisfied (as many of their friends present that night must be) that it did away with danger.

This being a lantern evening, slides were shown by Messrs. Atkinson (views at Margate, Paris, &c.), Medland (Moscow, Norway, &c.), Wellington (the Danube, the Rhine, Cologne, Nüremberg, Brussels, the Fjords, Salisbury), Rawlings (English scenery), and Hastings (Convention series).

BRIXTON AND CLAPHAM CAMERA CLUB.

December 17.—Demonstration by Mr. J. Howson, of the Britannia Works Company, upon the new Ilford gelatino-chloride printing-out paper, and the special "black-tone" lantern plates.

The Vice-President read a letter from Mr. Andrew Pringle, with reference to the Maddox Testimonial Fund, and it was decided to start a subscription list, to which several amounts were contributed.

CAMERA CLUB.

December 17,—Mr. A. Stroh in the chair.

Mr. Leon Warnerke gave a description and demonstration of a simplified collographic process.

He fully described the method of sensitising and printing the gelatine

skin from which the prints by the auto-copyist process are obtained, and he practically demonstrated the various treatment in inking and printing, an ordinary letter-copying press being employed. The effect of one of the prints taken on Whatman paper was much admired.

On December 31, Mr. T. M. Brownrigg will exhibit and describe a series of his lantern slides, and afterwards other members' slides will be shown.

HOLBORN CAMERA CLUB.

December 18,—Mr. J. F. Stevens in the chair.

Mr. John H. Avery gave a lecture on *Interior Photography*. He gave several reasons why amateurs, with only a little spare time, should take up with architectural photography. After a few failures, it was the easiest branch of photography. If one was using a quarter-plate, architectural subjects look very well in lantern slides. Again, they could take an interior on any day; but the negatives must be technically perfect. The camera must have a swing back as well as a cross front. The cross front was the most needful movement in the camera. He gave various hints for exposing, and recommended the soda developer. Backing was most essential for most subjects. He passed round a large number of prints and negatives, illustrating his remarks.

WEST LONDON PHOTOGRAPHIC SOCIETY.

December 11,—The President in the chair.

The President announced that the Secretary had received a circular letter from Mr. Pringle, inviting subscriptions to the fund for obtaining a testimonial to Dr. Maddox. He thought it was a matter worthy of the members' attention, photographers, as a body, having derived so much benefit from the invention with which Dr. Maddox's name was associated. The President next called the attention of the members to the forthcoming annual exhibition, and hoped all would make strenuous efforts to make it a grand success.

Mr. Charters White, M.R.C.S., read a paper on *Photo-micrography*, and after a few introductory remarks on the subject of his lecture, plunged *in medias res*, and described the apparatus which he was in the habit of using, and which he considered more useful generally, and considerably cheaper, than the very expensive forms which were in the market. He then gave very clear directions on the various details of the process, laying particular stress upon the necessity, firstly, of keeping the apparatus free from vibration; and, secondly, of properly centering the light, so as to obtain evenness of the light all over the plate. He then spoke on the important matter of exposure, the great *crux* in this, as in all branches of the photographic art. He explained that this matter was a difficult one, inasmuch as the colouring matter, whether the natural colour of the tissues or the colour introduced in staining, rendered it a very difficult matter to obtain a negative free from thinness in some cases or hardness in others. He said, however, that by careful observation of results, and by the habit of making notes of exposures and results, the difficulty might be eventually overcome, and tolerable ease obtained in judging the time required for exposure. After his paper Mr. Charters White exhibited, with the aid of the lantern, a large number of slides of his own making, explaining that, in many cases, the microscopic slides were of his own preparing and mounting, a matter which he commended to the members as a very important one. The slides exhibited covered a large range of subjects, such as histological, entomological, and more particularly odontological slides.

Mr. Hodges then brought forward a matter which he considered of great importance to the Society, viz., the question of holding meetings of a purely social character, outside the ordinary business meetings, to give facilities for members to meet together and discuss questions of photographic interest or otherwise, and so to cement more strongly the friendly relations of members towards one another. The matter received strong support, and it was resolved to discuss the matter informally at the next ordinary meeting on Friday next, after the lantern exhibition.

December 18.—Lantern evening.—Mr. Bilton in the chair.

Slides were shown by Messrs. Bilton, Blizard, Dixon, England, Kellow, Rogers, Seanlan, Scantlebury, and the Secretary.

The meeting then entered upon the discussion of Mr. Hodges' proposal to hold social meetings on the first and third Fridays in the month. Eventually a committee was appointed to report upon the suitability of a certain hall in Chiswick as headquarters of the Society.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB (PHOTOGRAPHIC SECTION).

December 11,—Mr. Edward Lovett (President) in the chair.

Mr. A. H. Allen demonstrated the rapidity and ease with which lantern slides of the finest quality could be produced by the collodio-bromide process, using for the purpose the washed emulsion sent out by Mr. Brooks, of Reigate, and showing that all the manipulations, from the cleaning of the plate to the finishing of the slide, could be carried through uninterruptedly in a very short time. The facilities for modifying the density and tone of the image were particularly noticed, and seemed to confer on the worker the power of readily producing any effect at will.

Mr. Low-Sargeant, being then called upon, said that the coating and development of collodio-bromide plates having been dealt with by Mr. Allen, he proposed to show the method of making an emulsion. He exhibited some slides made from the unwashed bromide emulsion, the making of which he was about to show, and from a collodion chloro-bromide emulsion recommended in The British Journal of Photography on November 20. Both of these were of a very fine quality, the chloro-bromide slide being somewhat warmer in tone than the other. Mr. Sargeant stated that, unless a sufficient exposure were given with this emulsion to assure warm tones, the grain was apt to be rather coarse. The lecturer then proceeded to make a small batch of an unwashed emulsion, using the bromides of cadmium and ammonium. The bromised collodion should be set aside for at least ten days. In this state it will keep indefinitely, and may be made up in bulk. At the end of this period it is sensitised in the usual way, using silver one and a half grains to the ounce in excess of the equivalents. The emulsion in this condition, the silver being in excess, has to be left for twelve hours, when it will have attained its maximum sensitiveness without reaching the fogging point. Bromides to the amount of two grains to the ounce in excess have now to be added. By this mode of procedure, the bromide being now in excess, the lecturer produced an unwashed emulsion which can be kept for several months without loss of sensitiveness, and always ready for use, no resensitising being required. The plates, when coated, are immersed for five minutes in a preservative, no other washing for the removal of the soluble salts being necessary. The preservative used by Mr. Low-Sargeant was a mixture of salicylic acid, tannin, and gallic acid, but any of the usual organifiers could be employed to suit the tones desired. The lecturer then proceeded to expose and develop a plate coated with an emulsion made by this method some time ago. With a simple developer—pyro, ammonium carbonate, and bromide—he produced a slide of fine density and rich, warm tone, which required no after treatment. The slides can, of course, be cleared or reduced with iodine, intensified with silver, toned with platinum, or generally treated in the same way as in any of the other collodio-bromide processes; but in this case a perfect result was produced without resort to any of these proceedings.

Time did not admit of the lecturer going fully into the working of the chloro-bromide process, but he referred his hearers to the clear instructions which appeared in The British Journal of Photography, and recommended it for the beauty and range of tones obtainable by it. This emulsion, however, had only about one-fourth the rapidity of the others.

RICHMOND CAMERA CLUB.

December 18,—Mr. Cembrano in the chair.

Mr. R. L. Kidd demonstrated the process of *Enlarging and Printing on Bromide Paper*. After describing the manufacture of bromide paper and its development (for which he recommended ferrous oxalate in preference to other developers), Mr. Kidd exposed a three-and-a-quarter-inch square picture, the portrait of a child, enlarged to whole-sheet size (23×17 inches). This was developed and fixed, and, proving rather over-exposed, a second exposure was made, which resulted in a very beautiful and perfect print. The mode of printing in clouds by double exposure was next illustrated. A snap-shot picture of Yarmouth sands having been exposed, enlarged as above, and the print partially developed and washed, a cloud negative was substituted, and a further exposure made, an excellent picture being the result. Mr. Kidd then made some contact prints. Folding a piece of paper in four, he exposed each quarter of the surface in succession behind the same negative, and developed the four pictures at once—an expeditious mode of producing a number of identical prints from one negative. This concluded the demonstration, which had been accompanied throughout by a clear explanation of each process. Mr. Kidd gave a description of the mode in which the 20,000 odd prints of the German Emperor's portrait, forming the frontispiece to The British Journal Photographic Almanac for 1892, had been produced by his firm, the whole being from one negative, printed twelve on a sheet (the position of which for each exposure was adjusted by machinery), at the rate of about sixty sheets a day.

Mr. Whipple, of the Royal Observatory, Kew, added some remarks in recognition of the services of Mr. Kidd and his firm to the cause of scientific photography, especially as applied to the recording of meteorological observations, their products and appliances being in use not only at Kew, but at all the affiliated observatories throughout the world.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

December 18,—Mr. A. R. Dresser in the chair.

Mr. Dresser gave a lecture on *Hand Cameras*, explaining the working of his own, and advising the use of a good lens and reliable shutter, also the advantages of films over plates, and comfort and ease in taking pictures that could not be obtained with the ordinary camera on a tripod, and producing results from these quarter-plate pictures by enlarging to 15×12, as good as those taken direct.

The Secretary took a flashlight group of several members with the Fusee Flash-lamp.

SHEFFIELD AND DISTRICT OPTICAL SOCIETY.

December 2,—Dr. Manton in the chair.

The President exhibited a universal lantern possessing many features of interest, suitable either for blow-through jet, ether or oxyhydrogen limelight, and equally adapted for the projection of transparencies or the demonstration of scientific experiments, the front carrying the objective slides on the extending principle of long-focus cameras, the space between condenser and objective being entirely unenclosed. In practice it was found that there was no appreciable leakage or diffusion of light into the room. Perhaps the greatest novelty lay in the condenser, 3¼×3¼, square, this being, of course, derived from a slightly larger condenser cut down, and the superfluous arcs of circles removed the slight loss of light resulting from the increase in focal length being more than compensated for by the power of this small condenser to project on the screen an unmasked transparency absolutely free from colour and clear to the edges. An unusually attractive evening was brought to a close by the demonstration of Scott's oxy-etho-benzine limelight, and, as the details of this new light are attracting much attention, somewhat full details are appended. A member having expressed a wish for a test, the wish was granted, although Dr. Manton pointed out that the optical and mechanical advantages were entirely in favour of the oxyhydrogen apparatus, against which Scott's light

was pitted, which was fitted with condensers of the Herschell type, and a half-plate portrait lens as objective, the jets, &c., being adjusted to a hair's breadth, and being fed by OXH from forty-feet cylinders fitted with Beard's regulators. The etho-benzine light, on the other hand, was placed in the experimental lantern above alluded (square condenser, with its attendant loss of light, into the bargain), and an ordinary lantern objective, costing a guinea, of ten inches focus was employed. The jet recently purchased had not been adjusted and adapted with regard to its bore, in accordance with the suggestion of the inventor. The saturator (hot air) had been used for nearly two hours on a previous occasion, and was fed by a partly used ten-foot bottle of oxygen without regulator. In spite of these crippling disadvantages, the new light stood the trial admirably; and, although the saturator had only five minntes' warming, the light was within a few candles of its rival. This proves that, under the most trying circumstances, the light is at least equal to its rivals. It was to be regretted that time and other circumstances did not permit of the conditions being reversed, the Scott light being placed in the "swell" lantern, and *vice versâ*. But further experiments will be made, and published shortly.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

December 16,—The President in the chair.

Mr. Moline proposed that the Association should contribute towards the Maddox Fund, and a list for this end should be started forthwith. This was seconded, and carried unanimously.

Mr. Smith, of the Eastman Company, was then asked to give his lecture and demonstration of the Kodak hand cameras. He showed the latest folding type, with removable roll-holder for using focussing screen, and in which the shutter has a working range of five seconds to one two-hundredth of a second, as well as time exposures. Mr. Smith advocated developing a number of films face downwards, to avoid puckering during development. He stated that the Eastman Company had quite got rid of the markings in the films, and that the Company were bringing out a cold varnish, to be applied with a brush, in the spring. At present, Mr. Brooker made a very good cold varnish. The Harrow factory being in working order, there was no difficulty in getting a supply of spools.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

December 16,—Mr. John Watson in the chair.

Mr. James Brown was announced to give a paper and demonstration on *Platinum Toning applied to Gelatino-chloride Paper*, but owing to illness, could not attend. The vacancy was filled by Mr. H. G. Ridgway, who showed on the screen a collection of slides (mostly collodio-bromide), illustrating the upper reaches of the Thames, from negatives taken on a recent holiday.

EDINBURGH PHOTOGRAPHIC CLUB.

This Club, having completed its tenth year, resolved to hold a public meeting to celebrate the occasion. This Club made it a rule of its early existence that no printed report of its transactions should ever enlighten the photographic world. A still further restriction was imposed that its members be limited to those who were also of the Edinburgh Photographic Society, and even they admitted by strict ballot regulations. The evening of the show was, as had been the day, one of the most solidly wetting and rainy ever encountered. Thanks to the painstaking work, almost unassisted, of Mr. L. Stewart Smith, the exhibits were on view, and all the paraphernalia of the latest things in microscopes, in lenses, in pictures, and in apparatus were visible at the regulation time, Tuesday, December 15, in the old and well-remembered rooms at 5, St. Andrew's-square, where the parent society made its first early appearances. Dr. Drinkwater was to have inaugurated the proceedings, but that dread shadow, influenza, had rendered him *hors de combat*, as it had also Mr. Ayton, who was to have taken a leading part. The lantern, however, filled up the time as the visitors slowly dropped in, and, just as the penultimate division of them came to be shown, their author, the President (Mr. Blanc), arrived, and he at once filled the gap by giving a striking practical description of some of his Norman slides, and describing lucidly the differences and growth of the various styles of early Christian architecture in France and England. The zeiss objectives, of which there were several examples, the match flashlights, and other examples of helps to rapidity of work were explained and shown in action. The microscopic sections, under Mr. Forgan, with the latest adaptations, were fully taken advantage of, and as thoroughly explained by the adepts.

EDINBURGH PHOTOGRAPHIC SOCIETY.

December 16.—Popular evening.—Mr. Hippolyte J. Blanc (the President introduced the lecturer, Mr. W. Lamond Howie, and remarked that, in pursuance of his promise made during the last Exhibition, Mr. Howie had found time to bring before them the results of his *Visit to Oberammergau and back in* 1890, and, from what they already knew of his work and its quality, the Council had not deemed it necessary to subject his slides to the usual preliminary rehearsal or examination.

Mr. Howie, in his journey to the land of the Passion Play at Oberammergau, said he did miss some of the famous and ever, and perhaps over, described scenes by the way. In trying to bring vividly to the minds of his audience the appearance of, and the altitude of, one of them, Cologne Cathedral, which he passed and artistically anatomised on the journey, he brought before the audience of a city surrounded by and built upon hills that, if they could imagine their own Assembly Hall, with its fine Pugin spire, replaced there with the Cologne Cathedra and its spires, the highest of them would be almost exactly on a level with the top of Arthur's Seat. (The Ordnance Survey puts the latter at 828 feet above the sea.) Leaving this city, with its bridge of boats, the route lay up the Rhine, and Bonn, with its universities, the Drachenfels, Ehrenbreitstein, and Schaffhausen were all placed under contribution. Nürnberg and its quaintnesses, its markets, and people, afforded many fine slides, and a grand portrait of Albert Dürer allowed some pregnant ideas on German art to be promulgated. One of the most enjoyable parts of the lecture was the introduction of quite out-of-the-way subjects, such as examples of fine and rare wood carvings, linen kists, bronze work, an ancient apothecary's shop, &c., contrasted with examples of Japanese art, and grimly, Germanly funny caricatures of British types of men, with prominent front teeth a quarter of a yard long, and the inevitable Scotch plaid suit, even to the hat. In describing the Passion Play at Oberammergau, he detailed the simple, real earnestness of the people engaged, their artistic conception of what this religious presentment should be, and more especially in using the canopy of heaven as the roof, and the builded frontispiece as the only part of human work beside that of the actors in the scenes. One of the examples of fine architecture, "The Monopteros Linderhof," might be quoted as proof of the editorial and Debenham contentions on the perspective view of pillared structures. It is similar to the choragic temple, or rather monument of Lysicrates, or to the well-known monuments to Robert Burns at Edinburgh and on the banks of Doon, and, from being taken too near to the base, the crown of the monument seemed to be toppled over or toppling, the lesson to young and all photographers being, If you cannot get a subject in due perspective or to take its proper position, rather leave it alone than strain the power of the lens, and thus give an unsatisfactory rendering.

Correspondence.

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

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editor.

Sir,—The phrase, "admittedly arbitrary interference of Captain Mantell," in Mr. Davison's letter, published in your last number, begs the whole question at issue with regard to the removal of his photographs from the walls of the Exhibition. Whether the interference should or should not be considered arbitrary is a matter to be decided by the majority of either the Council or the members generally. The Council have tacitly approved of the action taken, and the members present at the last ordinary meeting passed a resolution expressing their approval.

Referring to paragraph (6) of the letter, the reason why the pictures were removed, in spite of the so-called bye-law relative to the alteration of pictures which have been hung, was explained at length during the discussion at the last meeting.

The statement that Captain Mantell deferred the matter for "four or five days" before coming to town is not quite accurate. Mr. Davison must have made this mistake, because the report of the discussion in your last issue does not include all that was said. I was in the Gallery discussing the question of the exhibits just forty-eight hours after hearing that a difficulty had arisen. The first train that I could catch would only have brought me to London twenty-four hours earlier. If I had had the least idea that the matter was destined to assume such importance, I should probably have started at once, and thus saved the twenty-four hours.

The remainder of the letter consists partly of statements of facts as to which I have not full personal knowledge, and partly of expressions of opinion. To these it seems unnecessary for me to refer in detail.

Those who are interested in this question should refer to the full account of the discussion, which will soon be published in this month's number of the journal of the Photographic Society, and read that account in connexion with the correspondence which has appeared in the photographic press.

Opinions and statements of fact have now been published by those who think the executive are in the right, by those who think the reverse, and by the executive themselves. Further discussion would probably be useless, and those who are interested in the matter will be able to draw their own conclusion.

If only remains for me to thank Mr. Davison for the friendly way in which he has referred to me personally.—I am, yours, &c.,

A. M. Mantell.

8, *Mansion-row, Chatham, December* 21, 1891.

To the Editor.

Sir,—I am very sorry that Mr. Davison has thought fit to prolong a controversy which, as far as he is concerned, had better have been left as it was. So far, his honour has not been called into question, and the most serious imputations he has to meet, are, that he acted with childish petulance unworthy of his undoubted ability, and that, as a member of the council of the Society, he should have been among the first to uphold the regulations provided by that body, which duty he has conspicuously failed to perform.

I do not propose to attempt to show the fallacy of the reasoning of Mr. Davison and his friends with regard to the method of the rejection of his pictures, because, even if they could prove their contentions up to the hilt, the main issue of the case would in no way be affected. Mr. Davison delivered his pictures two days late, and the Society, acting in strict accordance with the regulations, rejected them on that ground, and on that ground solely. This is a simple statement of the case, and it would appear not to admit of argument. If Mr. Davison wishes for a legitimate cause of complaint against the Hanging Committee, there is one available which it would be difficult to defend. It is that the Hanging Committee, instead of rejecting Mr. Davison's pictures absolutely, gave him the option of allowing them to remain, "not for competition." No one but Mr. Davison had this option, but in one case two frames that were received late were hung and marked "not for competition," there appearing a reason for the delay beyond the exhibitor's control, and this is the only case in which pictures were accepted after time. The Hanging Committee clearly exceeded their duty in thus specially favouring Mr. Davison.

I cannot help expressing surprise, however, that Mr. Davison, in "correcting partial statements," as he calls it, should be so carelessly inaccurate in his own statements. He says, "They (his pictures) were accepted and hung by the Committee," "on the distinct understanding that they were for competition." As a matter of fact, they were *neither accepted nor hung* by the Committee. Mr. Davison, when he brought them, was told by the Assistant Secretary that they could not be accepted, unless marked "not for competition." He declined to agree to this, and disputed the Assistant Secretary's authority to decide the matter. They were then allowed to remain to await the Committee's decision. An over zealous friend of Mr. Davison, one of the Committee, in spite of his having been put in full possession of the position of affairs, hung these pictures without conferring with his fellow-members, and on his own responsibility. It must be said, to this gentleman's credit, that he admits the sole responsibility, and thus entirely exonerates his colleagues. Mr. Davison continues: "With this definite understanding" (that is, that the pictures were for competition) "they were kept upon the walls," and "that at least two out of the four active members of the Exhibition Committee actually signified their approval and satisfaction at their being hung without restriction." Mr. Davison will find it difficult to reconcile these statements with the fact that three of the four active members of the Committee, who, under the provisions of a bye-law, could not remove the pictures, agreed that a strong representation should be made on the the matter to the Hon. Secretary, with the result that he, not being a member of the Hanging Committee, and, therefore, not being bound by the bye-law, did remove them. What Mr. Davison means by this removal of the pictures, being done *in spite of* the bye-law that pictures once hung by a member of the Hanging Committee, are not to be moved by any other member, goodness only knows. He contradicts himself.

In your report of the meeting, the Assistant Secretary is made to say that the Hanging Committee had only two days for their work. Any one, giving the matter one moment's thought, would have seen that he could not have said so in the face of the fact that the receiving day was September 16, and the judging day September 25. What he did say was, the Committee had two days less than usual for their work; but Mr. Davison evidently does *not* give the matter a moment's thought, and, in his anxiety to crush that unfortunate official, builds upon this erroneous theory an ingenious imaginary account of the said official's proceedings.

Mr. Davison is mistaken (and it is the only pardonable mistake in his letter) in saying that Captain Mantell deferred the matter for four or five days. Captain Mantell received the letter referring to the case on Tuesday, and was in the Exhibition on Thursday.

I repeat, I regret that Mr. Davison did not leave the controversy as it was, or, at any rate, that, before making assertions which appear to involve everybody and anybody in blame except himself, had not taken the trouble to ascertain the real facts of the case. Had he done so, I feel sure that his sense of justice would have compelled him to acknowledge that the persons at fault were himself, for sending his pictures late, and the injudicious friend who seems to have been the main cause of all the troubles connected with the Exhibition. No one could regret more than I did the necessity for rejecting Mr. Davison's pictures. It was to my interest, as an official of the Exhibition, to make it as attractive as possible, and these pictures would have added to its attractions. It has been said that they were medalled. That is not so; but that they were worthy of being medalled no one could doubt.

I have now the unpleasant task of dealing with Mr. Robinson; and here, perhaps, the least said the better. Had my veracity been impugned by a man of unimpeachable integrity, it would have grieved me greatly, and I should not have rested until I had proved the charge to be groundless; but when a man who stands accused on two counts of the charges that have been brought home to him as an officer of the Society, and who, in a wild attempt to clear his reputation, accuses me of untruthfulness as a forlorn hope, I do not consider I am called upon even to deny the accusation. I feel assured that my reputation will neither lose nor gain by anything Mr. Robinson can say about me.—I am, yours, &c.,

December 21, 1891. ALEXANDER MACKIE.

To the EDITOR.

SIR,—Mr. Debenham's letter in your last issue obliges me to reply. A reference to the minutes of the Council meeting cannot prove that Mr. Robinson did not say what I have attributed to him, because conversational statements are not generally recorded in the minutes. At the said Council meeting Mr. Robinson was sitting on one side of the room, and I was sitting on the other; so that, if his promise to come as usual if he were in town had not been fairly audible, I should not have heard it. The circumstance was of prime importance to me, because it appeared probable that no one more experienced than myself would be appointed on the Committee, or, if appointed, would be able to serve. I had almost resolved to resign from the Committee, and mentioned this fact in a letter to Mr. Davison, and this promise of Mr. Robinson's had much influence with me in my resolution to remain. If I had consulted my personal preferences, I should not have allowed myself to be appointed. It is, therefore, natural that I should remember the circumstance better than the two or three members of Council who cannot call it to mind.

As to what Mr. Robinson said on the day when the pictures were sorted out, I took no special notice, because I did not anticipate any trouble. Mr. Mackie, Mr. Robinson, and I worked harmoniously together so far as I know, and I am sure that I did not hear Mr. Mackie make any objection to Mr. Robinson's presence and assistance. I remember Mr. Robinson saying something to the effect that his son's pictures ought not to have a good place because of their frames, and I remember what I have already stated about Mr. Robinson's own three pictures; but I took no more than a passing interest in any of the remarks made. But, at the same time, if any extraordinary speech had been delivered in my hearing, of course I should have noticed it—at least, the probability is that I should have noticed it; and I must say that the decisive statement that has been attributed to Mr. Robinson about his own pictures I do regard as extraordinary.

Then, Mr. Debenham refers again to the regulations that have been miscalled "bye-laws." Mr. Debenham says that the President refused to allow a motion for the repeal of one of them, and permitted only a resolution that they had expired and were of no effect. I seconded this resolution, and understood that it *rescinded* the whole of these rules. I have a memorandum, made shortly after the meeting, to that effect. If these rules expired with the Councils that passed them, I would ask why Councils have always acted upon them without ratifying them? Why did the Council pass, without a dissentient vote, my motion, in February last, that these "dead" rules be collected, and every member of Council be furnished with a copy? Why did the Council waste the time of its secretaries and the money of the Society in collecting and printing these "dead" rules? Why did the Council pass, without an adverse vote, my resolution rescinding all *other* rules than those collected and printed? Why did the Council pass Mr. Bird's motion rescinding one particular one of these "dead" rules? If these rules have expired with the Councils that made them, then the President and the Hon. Secretary exceeded their duty in asking for nominations for the progress medal; and, finally, I would ask why Mr. Debenham, and any other members of the Council who consider that he is right in this matter, have not urged their views before, but have allowed these "dead" rules to be acted upon time after time? The President has, I believe, an opinion such as that stated by Mr. Debenham, but I am not aware that he has ever forced it upon the Council, and I esteem the President too highly to believe that he would ever desire to do so. I submit, again, that the President has no power to make an authoritative ruling on such a matter; and, so far as my knowledge goes, he has never done more than urge his opinion in what I think may be fairly described as a casual manner.—I am, yours, &c.,

December 20, 1891. CHAPMAN JONES.

BLISTERS AND BLACK SPOTS ON ALBUMENISED PAPER.

To the EDITOR.

SIR,—This subject having come to the front again is my only excuse for troubling you with a few remarks. As you are aware, many years ago I gave considerable attention to the blistering of albumenised prints. I set out with a firm conviction that the trouble arose from the splitting of the paper during the various processes through which it had to pass; so, if any means could be found to prevent that, the object would be gained. The first thing I tried was steaming, both before and after printing, but found it uncertain and troublesome; the next was hot water (boiling) as in the first experiment, before and after printing; this proved quite successful in preventing blisters, but the prints never had such a nice look when finished, having a washed-out appearance. The third and last, was the use of methylated spirits of wine just after removal from the toning bath. I found this plan to be all that could be desired, not a blister to be seen, the prints not showing any of the defects of the boiling-water treatment; the only change in the prints was that the pink papers lost their colouring matter in the spirits. You have already twice published my mode. I need not trouble you further with it.

I may say that for more than two years the blister trouble has not

come to the front in my works, and it is attributed to the mode of keeping the paper before silvering, and this is how it is done: Half a ream or so is placed in a cool, dampish potting-shed, and allowed to remain for a week or two, when it is removed to the silvering room in such quantities as may be required, placed between boards, and withdrawn sheet by sheet, not allowing the heat of the room to dry up and harden it. The sheets when placed on the bath are quite limp, and there is no trouble with the paper curling up when placed on the bath. This is no small advantage, for when paper is dry it is sure to curl.

If I have not taken too much of your space, I should like to give a hint to my brothers of the camera, as this is now the season for the small brown spots to make their appearance on the negative, giving no end of trouble, not to say the loss of many valuable negatives. Here it is:—When the silvered paper is dried and quite cool, lay it face up, then with a tuft of cotton-wool give it a good rub all over; this will remove the small crystals of silver formed on the face of the paper.—I am, yours, &c.,

Glasgow, Dec. 10, 1891. J. STUART.

To the EDITOR.

SIR,—Will you kindly allow an old worker with ready-sensitised albumen paper (since over ten years) to contradict some of your assertions. You can allow this so more easily since you contradict yourself three times on one and the same page. I use as much as four quires in a day, therefore should know something about its working from printing up to blistering. You say, first, page 756, "When will it," &c., that the tone required, purple or black, depends on the negative. Answer; I say no, it depends not even on the toning bath, but only on the quality of the ready-sensitised paper. Whatever be the quality of the negative (if not too excessively bad of course), some paper will give any required tone from red at the beginning to purple, and then black if printed deep enough. Again, some will give these colours and lose all in the hypo, to go back to red or remain at bright purple. Others will never go to black and remain purple all through, and then, again, others will go as far as purple and return red in the hypo. Worst of all is the paper that wants enormous watching as soon as purple is attained; any further toning will procure black, but a greyish black, which will kill *all the details* in the shadows, rendering them of a dirty granulated grey.

I am publishing my views in series, and know exactly what each negative *will give* with good paper, as I had some and get some still; but, mind you, every batch I order works different from the precedent. Of course, some prints from negatives will tone quicker or more even than others; but they work very well when the bath is new and at the beginning, but not quite so even towards the end, and then prints of certain negatives will tone uneven whether a quarter square at one end, or whether a triangle at one corner, but then always the same parts are affected and never the others. Why I cannot explain, but there must be some reason for that in the negative.

Now to return to your contradictions; you say the fault is in the *poor negative*. In your next paragraph, same page, "A secondary," &c., you say that the ready-sensitised papers now in the market are less heavily salted, and less strong silver bath used. Well, then, it is the fault of *the paper*.

Then further on, same page, paragraph, "It is difficult," &c., you say it is well known that the ready-sensitised paper yields more vigorous prints, &c. Well, then, the paper is no more at fault, but is even *a better medium*. Please make these three opinions agree. If my opinion is worth anything, and I speak from experience, I would say that ready-sensitised paper, for one somewhat accustomed to it, will, if the results be good, give a good tone, should when printing and before any other handling but if the colour is of a dirty look no good results of any kind can be obtained. This is so true, that I have already upon receipt of some paper returned some untoned prints, and the maker himself was unable to tone them right and obliged to acknowledge the poor quality *of the paper*. If the paper is really good, any tone can be obtained with even middling fair negatives, and if paper is about right watch your toning carefully and stop it when the print has a deep purple colour, and just before it turns to black, and prevent the granulated shadows which spoil all. I always tone with bichromate of soda and gold. However long, if this letter be of some use to you or readers, you can use it.—I am, yours, &c.,

Asnières, Paris, Dec. 1891. A. LEVY.

THE LANTERN EXPLOSION.

To the EDITOR.

SIR,—Our attention having been directed to an article on lantern explosions from pressure gauges, contained in the issue of your esteemed JOURNAL of the 11th inst., permit us, in the capacity of the largest makers of these gauges, to offer a word of protest against your sweeping condemnation of pressure gauges on the Bourdon principle applied in this connexion. The lamentable increase in the number of accidents, to which you draw public attention, is due to the extended use of many gauges of very inferior make, and which are insufficiently fitted, and you do an injustice by visiting upon gauge-makers generally the blame of those who foist these inferior and dangerous instruments upon an all-enduring public. We venture to assert that it is now possible to make these gauges absolutely safe under all circumstances, even when used indiscriminately in connexion with oxygen and hydrogen; and in support of this contention, we may say that we have not heard of a single case of accident with any of the thousand or two of gauges which we have supplied for this class of work since the gauges have been tested with water in place of oil; although we are aware that no particular precaution is exercised by users in the great majority of cases, and we even know instances where the same gauge is used on hydrogen and oxygen cylinders alternately, in frequent succession and many times every day, with perfect safety. The writer of your article falls into the mistake of supposing that "the Bourdon gauge, by whomsoever made, is, of necessity, formed of thin metal, and it is unable to withstand the very strong pressure," because, if correctly constructed, the tubes can be made of considerable thickness, that is, nearly one-sixteenth of an inch for an internal diameter of about a quarter of an inch, and the strength of these is greatly in excess of the cylinder itself. The tube in our own make of gauges for 120 atmospheres will safely stand 600 atmospheres without breaking, and a pressure of something like 900 atmospheres is required to burst them. There are, however, gauges made in which the tubes are recklessly thin, and of corresponding incorrect shape, and we have in our possession such an exploded gauge, in which the thickness of the tubes barely exceeds that of the paper on which this is written. In addition, many tubes are made of very indifferent material, and it is therefore not surprising that these failures should occur. Your word of caution should, however, not have been directed against these gauges generally, but rather against the inferior articles which are only too readily bought, especially by middle-men, on the temptation of a very trifling larger profit.

The liability of traces of oil remaining in the tubes has now also been entirely overcome; but even if oil were present, absolute immunity from danger is secured by the use of the very efficient check patented by the Manchester Oxygen Company, the action of which leaves nothing to be desired. So long as this check is kept in order, there need be no fear of a chemical explosion in the gauge tube; and if our loose flap back in the case of the gauge is fitted in combination with the check, no damage could result even if the tube itself should give way.

The new gauge patented by Suiter cannot, of course, lay claim to great accuracy, and is, moreover, awkward to read off; but, worse than this, this novelty is of itself yet another source of danger, because, if the piston should become accidentally released, if would shoot out like a bullet from a gun under this enormous pressure, and it might thus bring about worse dangers than the imaginary difficulties it was invented to overcome.

A thoroughly well-made pressure gauge with steel tubes bored and turned out of the solid steel of special best quality, and provided with a large flap valve in the back, and the Manchester Oxygen Company's check in the connexion, may be regarded as absolutely safe for all practical purposes, and could not possibly be surpassed for convenience of reading and accuracy of indication. In these respects the gauges now sold by the leading firms in the trade may be confidently trusted; but, at the same time, users cannot be too careful, and it is always advisable to apply some kind of test to a gauge, such as to notice whether the tube takes any "set" when the pressure is applied. This may be done without great difficulty as follows:—Remove the rim and glass and lift the pointer over the rest-pin. Mark the exact position of the pointer on the dial, and after subsequently leaving it under a pressure of, say, 120 atmospheres for some little time, release the pressure, and observe whether the pointer returns to the exact position which it occupied at the commencement. If there is no perceptible variation the gauge has not been strained, and one may rest assured that the tube employed is strong enough for its work. A convenient method of finding out whether the tube contains traces of oil consists in removing the check, and after admitting pressure to the gauge, gradually unscrew the gauge so as to suddenly blow off the pressure, when traces of any liquid contained in the tube will be blown out at the same time, and may be examined.—We are, yours, &c.,

SCHÄFFER & BUDENBERG.

1, *Southgate, Manchester, December* 16, 1891.

To the EDITOR.

SIR,—I have read with considerable interest your report upon the fatal gas-bag explosion at Ilkeston. In it there are some points which call for remark, and a number of questions are suggested by it that might lead to the discovery of the exact sequence of causes leading to the disaster.

The first thing to be noticed, in order of importance, is that the jets were not lighted and the optical arrangements completed before the audience was admitted. This is simply inexcusable. It is not only inartistic but miserably bad management to go through the necessary centering of discs and burners, and the balancing of lights, &c., while an audience is in the room, and no lanternist of taste or real experience would think of doing it. Let us look for a moment at a parallel case. What would be thought of a theatre manager who, five minutes before the time when the play should begin, rolled up his curtain and struck a match to light his footlights, &c., and then practised with his gas taps

until the performers came on? Inartistic!! and what does a lantern exhibition pretend to be unless an artistic performance?

It goes without saying that, if Mr. Scattergood had made a thorough working trial with his lantern before the admission of the audience, no such calamitous results could have been produced by the explosion. That both bags were black is not to be wondered at, seeing that many makers only make bags of black material, unless specially ordered otherwise, the mere stencilling of the letters O and H on the two bags being usually considered distinctive enough. It is about these bags that one could wish for more information, and I would propose the following questions:—(1), Were the bags empty before being filled for the first night's entertainment? (2), Who filled them, where were they filled, and when? (3), Were both bags quite full; if not, how much was there in the H bag and O bag respectively? (4), How much was there in each of the bags at the close of the entertainment? (5), Did any person assist at the refilling of either of the bags; and, if so, did that person remember noticing particularly the mark on the bag, or how much it contained? The facts already in our possession leave no room for doubt that a mixture of the gases had been made in the bag finally coupled to the lantern as the oxygen bag. It is not surprising to find that the light in the top lantern was satisfactory, and yet that when the O (?) was turned on to the lower lantern an explosion took place. In a mixed jet there is an explosive mixture in the horn of the jet and mixing chamber all the time the jet is in full action, and it is merely the rush of the gas through the nozzle which prevents the flame instantly flashing back and causing the jet to snap out. Under certain conditions this will happen constantly, to the chagrin of the operator. But, in case the flame should flash down the jet, it will usually travel as far as there is a continuity of a violently explosive mixture.

In a case like the present, when the oxygen bag was evidently charged with a mixture of the gases in almost exactly the proportions of their perfect chemical combination, the flash back would not be arrested until it reached the bag. How do I know that the gases were in this proportion? Simply by comparing the resulting wreckage with that caused by the explosion of about four and a half cubic feet of pure mixed H and O. produced by the electrolysis of water, the gases being, therefore, in the most perfectly explosive proportions. The wreck caused by this explosion was not as great as that produced by that at Ilkeston. This makes it very certain that the Ilkeston explosion was caused by a mixture in almost perfect combining proportions, especially since it is well known that, if these proportions are only slighty departed from, the resulting explosion is considerably enfeebled. In fact, coal gas may be mixed with a reasonable proportion of oxygen without producing a readily explosive mixture, but the flame of such a mixture will be noticeably whiter than that of pure coal gas if burned in air. I am sorry to find that this explosion has produced a distinct feeling of "unsafeness" in the minds of many people, and it is only due to both lanternists and public that the causes of this explosion should be thoroughly made clear if it is possible, and Mr. Scattergood can do a considerable service to both by giving every aid possible to the investigation.—I am, yours, &c., A. P. Okell.

Overley, Bowdon, December 1, 1891.

To the Editor.

Sir,—I think there ought to be a strict investigation by appointed experts into the late terrible lantern explosion at Ilkeston, that other operators may be benefited. I believe Mr. Scattergood would give all the assistance he could in such an inquiry.

From the published reports, everything seems to have been done in a proper manner, whereas a close examination might reveal the weak point.

I have been a public exhibitor over twenty-five years, and have at times had the light blown out as described with a slight explosion, resembling the snap of a pistol; at such times my hand, of course, has been on the oxygen tap, and the moment the light has been blown out I have closed the tap; in fact, the action has almost been simultaneous with the explosion. I have since ascertained that this occurs through a defective jet.

Has Mr. Scattergood ever cleaned his jets? If so, how? Another question which arises is, How was the lantern put out the preceding evening? Were all the jets at the lantern turned off first, or was it put out by closing the taps at the bags? How long have the bags been in use? and are the letters H and O very distinct, or partly worn out? Again, what length of rubber tubing is used from the bags to the lantern? and does Mr. Scattergood always use the same tube for the same bag, or sometimes one and sometimes the other? Has he a dissolver to the lantern? If so, were the tubes fron the jets to the dissolver taken off the preceding evening? Does he use blow-through (safety) jets? Were the bags amongst the audience, or were they in a space to themselves? Were the weights strapped on?

By an inspection of the apparatus on the spot a lot of little questions might arise which would throw light on the matter.—I am, yours, &c., J. R. F.

Conway, December 5, 1891.

A LINK WITH THE PAST.

To the Editor.

Sir,—In connexion with the early history of photography, it may interest some of your readers; as a link between the very earliest investigators and the present time, the following circumstances may be worth reproducing:—

Yesterday, Sunday, December 6, died at Newcastle-on-Tyne, aged seventy-three, Charles William Scheele, a resident there for fifty years, a worthy citizen, after only four days' illness.

The following paragraph, taken from the introductory remarks in the catalogue of the Liverpool Photographic Exhibition of 1891, explains itself, and I venture to ask you to give it to your readers:—

"We come now to 1777, when a brilliant genius appeared, Charles William Scheele, of Stralsund, in Swedish Pomerania; he was a distinguished investigator, and must be considered as one of the founders of modern chemistry. He made the first scientific investigation of the behaviour of silver chloride under the influence of light. First, he noticed the action of differently coloured light; that the silver salt was quickly darkened by violet or blue; then that red or yellow rays had much less effect; but Scheele also discovered the cause. These technical particulars I need not enter on. It is, however, the first leading principle of all photographic discovery. Scheele really obtained the first photograph ever produced by fixing a glass prism in his window, and allowing the refracted sunbeams to fall on paper prepared with a salt of silver. In performing his experiment, Scheele had no idea of the uses to which his discoveries have since been applied in the formation of photography. His sole idea was to demonstrate a principle existing in light.

"As a connecting link between this historical period and the present, a lineal descendent of Charles William Scheele, of Stralsund, bearing the same name in full, has been resident in Newcastle-on-Tyne for nearly half a century. He was also born in Stralsund, and is also engaged in the chemical industry. Two of his daughters are married, and resident in Cheshire."

—I am, yours, &c., Thos. S. Mayne.

Liverpool, December 7, 1891.

WHAT SYLVESTER PARRY DID WRITE.

To the Editor.

Sir,—In last week's Journal, "Cestrian" says: "Mr. Sylvester Parry. . . . . maligns the good people of Cheshire, when he *infers* they are so timid that they no longer go to lantern exhibitions, and if they do go they sit as far away from the lantern as possible."

If "Cestrian" had been accurate in his quotation from my letter, dated November 30th, he would, no doubt, have courageously attached his name. I had no intention to, neither have I in any way, maligned the "good people" of Cheshire or elsowhere, and as "Cestrian" is good enough to inform the readers of the Journal, that a *few* days ago (my letter is dated November 30) the small theatre of the Grosvenor Museum was crowded, the manipulator of the lantern working under difficulties, is a proof that my facts do not, and could not, apply to that institution. "Cestrian" makes two mistakes to which I draw his attention. First, he considers Chester *all* Cheshire—this is a great mistake; and, secondly, he "jumbles up" "inferences" with "facts;" the latter are stubborn realities.

What I did write was:—"The influence of this accident was extending [*i.e.*, not locally, but generally] to the detriment of lantern exhibitions, and who can wonder at the advice frequently given since to the 'little ones,' or those of 'older' growth, 'Don't sit near the lantern!' or the answer to an invitation, 'I don't care that much for a lantern picture to go near the place!' In two instances in this district (Cheshire) the audiences have dwindled down to nearly one-half since the accident."

I have perused with great interest, Mr. William Brooks's article on "The Limelight," and I quite agree with him, that before a person was allowed to exhibit the limelight in public, a certificate of competency ought to be possessed by the lanternist, obtained from a legally constituted source.—Yours, &c., Sylvester Parry.

Chester, December 19, 1891.

DOES THE LATENT IMAGE FADE BETWEEN EXPOSURE AND DEVELOPMENT?

To the Editor.

Sir,—In your editorial reference to my letter on the above subject, which appeared in your issue of the 11th inst., you point out that I did not furnish particulars of how and where the paper in question was stored between exposure and development; will you, therefore, now kindly allow me space to supply that omission, though I do not think the details will throw much further light on the subject?

The 12 × 18 papers were enclosed in one of the cylindrical cardboard cases in which the paper is sent out by the makers, the lid of which fits tightly, and the test paper put into a quarter-plate cardboard box. Both were locked in a drawer of an ordinary mahogany wardrobe, outside of which drawer the doors of the wardrobe close. The wardrobe is old enough to be free of suspicion of the emanations from the polish or varnish, and it is in a bedroom on the third floor, to the window of which I attach my enlarging camera.

No chemicals are kept either in the wardrobe or bedroom, and, during the time I wrote of, there was neither gas nor fire burned in the room, which is well ventilated.

The developer used was ferrous oxalate.

The autumn months were unusually wet, hence damp may have been a factor in destroying the latent image; but there were certainly no alternate damping and drying the paper.

You appear to think the fading due to chemical action, and probably you are right. You further suggest that it may have come from without, viz., from the surroundings of the paper; but, in view of the above facts, I hardly think that probable, but would be inclined to look for the cause either in the texture of the paper or in something left in or added to the emulsion during its preparation. JOHN LEISK.

Lerwick, December 19, 1891.

BLACK OR PURPLE TONES.

To the EDITOR.

SIR,—You will pardon me if I do not quite agree with your paragraph on the subject in a former issue.

By using the green glass printing and the uranium toning bath, as shown in the enclosed, either black or purple can be obtained with the greatest ease on matt or albumenised paper, and with any negative, thin, dense, flat, or vigorous, that deserves the name of negative.

As to the paper, I venture to say that you are equally mistaken. The strength of the sensitising baths is now just the same as in the happy "olden times," only the paper which is made preservative must of necessity be less vigorous than paper floated on the ordinary silver bath. Nevertheless, the amount of silver in the preservative paper is greater than in the paper sensitised on a very strong bath in the ordinary way.

It seems that many of the old school still adhere to the belief that, the stronger the silver bath, the better the result. This is not so. Any bath above twelve per cent. only adds to the probability of blistering with albumenised papers; and with the stronger bath far less silver penetrates into the paper (or rather below the surface) than with the weaker bath of from ten to twelve per cent. The strong silver bath coagulates the albumen so rapidly that the surface is rendered impenetrable, and the sheet consequently receives less silver on a strong bath than on the weaker one.

I have made these experiments on a large scale with all kinds of albumenised papers, and at various periods with solutions of from ten to thirty per cent. with the same result in each case. I therefore purposely use the baths of the strength before mentioned, as I find that for my purposes, and with my preserving process, a stronger bath only produces bad results.—I am, yours, &c., OTTO SCHÖLZIG.

31, *Binfield-road, Clapham-road, S.W.*

OXYHYDROGEN EXPLOSIONS.

To the EDITOR.

SIR,—Would you kindly allow me space to point out the possible cause of the late and other explosions of the oxygen and hydrogen gases when stored in, and being used from, bags? Firstly, it is a well-known fact that a weight, say a hundred pounds, exercises a stronger pressure on the burning gas when the bag is full than it does when the bag is nearly empty.

Secondly, it is likewise a well-known fact that when two vessels are coupled together, the one vessel more strongly pressed than the other, that the steam, gas, or liquid will leave that vessel and go into the other, until the pressure in them both is equal.

Thirdly, it is likewise well known that the two gases are not burned at the same rate, that is if pure hydrogen is used, the combining proportions being two to one of oxygen, or if coal gas is used, then their proportions are just reversed, so that in the former case, if both bags are full at starting, the hydrogen one will get empty in half of the time of the oxygen one, and consequently lose pressure in the same ratio, and allow the oxygen to get mixed up with it.

The mixing chamber at the root of the jet is quite sufficient for that purpose. And besides the inequality of pressure, the tendency of gases to mix produces these undesirable conditions; and another cause is the bags very soon get leaky, and allows the contents to escape and the common air to take its place, so that here we have an explosion ready prepared, and the only thing that prevents it from taking place is the fact that the gases are pressed out as quickly as they are consumed. But let the pressure-boards be placed too near a wall, form, or chair, or other obstacle to their downward progress, then the gases would not be pressed out with sufficient speed, the flame would burn back and explode, so that to burn the oxygen and hydrogen from bags is a very unwise proceeding, and the man who entices people into a hall for the purpose of getting the'r money to pay parties 750*l.* a year, but pretending to the people that it is all for the good of their "Black Brodders," without letting them know the danger they are exposed to, cannot be held to be free from a grave responsibility.

The limelight can be produced in its greatest intensity, absolutely free of danger, at from one-eighth of an inch to one hundred inches water pressure, purer and cheaper than can be used from bags, and yet people will stick to the latter, maiming and destroying their fellow-creatures with legal impunity. Government should step in, and prevent the use of bags, as there can be no doubt they are a dangerous apparatus.—I am, yours, &c., WILLIAM BIRRELL.

115, *Graham-street, Airdrie, December* 1, 1891.

PERSPECTIVE AND THE PHOTOGRAPH.

To the EDITOR.

SIR,—Although possibly you may not feel disposed to insert this letter in your JOURNAL, still, on the chance of your finding it a place, would venture to say that it was somewhat rash on my part (being an outsider) to have touched on the article in question at all; but, as my letters have called forth somewhat contemptuous (if not malicious) criticism, it has been a lesson not yet to be forgotten.

After nearly thirty years spent in hard work as drawing-master, and some practice as colourist to the profession, it is not edifying to be advised by your correspondent, Mr. Bolas, to attend a Board school, or an art class, as a beginner. This gentleman's epistle is undoubtedly smart, but I observe that he, with other correspondents under this heading, since my attempts at literature, have carefully abstained from touching too closely on the points in question.

Perspective, as a study, is most fascinating, though strictly technical and scientific, its principles few, and theories simple; so simple in fact, that the subject does not admit of discussion. No one can dispute that we get our vertical from the plumb-line, and the horizontal from the surface of still water, or that black is black, and white white.

There are so few professions or trades having to do with the representation, pictorially or otherwise, of forms, solids, or ornamentation, that can flourish without drawing and perspective. In ignoring the latter, I think photographers stand almost alone; personally, I have met but few who possess more knowledge of the subject than can be obtained by reading a shilling book. My idea in suggesting their taking it up among themselves was, that they would thus avoid what would be objectionable to some, namely the attendance at schools of art and *beginning*, as they must, in the company of boys and girls, of twelve or thirteen years.

It is my intention, Mr. Editor, if possible, to start a perspective class at no distant date, limited as to number, and strictly confined to my patrons, the professional photographers in London, and of which I shall give due notice by advertisement.—I am, yours, &c., HENRY FLATHER.

15, *Huntriss-row, Scarborough, December*, 1891.

To the EDITOR.

SIR,—As one who has been through the mill at South Kensington (Science and Art Department) and obtained the two certificates for perspective, second and third grade, first class, teaching the subject, and whose occupation is that of draughtsman, I feel competent and fully justified in saying that I read Mr. Flather's letters fully intent on picking a hole in them, and I am bound in justice to admit that there is not an error in either one. All he says is technically and practically correct, and, in my opinion, the items are as clearly expressed as is possible, taking into consideration the compression necessary in three short letters, and the absence of the usual blackboard and chalk, and I feel it incumbent on me to proffer what little support I can to his efforts. That Mr. Flather's letters should bring some rather heated, gaseous, and cutting replies, is natural where the matter is not understood, and, having read, pass them without comment, excepting the remarks from our friend "Free Lance," in his *On Things in General*, in last week's issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, wherein he spreads himself out nobly, and, I think, deserves a front place among your contributors. Allow me to quote him: "Mr. Flather is no student of perspective . . . or he would not speak of a plane behind the picture plane." Ahem! I think, Sir, this is a fine example of the modesty of true genius.—I am, yours, &c.,

T. H. DE PUFFEY.

8, *Aberdeen-terrace, Scarborough, December* 14, 1891.

[All sides having been fully heard, we here close this correspondence.—ED.]

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—December 31, *Warm Tones in Lantern Slides.* January 7, paper by Mr. P. H. Newman, on *Some Recent Exhibitions.* Visitors are invited.

Exchange Column.

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

Will exchange 12×10 Eclipse camera and lens for lantern, slides, and sheet.—Address, ROBINSON, 1, St. Mary-place, Castlegate, Berwick.

Wanted, 10×8 studio camera with single or double slides and bellows body complete, in exchange for oil paintings, portraits, animal or landscape subjects.—Address, N. P. C., 5, Cobden-chambers, Pelham-street, Nottingham.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

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

PHOTOGRAPHS REGISTERED:

Thomas Bourke, Perth, N.B.—*Two portraits of the Right Rev. James Smith, Bishop of Dunkeld.*

HENRY COOPER.—Yes, with thanks.

CONRAD BECK.—Received. Next week.

R. J. wants to know if the collotype process is patented.—No.

RALPH L. LEGG.—Use orthochromatic plates for copying oil-colour pictures.

C. WILCHER.—Any good white starch will answer quite as well as a mountant.

G. F.—The amount of pure gold in half a sovereign is about fifty-seven grains.

W. J. FERGUSSON.—Better address the Secretary of the Paisley Society. We did not receive the report.

E. A. W.—The three formulæ about which you inquire will be found in the ALMANAC. All can be relied upon.

E. SCAMELL.—M. Wolfe, of Dayton, Ohio, U.S.A., supplies screen plates. Probably he will send you his list of terms.

PRINTER.—You will find the probable cause of the spots on your prints set forth in our article of a fortnight ago.

CHERUB.—The print forwarded is by the Woodburytype process. In a sense, that is a carbon process, but is certainly not what is understood as "the carbon process." It is a good print, nevertheless.

A. JONES.—Having carefully examined the negatives, we have concluded that the differences in density must be due to uneven coating of the films. From the data furnished, we can assign no other cause.

B. E. BENTON.—If the condenser is eight and a half inches in diameter, it should perfectly illuminate a half-plate negative. Is the light properly centred, and is it the right distance from it? We suspect not.

J. MARTYN.—We are quite familiar with the methods of the individual you name, which we have long endeavoured, by all the means in our power, to reform. Communicate with the local Superintendent of Police.

MR. W. LEACH reminds us, *apropos* of the late micro-projection controversy, that when excising a portion of his letter we deleted with it a correction of a printer's error, the word Cambium having been printed Cambrian.

PASTEL.—The thing is a fraud. We referred to it a few weeks ago. No readers of the JOURNAL would be foolish enough to part with their money for such promises, hence your kindly warning is unnecessary. Thanks, nevertheless.

W. C. W.—The cause of the "metallic-like appearance" round the edges of the plates is that they are stale. If they were a recent purchase, you would be justified in returning them from whence they came. This would not be the case, however, if you have had them some months in stock.

ENAMELLER asks why it is that enamel collodion has such a different smell from that supplied for the wet-collodion process? He adds, the iodising salts have no smell.—The difference is this: Collodion for negatives is made with unmethylated alcohol, while enamel collodion is made with the methylated article.

S. A.—If, as you say, the chocolate colour comes off the mounts when they are moistened, there need be no wonder that they stain vignettes mounted upon them. The only way to remedy the evil will be to mount a piece of pure white paper upon them, and then mount the prints on that. If the work be neatly done, the paper will not show.

A. WALTERS.—"White Hard" varnish, diluted with methylated spirit, is a good varnish for negatives. But "brown hard," similarly diluted, is much better, because it forms a tougher and harder film, and is consequently a better protection to the negative. It is slightly darker in colour than the former, but this may be disregarded in the very thin film.

W. S. says: "Will you please tell us what solution we can use for unmounted prints—to keep them flat after they have been printed and toned—to immerse them in?"—We know of no solution that would be safe to use. A mixture of glycerine and water (the former in very small proportion) would prevent the prints from becoming abnormally, and so avoid the curling. But in damp weather they would be liable to absorb moisture, and that would be conducive to fading.

W. W. RANDALL writes: "In Mr. R. Hitchcock's article on 'Development,' published in your JOURNAL for November 20, I find the following: 'The function of the first (*i.e.*, pyrogallol, &c.) is to reduce or decompose the silver compound in the gelatine film. . . . . *But this decomposition only takes place when the alkali is present.*' The italics are mine. Surely Mr. Hitchcock made a slip when he wrote the italicised sentence. It is perfectly possible to develop a plate with a solution of pyro only. I did it; strength, two grains to the ounce, Schering's pyro. Subjects, instantaneous marine and landscape views. The plates took about ten hours to develop, and were badly stained, but print all right."

J. C. MELTON writes: "I am using a four-wick lamp in my lantern, and it gives quite sufficient light for a small screen such as I have. The only fault with it (the lamp) is that it gives off a most unpleasant smell, that pervades the whole house while it is alight. Only the best 'water white oil' is ever used. Can you suggest anything that can be done to prevent this unpleasantness?"—The only thing we can suggest is to keep the wicks neatly trimmed, and the lamp scrupulously clean. Bear in mind that however perfectly the lamp may be cleaned, if it be allowed to remain an hour or two before it is lighted, it is necessary to carefully wipe it again, as the oil will creep up the wick tubes and down the sides. In nine cases out of ten it is the oil that is on the outside of the lamps and wick tubes that causes the smell.

BEGINNER writes: "Would you kindly answer me the following questions? Having started enlarging recently, I find a great difficulty in getting my enlargements sharp all over; for instance, in making a 23×18 enlargement from a cabinet full length by daylight, if I focus for the head the feet would would be very indistinct, and *vice versâ*; and in some cases the top is completely vignetted. I usually enlarge with the lens that takes the portrait, and have the following lenses, if you would suggest which would be the best to use:—a Ross's cabinet, and rapid symmetrical rectilinear (12×10), and a large panel lens. Of course, when the lens is stopped down, it is not so bad; but should not I get it as sharp in one place as another, the negative, lens, and picture being on the same level?"—Evidently the lens used has too round a field, and is probably of too short a focus for the purpose. Try the Ross cabinet lens, and, if this does not answer, use a lens of still longer focus. As a rule, professional enlargers employ lenses equal to taking a negative a size or two larger than that to be enlarged from.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.—The following awards, consisting of bronze medals, have been made at the Exhibition of the Society of Amateur Photographers of New York, held at the American Institute Fair. The Judges were Messrs. William Kurtz, Frank La Marma, and Henry A. Ferguson—a professional and an amateur photographer, and an artist. Landscape (superiority), frames Nos. 38, 39, 46, 52, 53w: H. M. Grisdale. Landscape (excellence), frame No. 220: Alfred Stieglitz. Landscape (merit), frames Nos. 147, 164, 166: Hugo S. Mack. Marines (superiority), frames Nos. 79, 87, 102, 103: Charles Wager Hull. Marines (excellence), frame No. 188: Ferdinand Ruppert. Portraits (superiority), frame No. 28 B D Z: Charles H. Davis. Instantaneous (merit), frame No. 273 P and Y: G. W. Wundrum. Enlargements (superiority), frame No. 110: L. H. Laudy. Enlargements (excellence), frame No. 11: Louis T. Brush. Enlargements (merit), frame No. 21: J. S. Converse. Genre (superiority), frames Nos. 17 and 18: Miss Emilie V. Clarkson. Interiors (excellence), frame No. 263: Fred. Vilmar. The Judges also recommended for honourable mention Frames 120–139 (examples of different methods of sensitising and toning upon various papers): Edward Leaming. Frame No. 205: A. L. Simpson. Frames Nos. 94, 95, 96 (cloud effects): Charles Wager Hull. A Hetherington magazine camera was awarded to Charles Wager Hull by popular vote.

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